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Notes on bird breeding activity in a lowland forest in south-west Brazilian Amazonia

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SUMMARY.—We present data pertaining to the nesting of 12 species of forest birds, based on opportunistic observations made between April and November 2018 in Humaitá Forest Reserve, Acre, in south-west Brazilian Amazonia. For some of these species, knowledge of their reproduction is still little known, e.g. Blue-tailed Emerald *Chlorostilbon mellisugus*, White-shouldered Antshrike *Thamnophilus aethiops*, Black-spotted Bare-eye *Phlegopsis nigromaculata* and Pink-throated Becard *Pachyramphus minor*. The data presented here help to fill gaps in the reproductive biology of these species in an ornithologically poorly known region.

Understanding of the breeding biology of birds is necessary to inform successful conservation programmes, as well as to guide studies of ecology and evolution (Martin 2004). Although study of the biology of Neotropical birds has been increasing, there is still a great gap of knowledge, especially for species in Amazonia (del Hoyo *et al.* 2019). For many bird species in Amazonian Brazil, especially those with restricted geographic ranges or that are specialists of a specific habitat type, basic information concerning their reproduction is still unknown (del Hoyo *et al.* 2019). Here, we contribute novel data regarding the breeding of several Amazonian birds based on opportunistic observations made in a forest fragment in eastern Acre, Brazil.

Methods

Study area.—Humaitá Forest Reserve (HFR) (09°45'19"S, 67°40'18"W) is a forest fragment of approximately 2,000 ha administered by the Federal University of Acre, in the municipality of Porto Acre, south-west Brazilian Amazonia. The fragment comprises relatively open *terra firme* forest containing patches dominated by *Guadua* bamboos, and alluvial *várzea* forest (Acre 2010, IBGE 2012). Mean annual minimum and max. temperatures are *c.*24 to 26°C, respectively (Alvares *et al.* 2013). Mean annual rainfall is *c.*1,900 mm. The wet season extends from October to April, and the dry period from May to September (Duarte 2006).

Field work.—We made opportunistic observations of bird breeding behaviour between April and November 2018 usually using binoculars and, in some cases, documenting it photographically. Some of the nests found under construction, or with eggs or nestlings, were revisited to observe if they were still active. Estimates of height of nests above ground was made visually. When nests became inactive we collected the most accessible ones and took the following measurements: external height, depth of cup, external and internal diameter, wall thickness and mass, using digital callipers (accurate to 0.01 mm) and a digital scale (0.05 g), and these tools were also used to assess the size of some eggs. Nests collected were deposited in the collection of the Laboratory of Ornithology at the Federal University of Acre. We follow the species-level taxonomy and nomenclature of Gill & Donsker (2019). The description of types of nests follows the proposals for standardisation made by Simon & Pacheco (2005).

Species accounts

During the eight-month period, we observed 16 breeding events pertaining to 12 different species in HFR. Details follow.

RUDDY QUAIL-DOVE *Geotrygon montana*

On 21 April we found a nest with an adult incubating. It was constructed of dry leaves and some sticks. The nest was of the simple / platform type and was sited in the fork of a plant c.1.5 m above ground. The nest contained two all-white eggs (Fig. 1A). We did not revisit this nest subsequently. Another nest of this species in eastern Acre was found in Chico Mendes Extractive Reserve on 29 October 2011 by M. A. Freitas (<http://www.wikiaves.com/800524>). Our record coincides with the period in which the species is nestbuilding in the understory of primary forest in southern Costa Rica (Skutch 1949). In central Amazonia, Stouffer & Bierregaard (1993) demonstrated that this species' abundance around Manaus is correlated to rainfall (annual peak in January–April) during the breeding season. Our nest was similar to those found by Skutch (1949) in Costa Rica, Stratford (2004) in central Amazonia, Greeney *et al.* (2004) and Cadena-Ortiz & Buitrón-Jurado (2015) in Ecuador, and Raine (2007) in south-east Peru.

OCELLATED POORWILL *Nyctiphrynus ocellatus*

On 22 August JML observed a female (Fig. 1B) and a nestling (Fig. 1C) on dry leaves beside a trail. As he approached the nestling, the female performed a distraction display, walking on the ground with its wings lowered and uttering an alarm vocalisation. Other nest records in Acre are in August–September (T. N. Melo, <http://www.wikiaves.com/1456885>; R. A. Plácido, <http://www.wikiaves.com/2260246>; E. Guilherme, <http://www.wikiaves.com/2693387>; D. P. Guimarães, <http://www.wikiaves.com/2862455>). Kirwan (2009) found a nest of this species in August in Mato Grosso. For South America as a whole, Robbins & Ridgely (1992) suggested that breeding is likely to occur in July–September. However, Raine (2007) reported finding an egg in September and a nestling in November, in Madre de Dios, south-east Peru. Anderson (2000) found that Ocellated Poorwill prefers to nest close to trails in the forest and in open areas, as was also true of the observation reported here.

PAURAUQUE *Nyctidromus albicollis*

On 7 June and 1 August we found two nests on the forest floor. One had two eggs laid at the edge of a trail, while the other involved a single egg laid on dry leaves at the edge of the forest near the reserve buildings (Fig. 1D). The latter was predated a few days later and the first nest was not visited subsequently. The eggs were coloured beige with pale pink spots (Fig. 1E). In Acre, nest records of this species are in August–October (E. Guilherme; <http://www.wikiaves.com/1434453>, <http://www.wikiaves.com/2332636>). Oniki & Willis (1982) reported that the species breeds between May and December in central Amazonia. Kirwan (2009) recorded a nest with eggs in north-east Peru at the end of September and in the Atlantic Forest he found eggs and nestlings between September and February. Further, Alvarenga (1999) reported nesting in October and November in the Taubaté region of São Paulo state, also in the Atlantic Forest.

BLUE-TAILED EMERALD *Chlorostilbon mellisugus*

On 1 June JML found an incomplete nest (Fig. 1F) c.4 m above ground, over a small dry watercourse. He observed a female carrying material to the nest, which was constructed of tiny twigs, dry leaves and fibres on the outside. On the day of the observation he noticed



Figure 1. Breeding records of birds in Humaitá Forest Reserve, Porto Acre, Acre state, south-west Amazonian Brazil: (A) eggs of Ruddy Quail-dove *Geotrygon montana*; (B–C) female Ocellated Poorwill *Nyctiphrynus ocellatus* and nestling; (D–E) adult Pauraque *Nyctidromus albicollis* and egg; (F) female Blue-tailed Emerald *Chlorostilbon mellisugus* on nest; (G) female Little Woodpecker *Veniliornis passerinus* nestbuilding; and (H) nest and eggs of Plain-throated Antwren *Isleria hauxwelli* (A–C and F: Jônatas M. Lima; D, E, G and H: David P. Guimarães)

that the female was completing the nest. The nest was of the high cup / side type and was attached to a vertical branch (Fig. 1F). In northern Amazonia, F. D. Oliveira (<http://www.wikiaves.com/3134129>) found an active nest on 5 September 2018, differing only in that the external material lacked any dry leaves in the wall. In Venezuela, Thomas (1994) observed a cup-shaped nest with two eggs on 23 December 1982. It too was constructed by the female alone. Use of dry leaves on the outside of the nest has also been observed for Glittering-bellied Emerald *C. lucidus* in the Atlantic Forest of Minas Gerais (Lopes *et al.* 2013).

LITTLE WOODPECKER *Veniliornis passerinus*

On 26 April DPG observed a female building in a dead branch of a tree in forest dominated by *Guadua* bamboo, for >5 minutes (Fig. 1G). The female remained pecking at the edges of the opening and seemed to increase the size of the entrance to the nest. This species' breeding biology is still little known. Gussoni *et al.* (2009), found an active nest in the cavity of a Chinaberry tree *Melia azedarach* (Meliaceae) on 5 May in south-east Brazil. That nest had a vertical tunnel, apparently in the same form as the nest reported here.

PLAIN-THROATED ANTWRN *Iseria hauxwelli*

On 29 October DPG found a nest c.0.5 m above ground on a small shrub in forest (Fig. 1H). The nest was the low cup / fork form, constructed entirely of dry and thin malleable twigs. It contained two eggs, which were pale brown and covered with spots concentrated at the larger end (Fig. 1H). On the day of discovery, the male was incubating. When we revisited the nest a few days later, the eggs were no longer present. The nest was collected and measured as follows: external height and depth of cup 40 and 30 mm, respectively; external and internal diameter 68 and 40 mm, respectively; wall thickness 12.05 mm; and mass 3.54 g. The nest size, composition and support resembled nests of Leaden Antwren *Myrmotherula assimilis* in central-west Amazonia (Leite *et al.* 2016), and those of other *Myrmotherula* such as Amazonian Streaked Antwren *M. multostriata* and Cherrie's Antwren *M. cherriei* (Sick 1997, Chaparro-Herrera & Ruiz-Ovalle 2014).

WHITE-SHOULDERED ANTSHRIKE *Thamnophilus aethiops*

On 23 April we recorded two active nests both containing two eggs. They were constructed of fine twigs, small dry leaves, moss and rhizomorphic fungi on the outside (Fig. 2A). The nests were of the low cup / fork type and were inserted into the fork of support plants. Both nests were c.0.5 m above ground. One was at the edge of a trail 3 m from a treefall gap. The eggs were white with brown spots concentrated at the larger end (Fig. 2C). We sporadically followed one of these nests. Both sexes incubated (Fig. 2B). On 27 April at 08.45 h, the female was incubating and at c.12.40 h the male was doing so. On 12 May at 13.15 h, the male was again incubating and two hours later the female took over. After 12 May, we did not notice the pair at the nest and we verified that it had been abandoned. Both nests were collected and their mean measurements were as follows: external height and depth of cup 56 and 53.5 mm (SD = 0.14 and 0.77), respectively; external and internal diameter 72 and 55 mm (SD = 0.72 and 1.41), respectively; wall thickness 14.97 mm (SD = 0.10) and mass 6.68 g (SD = 0.16). The species' breeding biology is poorly known. In Brazil, nests of *T. a. incertus* have been found in October, November and February, a nest of *T. a. punctuliger* in July and one of *T. a. polionotus* in September (Zimmer & Isler 2019). On 10 September 2014, T. N. Melo (<http://www.wikiaves.com/1462017>) documented a female incubating two eggs at the edge of a track in HFR. The characteristics of the nest, colour and shape of the eggs, and parental care by both sexes are similar to those of other species of *Thamnophilus*, not only in Amazonia



Figure 2. Breeding records of birds in Humaitá Forest Reserve, Porto Acre, Acre state, south-west Amazonian Brazil: (A–C) nest, male and eggs of White-shouldered Antshrike *Thamnophilus aethiops*; (D–F) nest, eggs and nestling of Black-spotted Bare-eye *Phlegopsis nigromaculata*; (G–H) nest of Ruddy-tailed Flycatcher *Terenotriccus erythrus* and adult carrying nesting material; (I) female Pink-throated Becard *Pachyramphus minor* perched above nest; (J) nest of Olive Oropendola *Psarocolius bifasciatus*; (K) female Silver-beaked Tanager *Ramphocelus carbo* with nesting material (B, C, G, H and J: Jônatas M. Lima; A, D–F, I and K: David P. Guimarães)

but also in the Atlantic Forest and Panama (Skutch 1984, Raine 2007, Zyskowski 2008, Silva & Carmo 2015).

BLACK-SPOTTED BARE-EYE *Phlegopsis nigromaculata*

On 11 November JML found an active nest with two eggs in the cavity of a dead tree trunk with an opening c.1 m above ground (Fig. 2D). The base of the nest was 13 cm wide and 20 cm from the entrance. The nest had the shape of a small shallow 'basket' of dried bamboo leaves (*Guadua* sp.) and fine twigs. The eggs were stained dark pink with predominantly purple linear markings (Fig. 2E) and the following dimensions: 25.4 × 20.05 mm and 25.4 × 20.5 mm, mass 5.2 and 5.6 g, respectively. After 15 days, we observed just one nestling c.2 days old (Fig. 2F). The nestling, still with its eyes closed, had completely dark naked skin and whitish labial commissures. After four days we found the nestling dead in the nest and covered by ants. Also in Acre, on 30 May 2007 E. Guilherme (<http://www.wikiaves.com/802797>) documented a nest with two eggs in a cavity at the base of a dead palm (*cf. Attalea* sp.) with the same characteristics as that we found in HFR, that reported by Leite *et al.* (2018) in eastern Amazonia, in late January, and the nest found in a bamboo stalk by Raine (2007) at Tambopata, Peru, on 20 March 2001. Our nest is also similar to those found in northern Amazonia (Cadena *et al.* 2000, Hill & Greeney 2000) and the eggs resembled those reported by Cadena *et al.* (2000) in Colombia, by Hill & Greeney (2000) in Ecuador, and by Leite *et al.* (2018). The dark skin and whitish labial commissure of the nestling match the report by Cadena *et al.* (2000).

RUDDY-TAILED FLYCATCHER *Terenotriccus erythrurus*

On 7 August JML found a nest being completed beside a trail (Fig. 2G). Nearby, he observed an individual with material in its bill (Fig. 2H). The nest was closed, constructed of soft fibres, and suspended from the branch of a supporting plant c.1.7 m above ground. We did not collect or subsequently follow the nest's progress. Also in eastern Acre, T. N. Melo (<http://www.wikiaves.com/1821127>) photographed an adult carrying nesting material on 26 August 2015. The nest was spherical and was sited on a palm frond c.1.5 m above ground. Ruddy-tailed Flycatcher nest records date from September and November in Pará and Rondônia, respectively (Kirwan 2009). In Costa Rica, the species' breeding season extends from March to May (Stiles & Skutch 1989). Our record in HFR coincides with the season reported by Hilty & Brown (1986) in north-west Colombia, from February to August. The nest in HFR was similar to Skutch's (1960) description from Panama, where he found nests 1.5–4.0 m above ground between March and May.

PINK-THROATED BECARD *Pachyramphus minor*

On 18 October DPG found an active nest constructed at the tip of a branch 10 m above ground (Fig. 2I). The nest was bound with fibres at the attachment with the supporting tree, constructed of coarser fibres and was of the closed / retort / pensile type (Fig. 2I). The pair was constantly visiting the nest, possibly feeding young. In central Amazonia, on 3 March 2014, R. E. Czaban (<http://www.wikiaves.com/1276432>) recorded a pair constructing a nest c.10 m above ground in an isolated tree.

OLIVE OROPENDOLA *Psarocolius bifasciatus*

On May 26 JML observed an adult feeding a young. At the site, there were at least three closed / retort / pensile nests suspended from branches c.25 m above ground (Fig. 2J) on an emergent tree, in forest dominated by bamboos. In Acre, L. M. Brito (<http://www.wikiaves.com/2280810>) recorded a male building a nest on 10 September 2016. The nests of Olive Oropendola can reach 2 m long (Sick 1997). According to Baksh (2012), nesting in the canopy and colony organisation increase security in the breeding season.

SILVER-BEAKED TANAGER *Ramphocelus carbo*

On 28 September DPG photographed a female carrying material (Fig. 2K) to a nest concealed in bushes c.1.5 m above ground in an open area with human activity near the reserve buildings. E. P. Lima (<http://www.wikiaves.com/228509>) and A. Machado (<http://www.wikiaves.com/2398499>) recorded nests each with two eggs on 8 September 2010 and 15 December 2015, in Acre and Rondônia, respectively. Lopes *et al.* (2013) found nests on 20 and 22 September in eastern Amazonia. Sick (1997) reported that the female builds in dense shrubs as we observed in HFR. The height of the nest in HFR accords with the reports by Osuna (2017) and Lopes *et al.* (2013) who found nests between 0.6 and 2.5 m above ground. This species is well adapted to open environments and human activity, and will nest in urban areas and use non-native plants (Almeida *et al.* 2012).

The available records are still insufficient to accurately determine the seasonality and duration of the breeding period of the species listed. However, they are represent initial data that help to fill gaps in our knowledge for these species in Amazonia.

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