

Notes on the abundance and breeding of the Black-crowned Capuchin Babbler *Phyllanthus rubiginosus* in southwest Nigeria

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Summary

The abundance and breeding of the Black-crowned Capuchin Babbler *Phyllanthus rubiginosus* are described, based on a 4-year study (2016–2019) that combined line transect and mist-netting in southwest Nigeria. A total of 242 individual sightings was made during quarterly surveys ($n = 16$) of a total of *c.* 6 km of line transect each survey, with 15.1 ± 6.5 (SD) individuals encountered per survey. Birds were frequently recorded in groups along forest edges (group size: 5.9 ± 1.7 ; $n = 41$) but the encounter rate did not vary significantly across seasons and years. An open cup nest containing five eggs, the first nest described for this species, was observed for 28 days; this nest and two mist-netted adults with brood patches suggest that breeding takes place at least during the wet season.

Résumé

Notes sur l'abondance et la reproduction du *Phyllanthus rubiginosus* au sud-ouest du Nigeria. L'abondance et la reproduction du *Phyllanthus rubiginosus* sont décrites, basées sur quatre ans d'étude (2016–2019) ayant combiné transects et captures au filet dans le sud-ouest du Nigeria. Un total de 242 individus a été observé lors d'études trimestrielles ($n = 16$) sur un total par parcours de *c.* 6 km, avec 15.1 ± 6.5 (DS) individus rencontrés. Les oiseaux ont souvent été observés en groupes en bordure de forêt (taille du groupe: 5.9 ± 1.7 ; $n = 41$)

mais la fréquence des observations n'a pas varié de manière significative selon les saisons et les années. Un nid, le premier décrit de cette espèce, en forme de bol contenant cinq œufs a été observé pendant 28 jours; ce nid et deux adultes pris dans les filets avec des plaques incubatrices suggèrent que la reproduction intervient au moins pendant la saison des pluies.

Introduction

The Black-crowned Capuchin Babbler *Phyllanthus rubiginosus* was recently split at the species level from the Grey-hooded *P. atripennis* and Grey-caped *P. bohndorffi* Capuchin Babblers (Hoyo & Collar 2016). It is found along forest edges of the Guinea-Congo Forest Biome (Collar & Robson 2007, Dowsett-Lemaire & Dowsett 2014) and is probably locally common, as groups were collected for food by rural dwellers (Collar & Robson 2007). This hunting, along with forest clearance for agriculture, appears to be a leading cause of population decline in this species, which has been classified as Near Threatened on the IUCN Red List (BirdLife International 2016). In Nigeria, the Black-crowned Capuchin Babbler is found in a small area of the southwest (Lagos, Badagry, Abeokuta and Ibadan) and at Kagoro on the southern escarpment of Jos (Elgood *et al.* 1994), where urbanisation (Awoyemi & Bown 2019) and forest degradation (Abalaka & Manu 2007) are widespread. Of these areas, only the Forest Reserves of the International Institute of Tropical Agriculture (IITA) at Ibadan and Kagoro-Nindam at Kaduna are likely to survive in the near future, due to the impacts of urbanisation on wild areas around Lagos, Badagry and Abeokuta. Despite these threats, data on demography and breeding, which could be useful for conservation efforts, are largely lacking (Elgood *et al.* 1994, BirdLife International 2016). As part of a long-term plan to promote the conservation of birds and forests in southwest Nigeria, the IITA Forest Centre project was started in 2015, consolidating previous projects funded by the same donor, the A.G. Leventis Foundation. This article presents findings from the project concerning the Black-crowned Capuchin Babbler, from 2016 to 2019, with an additional observation of an adult with a brood patch in 2020.

Methods

Surveys were conducted within the IITA Forest Reserve, Ibadan (7.50°N, 3.92°E; *c.* 243 m a.s.l.), a *c.* 360-ha regenerating secondary rainforest, which supports large native tree species such as *Ceiba pentandra*, *Milicia excelsa*, *Terminalia superba* and *T. ivorensis* (Manu *et al.* 2005, Neuenschwander *et al.* 2015, Awoyemi & Bown 2019). The forest is a designated Important Bird and Biodiversity Area (IBA) and supports populations of the Black-crowned Capuchin Babbler (Ezealor 2001). The area experiences an annual rainfall of 1500–2000 mm (Ezealor 2001), a daytime

temperature of 26–38°C (Neuenschwander *et al.* 2015) and almost equal periods of wet (Mar–Sept) and dry seasons (Oct–Feb).

Standardised line transects and mist-netting were used in the framework of the Forest Centre project, to monitor bird populations in the study area from 2016 to 2019. These techniques were employed concurrently at quarterly intervals in Mar–Apr, Jun–Jul, Sep and Nov–Dec, between 7h00 and 11h00. At each quarterly survey, three transect lines, each *c.* 2 km long and separated by at least 200 m, were walked over a 3-day period (total *c.* 6 km per survey), while recording all birds seen and heard, and mist-nets (120 m long, 2.5 m high, five shelves and 32 mm mesh) were set up at three constant effort sites within the forest (7.29814°N, 3.53541°E; 7.29852°N, 3.53335°E; 7.29805°N, 3.52961°E), to trap and measure birds. The nets were checked for bird extraction at 30-min. intervals and all ringing data were deposited at the A.P. Leventis Ornithological Research Institute (APLORI), Jos, Nigeria. The birds were identified using Borrow & Demey (2014) and Chappuis (2000). All Black-crowned Capuchin Babblers noted during the study period were included in the present study. AGA participated in all surveys.

We calculated encounter rate as the total number of Black-crowned Capuchin Babblers seen and heard during line transects and estimated group size as the mean of the total number of individuals recorded at a time during the survey. We tested if encounter rate varied with season and year by conducting Wilcoxon signed-rank and Kruskal–Wallis tests respectively, in R statistical software (R Development Core Team 2013). All error measures presented are SD.

A nest of the Black-crowned Capuchin Babbler was discovered on 18 Jul 2019 and was monitored for 28 days at *c.* 5-day intervals. Nest measurements were taken with a vernier calliper on 23 August, nine days after the last activity at the nest was observed. Finally, as this article was going to press, an adult with a brood patch was netted during other work, and is reported below.

Results

A total of 242 bird sightings was made during the 16 line transect surveys, with a mean encounter rate of 15.1 ± 6.5 birds sighted per survey. The encounter rate did not vary between seasons (Wilcoxon signed-rank test, $W = 214$, $P = 0.86$) or years (Kruskal–Wallis, $\chi^2 = 1.5047$, $df = 3$, $P = 0.68$). All individuals encountered during line transects were found in groups of conspecifics (group size: 5.9 ± 1.7 ; $n = 41$), confirming the gregarious nature of the species reported by Collar & Robson (2016). Only two individuals of this species were mist-netted during the 2016–19 study: one with an active brood patch, netted along the forest edge at 8h00 on 1 Jul 2016 (wing 119 mm; mass 97.6 g), and one with no brood patch trapped at 8h30 on 13 Mar 2019 (Fig. 1; wing 121 mm; tarsus 45.9 mm; mass 90.4 g). An additional adult netted on 24 Jun 2020 also had an active brood patch (wing 121 mm; tarsus 43 mm; mass 91.5g).



Figure 1. Black-crowned Capuchin Babbler mist-netted in the IITA Forest Reserve, Ibadan, 13 Mar 2019 (photos: AGA).

The nest of the Black-crowned Capuchin Babbler was an open cup constructed of tendrils, twigs and leaves (Fig. 2), found *c.* 2.5 m above ground level in the fork of a young (*c.* 3 m tall) *Blighia sapida* tree along the forest edge (7.29805°N, 3.52961°E), in an area dominated by native trees, shrubs and climbers, including *Albizia zygia*, *Antiaris toxicaria*, *Ceiba pentandra*, *Combretum racemosum*, *Dioscoreophyllum cumminsii*, *Piper guineense*, *Pycnanthus angolensis* and *Trichilia monadelpha*. Observations at this nest are summarised in Table 1. The nest measurements (mm) were: external diameter 130; internal diameter 99; external depth 120; internal depth 111; thickness 9.

Table 1. Observations at a Black-crowned Capuchin Babbler nest in the IITA Forest Reserve, Ibadan, Jul–Aug 2019.

Date	Observation
18 Jul	Five green-blue eggs found in an open cup nest.
23 Jul	Eggs reduced to three (perhaps due to nest predation).
31 Jul	Closer observation revealed only one nestling, with a few bits of egg shell.
8 Aug	Adult left nest as observer approached; nestling developing feathers but a new egg seen next to it.
14 Aug	No eggs or nestlings in the nest but pieces of broken shells; adult calls heard <i>c.</i> 20 m away.



Figure 2. Nest of Black-crowned Capuchin Babbler in the IITA Forest Reserve, 2019: A, 23 Jul; B 31 Jul; C 8 Aug; D 23 Aug. (Photos A, B, D by AGA; C by TAA).

Discussion

The observed encounter rate suggests a small population, which appears to be stable (no significant differences across seasons and years). It is unlikely that these birds engage in local migration between sites as the species was recorded during line transects in all the quarterly surveys. All individuals recorded during line transects were found along forest edges and in groups of conspecifics, consistent with the findings of Collar & Robson (2016). This gregarious nature and preferred habitat (middle layer and edges of forests) could predispose the Black-crowned Capuchin Babbler to anthropo-genic threats, particularly collection for food. In addition, although the IITA Forest Reserve is protected against illegal logging and poaching, urbanization is a threat to the long term persistence of the Black-crowned Capuchin Babbler in this area.

The nest that we found appears to be the first of the Black-crowned Capuchin Babbler to be documented (*cf.* Fry & Keith 2000), since the breeding details given by

Collar & Robson (2007) for *P. atripennis sensu lato* were from nests recorded by G.D. Field in Sierra Leone in 1993 (C. Robson *per* N.J. Collar *in litt.*), which therefore refer to the taxon now separated as *P. bohndorffi*. Although these records show that both species utilise similar nesting materials and site, all of our breeding evidence (from mist-netting and nest observations) was obtained during the wet season (Jun–Aug), in contrast with the Nov–Feb (dry season) nesting period of *P. bohndorffi* reported from Sierra Leone (Collar & Robson 2007).

Although we cannot be sure, the inconsistency in nest contents observed in this study (Table 1) could be due to laying by more than one female, and predation. The clutch size given by Collar & Robson (2007), referring as we now know to *P. bohndorffi*, is two eggs, but although the breeding systems of *Phyllanthus* spp. are poorly known, their consistently gregarious behaviour suggests that they may be cooperative breeders, like other babblers found around the study area, including the Blackcap Babbler *Turdoides reinwardtii* and Brown Babbler *T. plebejus* (Elgood *et al.* 1994). It appears that at least two of the five eggs observed on 18 July were lost, probably to predation. Although only one nestling was observed on 31 July, all three eggs that had remained on 23 July may have hatched, in which case it is likely that two nestlings had been drowned by the downpour that preceded the 31 July observation. The new egg sighted on 8 August, next to the surviving nestling, may have been laid by a new female that had just commenced laying. Assuming that the nestling seen on 31 July had hatched about 29 July, this sequence suggests an incubation period of ≥ 11 days, which is consistent with what is known for other tropical African babblers (Fry & Keith 2000) and for another similarly sized bird that breeds in the area, the Ibadan Malimbe *Malimbus ibadanensis* (Awoyemi *et al.* 2018). If the nestling had fledged, the nestling period would have been between ten and 16 days (from 29 July to somewhere between 8 and 14 August), which is also consistent with what is known for related species (Fry & Keith 2000). However, the lack of evidence of a nestling from the later egg suggests that the nest might have suffered predation after the 8 August observation.

Our findings support the present conservation status of the Black-crowned Capuchin Babbler, though further studies are needed to determine population density and trends in the known sites of the species in Nigeria, explore new sites, and investigate the impact of habitat fragmentation on genetic diversity. Immediate conservation action is needed to raise awareness about the threats facing this species, especially those resulting from habitat destruction and the collection of groups for food, in the hope of reversing its decline.

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