

# The first described nests of Black-bellied Cuckoo *Piaya melanogaster*, from French Guiana

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Received 9 July 2014

**SUMMARY.**—Although widespread throughout Amazonia, little is known of the breeding biology of Black-bellied Cuckoo *Piaya melanogaster* and its nest has not been described. We found two nests in French Guiana, both with two nestlings. The open, cup-shaped nests were constructed with twigs, pieces of vine and dead leaves within dense tangles of vines. The nestlings were mainly fed hairy caterpillars and, to a lesser extent, other arthropods. Our observations suggest that the species' breeding biology is similar to that of the closely related and better-known Squirrel Cuckoo *P. cayana*.

The non-parasitic cuckoos of the genus *Piaya*, Squirrel Cuckoo *P. cayana* and Black-bellied Cuckoo *P. melanogaster*, are widespread over most of the New World tropics. They possess discreet behaviour, moving furtively through the forest canopy or other tall vegetation, and are easily overlooked. They feed on a variety of arthropods, most frequently on hairy, noxious caterpillars. Of the two *Piaya*, only the breeding biology of the Squirrel Cuckoo is more or less known. Its open cup-shaped nest of twigs and sticks is constructed in a tangle of lianas or vines, in dense shrubbery or in overgrown trees. Clutch size is two, rarely three, white eggs (Payne 1997, 2005, Erritzøe *et al.* 2012).

Black-bellied Cuckoo occurs in eastern Venezuela, south-eastern Colombia, the Guianas, eastern Ecuador, eastern Peru, northern Bolivia, and from Pará, Amapá and across Brazilian Amazonia to northern Mato Grosso. It mainly occupies the canopy and subcanopy of *terra firme* forest and low forest on sandy soil, although it is occasionally observed at forest borders and in shrubby vegetation away from forest, or in savanna woodland. It is generally thought to be uncommon, but its secretive behaviour makes it difficult to observe, and the species is the least known of the *Piaya* cuckoos, while its nest remains undescribed (Payne 1997, 2005, Erritzøe *et al.* 2012). In French Guiana, the species is confined to the country's interior forests, where it is rather common, and it is absent from the littoral (Tostain *et al.* 1992). Only one breeding record for Black-bellied Cuckoo is mentioned in the literature. In late July 1989, adults attending a nest with nestlings were observed along the piste de Saint-Elie (c.05°17'N, 53°03'W) in French Guiana, but no details are known (Tostain *et al.* 1992). We report here on two nests of Black-bellied Cuckoo also found in French Guiana.

## Methods

The site of the two nests was an islet forming part of the Saut Mapaou, a rapid on the Approuague River (04°12'N, 52°18'W). The distance between the island and the riverbank on one side was c.10 m. On this bank, MF owns a clearing of c.0.5 ha with a shelter, which he visits at irregular intervals. The islet has a surface area of approximately 10 × 5 m and is completely covered by vegetation, with a tall tree, c.12 m high. The first nest was constructed in the tree and was observed for a total of approximately 12 hours from a distance of c.3 m by MF between c.07.00 h and 12.00 h during the mornings of 16 and 17 August, and between c.14.00 h and 16.00 h during the afternoon of 16 August 2013. The

second nest was constructed in the same tree, but was only visited briefly on 11 November 2013 to check the contents.

## Results

On 15 August 2013, the attention of MF was drawn by Black-bellied Cuckoos flying to and fro between the riverbank and the islet in the rapid. On searching the islet, MF discovered the birds' open, cup-shaped nest *c.*8 m above ground in a dense tangle of vines around a fork at the tip of a horizontal branch (Fig. 1). It was constructed of twigs, pieces of dry vine and dead leaves, and resembled suspended litter, which made it difficult to locate the nest from below. The external diameter and the total height of the nest were *c.*25 cm and 10 cm, respectively. It contained two nestlings, approximately  $8 \pm 2$  days old (Fig. 2).

The adult cuckoos were not shy. They continued their provisioning activities in a normal way when MF was sitting in the tree. By day, they brought food to the nest approximately every 45 minutes. However, from sunrise (at *c.*06.20 h) to *c.*09.00 h and from *c.*17.00 h to sunset around 18.30 h, provisioning was much more frequent, with intervals between feedings of just 10–15 minutes.

All foraging occurred in the canopy of trees on the mainland. An adult with prey always arrived on the islet and then at the nest in the same way. On arriving at the riverbank, it first perched for several minutes in the vegetation, observing the surroundings before flying to the islet (Fernandez & Ingels 2014). There, the adult hopped up through the vines to the nest. It always arrived from below, never from above, and always via the same route. On departing the nest, the adult flew off directly or hopped to a nearby vine and then flew to the riverbank.

Just prior to arriving at the nest, an adult with prey would utter a few soft calls to which the nestlings would respond with begging calls. These loud begging calls could be heard on the riverbank *i.e.* from a distance of *c.*12 m. Transfer of prey and occasional removal of a faecal sac occupied <1 minute, following which the adult immediately departed. In the first hour or so after dawn, when feeding rates were most intense, faecal sacs were removed during each provisioning, three during the first morning and four the second morning. During the day when provisioning was infrequent, faecal sacs were removed less often.

The inside of the gape of the nestlings was bright red and the palate showed small white knobs (Fig. 3). The nestlings were mainly fed hairy caterpillars and, to a lesser extent, with grasshoppers, crickets and other arthropods (Fernandez & Ingels 2014). Caterpillars brought to the nest included *Automeris illustris* (Fig. 4), *A. hamata* and *A. liberia*, also a *Dirphia* sp. probably *tarquinia* (Hemileucinae, Saturniidae) and *Amphonyx duponchel* (Sphinginae, Sphingidae). Other prey included grasshoppers, crickets (Gryllidae), bush crickets (katydids, probably Pseudophyllinae, Tettigoniidae) and cicadas (Cicadidae), as well as wandering spiders, probably a *Phoneutria* sp. (Ctenidae). All caterpillars of the family Saturniidae have stinging hairs, and spiders of the family Ctenidae are poisonous (F. Bénélux pers. comm.). However, we assume that the adults squeezed the possibly toxic leaf remains from the guts of caterpillars before they were fed to the nestlings (Fig. 5).

On 18 August, in the late afternoon, the nest was found to have been destroyed and the nestlings had disappeared. It was most probably predated. The loud begging calls of the nestlings and / or MF's presence on the islet could have attracted the attention of predators. Possible predators seen in the clearing and on the islet included *Micrastur* forest falcons and Tayras *Eira barbara*.

On 11 November 2013, MF observed the cuckoos again flying to and fro between the riverbank and the islet. On visiting the islet, MF discovered that they had a new nest with nestlings. It was similar to the first and constructed in a very dense tangle of vines in the



Figure 1. Black-bellied Cuckoo *Piaya melanogaster* at nest within dense tangle of vines, French Guiana, August 2013 (Mathias Fernandez)

Figure 2. Nestlings of Black-bellied Cuckoo *Piaya melanogaster*, approximately  $8 \pm 2$  days old, French Guiana, August 2013 (Mathias Fernandez)



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Figure 3. Nestlings of Black-bellied Cuckoo *Piaya melanogaster* uttering begging calls as an adult arrives with prey, the white knobs on reddish palate clearly visible; French Guiana, August 2013 (Mathias Fernandez)

Figure 4. Adult Black-bellied Cuckoo *Piaya melanogaster* with noxious *Automeris illustris* caterpillar, French Guiana, August 2013 (Mathias Fernandez)

Figure 5. Adult Black-bellied Cuckoo *Piaya melanogaster* with an *Automeris* caterpillar that has a drop of gut contents hanging from its rear, French Guiana, August 2013 (Mathias Fernandez)

same tree, but 4 m lower, at a height of *c.*4 m. The tangle of vines was so dense that it was impossible to see or photograph the young in the nest. However, when the adults arrived with food, MF heard begging calls of two different young and, from the intensity and a

comparison of these calls with the begging calls of the young at the first nest, he estimated that they were *c.*1 week old. Unfortunately, the survival of this nest could not be followed.

## Discussion

The nest sites of Black-bellied Cuckoos described here are similar to those chosen by Squirrel Cuckoos, *i.e.* dense shrubbery or a tangle of lianas or vines in trees (Payne 2005, Erritzøe *et al.* 2012). Both nests of Black-bellied Cuckoo were open cups, similar to the shallow platform or open-cup nests of Squirrel Cuckoo (Haverschmidt & Mees 1994, Payne 2005).

The first Black-bellied Cuckoo nest held two nestlings, which corresponds to the usual clutch size of Squirrel Cuckoos (Penard & Penard 1910, Payne 2005, Erritzøe *et al.* 2012). When found on 15 August, the nestlings were estimated to be  $8 \pm 2$  days old. With an estimated incubation period of 18–19 days as for the similar-sized Squirrel Cuckoo (Erritzøe *et al.* 2012), eggs would have been laid around 20 July. The nestlings in the second nest were probably one week old on 11 November, which suggests that eggs were laid on *c.*15 October, 8.5 weeks after the first nest disappeared and 12.5 weeks after the first clutch was laid. Black-bellied Cuckoos probably nest several times in a season, like Squirrel Cuckoos (Payne 1997), meaning that the second clutch should not necessarily be viewed as a replacement.

Our observation of approximately one feeding of the nestlings per 45 minutes during the day corresponds well with the single feeding per hour given for Squirrel Cuckoos (Skutch 1966). Many of the caterpillars and arthropods fed to the nestlings have stinging hairs and/or are noxious. The adults probably squeeze the possibly toxic leaf remains from the guts of most caterpillars, but it did not appear that stinging hairs are removed. We did not observe if the nestlings regurgitated these hairs in pellets, as adults do (Payne 1997).

The white knobs on the reddish palate of the nestlings are remarkable. Skutch (1966) stated that the gape of Squirrel Cuckoo nestlings is bright red, although he did not mention the presence of white knobs or markings. The gapes of nestlings of Guira Cuckoo *Guira guira*, *Crotophaga* species and some *Coccyzus* species also possess bright, whitish markings that contrast strongly with the red palate (Sick 1993, Payne 1997). Such markings may assist the adults to place food in the chick's open bill, especially in a dark nest within dense tangles of vegetation, as is often the case for *Piaya* cuckoos. However, the question then remains why these markings should only occur in nest-building cuckoos and not in those that parasitize host species with a domed or closed nest, *e.g.* Striped Cuckoo *Tapera naevia* and both *Dromococcyx* (Payne 1997).

In Guyana, Squirrel Cuckoos have been recorded breeding in April and July–September (Erritzøe *et al.* 2012), and in Surinam in July (Ribot 2013), while eggs in the Penard collection were collected in March–July and September (Haverschmidt & Mees 1994). In French Guiana, nests under construction were found in March and August, and a nest with young in July (Tostain *et al.* 1992). In Amapá and Pará (Brazil), nesting has been observed in January, March, May, July and August (Payne 2005, Erritzøe *et al.* 2012). In French Guiana, Black-bellied Cuckoo nests with nestlings have been found in July (Tostain *et al.* 1992), and August and November (this paper). Thus, over the Guiana Shield (French Guiana, Surinam, Guyana and adjacent regions of Brazil), *Piaya* cuckoos appear to breed from January to November, *i.e.* from the onset of the short dry season (February–April), through the long rainy season (May–mid August) until the end of the long dry season (mid August–November) (Penard & Penard 1910, Payne 2005, Erritzøe *et al.* 2012). As Squirrel Cuckoos nest several times over the course of a single season (Payne 1997) and there does

not appear to be any seasonality in breeding by either *Piaya*, they probably breed year-round in this region.

#### Acknowledgements

We thank Frederik P. Brammer, Guy Kirwan, Jan Hein Ribot, Tom Schulenberg, Arie Spaans and Paul Van Gasse for help with literature, and Marco Gaiani and José Clavijo A. of the Museo del Instituto de Zoología (Maracay, Venezuela), and Frédéric Bénélux, for identifying food items brought to the nestlings. We are grateful to Frederik P. Brammer, Olivier Claessens, Des Jackson, Guy Kirwan and Chris Sharpe for their comments and for improving drafts of this paper.

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