Breeding biology of White-faced Nunbird *Hapaloptila castanea* in Ecuador

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Reportamos la primera información sobre la anidación de la Monja Cariblanca *Hapaloptila castanea* de bosque subtropical cerca a Tandayapa al nor-occidente del Ecuador a una altitud de 1.900 m durante el mes de mayo hasta julio del año 2000. El nido estaba localizado bajo tierra consistiendo de un túnel de entrada de 38 cm de largo abriéndose en una cavidad más ancha. Dos huevos fueron puestos entre 28 de mayo y 30 de mayo de 2000. La incubación tuvo una duración de 15 a 18 días y las crías salieron del nido entre 37 y 38 dias después de empollarse. Ambos adultos participaron en todos aspectos de anidación, y fueron observados haciendo entrega de una gran variedad de comida a las crías, incluyendo insectos, arañas, crías de otras aves, un ratón y una rana. El comportamiento de ambos adultos y crías son descritos.

White-faced Nunbird *Hapaloptila castanea* is rare and local in subtropical Andean forests between Colombia and northern Peru[1]. Virtually nothing has been published on its breeding behaviour, only that a male with a brood patch was found near Cali, at 1,800 m, in the Western Cordillera of Colombia in April[2].

On 13 April 2000, we found a single bird at 1,900 m, near Tandayapa Bird Lodge, Pichincha Province, Ecuador (00°00'N 78°41'W). On 26 April, we observed a pair in the same location, one with mud caked on its bill, suggesting it had been excavating a nest. On 30 April, the nest was discovered nearby, and we began to observe the pair at the nest on a near-daily basis, continuing to do so until both nestlings had fledged, on 23 July. A total of 320 field hours was spent observing the nest. We report here the results of our observations.

Nest description

The nest was located c.5 m from a forest clearing caused by a large landslide in December 1999. The nest burrow was located in a dirt bank under a large tree. The tunnel opening faced almost due south (182°), was straight and inclined downward c.10°. It was oval-shaped (c.5 cm high and 7 cm wide) and continued for c.38 cm before opening into an ovoid cavity, c.23 cm long x 16 cm wide x 10 cm high (Fig. 1). The cavity was lined with small leaves. In front of the nest opening there was a 16 cm-long flat area which the birds used as a landing area (Fig. 2).

Timing

Most of our data came from visual inspections of the nest. Initially, the nest was checked only every few days to avoid disturbance. Subsequently, when

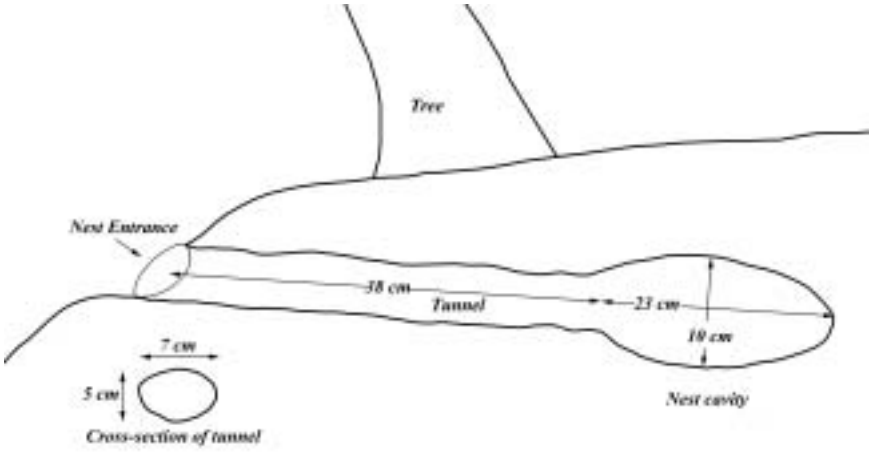

Figure 1. Diagram of the nest of White-faced Nunbird *Hapaloptila castanea*.

the birds had become accustomed to the presence of observers, we checked the nest daily, although only when the adults were not nearby.

The pair had completed excavating the cavity when observations commenced. Between 3 May and 21 May, the pair lined the nest with leaves. No copulations were observed. Two white eggs were laid between the mornings of 28 May and 30 May. The first egg hatched between the mornings of 14 June and 15 June. The second egg hatched between noon on 15 June and the morning of 16 June. The first nestling fledged in the afternoon of 22 July, the second the next morning. Based on these data, incubation lasted 15–18 days and the young fledged 37–38 days after hatching. The total nesting period was at least 88 days, possibly more than 101 days if the bird first seen on 13 April had already commenced nest-building.

Behavioural observations

The birds were initially very wary of observers and would not approach the nest if any were nearby, even if concealed in a hide. They gradually became accustomed to human presence and for a period of several weeks we were able to observe them from a distance of just 8 m without signs of disturbance or stress. However, as the fledglings grew larger the birds seemed to become more wary and the observation distance was increased to 15 m.

The two adults were almost identical in appearance. In direct comparison, one (hereafter the first bird) was slightly plumper, had slightly darker underparts and had a slightly larger bill than the other (the second bird). Despite these differences, we were unable to separate the adults until we discovered that, at close range, a slight but obvious difference in bill shape could be used to distinguish them with certainty. The first bird had a distinct downward bend near the tip of the lower mandible, a feature lacking in the other. As no copulations were observed, we were unable to confirm their sexes in the field. However, following examination of a pair held in the Natural History Museum, Tring (collected below Páramo Frontino, Antioquia, Colombia, by T. K. Salmon, in 1876), we determined that those features exhibited by the second bird precisely matched those of the female specimen and that the first was a male.

General observations

Both sexes participated in all aspects of the breeding cycle, including nest construction, incubation, brooding and feeding of the young. Before entering and after leaving the nest, the adults almost always perched on a small sapling above the nest for a period of a few seconds to a few minutes.

Nest construction

As previously mentioned, the cavity had already been excavated when observations commenced. Between 3 May and 21 May we occasionally saw a nunbird pick a small leaf off a nearby tree in a sallying flight and then enter the nest with the leaf. For unknown reasons, the adults were very slow to line the nest and there were several days when we did not observe the birds at all.

Incubation and brooding

We were unable to observe the nest at close range until the final week of incubation, thus our data on changeovers are sparse. However, we did observe a definite pattern during the final six days of incubation. There was always a changeover at dawn, between 05h44 and 06h26, another at 08h15–0940, then at 10h55–12h00, and another at 13h30–15h40. No changeovers were observed after 15h40, although we only observed during that period for two days of the final six. During changeovers, the nest remained untended for a mean 29 minutes (N=17), once as long as 72 minutes. Occasionally an incubating bird left the nest for a few minutes, perched nearby and then returned to the nest.

After the eggs hatched, the parents brooded the nestlings until 27–29 June. During incubation and brooding, on all nine occasions where the bird was identified with certainty, the male was the last to enter the nest in the afternoon. This suggests that the male was responsible for the majority of incubation and brooding.

Nestling phase

The two eggs hatched c.1 day apart and the parents began feeding the first nestling immediately. We witnessed 235 food deliveries, 183 (78%) of which were insects and larvae. Frequently they were large items such as beetles, grasshoppers and caterpillars. Twenty (8%) were of other large vertebrates and invertebrates, including four spiders, nine lizards, two nestling birds (Fig. 3), a mouse and a small frog. The remaining 32 items (14%) were not clearly observed or not could not be identified. For 229 of these, the identity of the parent delivering the food was determined. The female delivered 136 (59%) items and the male 93 (41%) items. As the male was responsible for the majority of the incubation, it was possibly foraging largely for its own requirements.

The nestlings began vocalising soon after hatching on 16 June. Initially the vocalisations were very faint and not audible more than 1 m from the nest. By 4 July, the nestlings were calling sufficiently loudly to be heard 20 m away. The most frequently heard was the begging call, a high-pitched, rapid trill with the notes given c.18 times per second. The nestlings would commence begging

Figure 2. White-faced Nunbird *Hapaloptila castanea* at nest entrance (Nicholas Athanas)

Figure 3. White-faced Nunbird *Hapaloptila castanea* with predated nestling bird, which it fed to its own nestlings (Murray Cooper)

calls upon hearing the vocalisation or wingbeats of a parent, and continue until being fed. Curiously, the nestlings never called simultaneously, and the calling bird was always the nestling that advanced up the tunnel to be fed. Towards the end of the nestling phase, they would frequently give a whistle very similar to the adult call, but higher pitched. The nestlings' loud calls attracted the attention of potential nest predators on three occasions. A Beautiful Jay *Cyanolyca pulchra* discovered the nest once, and a pair of Toucan Barbets *Semnornis ramphastinus* examined it twice. Despite becoming very excited, none of the potential predators entered the cavity.

The adult nunbirds never removed faecal sacks from the nest. Faecal matter accumulated in the hole, but this did not seem to attract insects and had no apparent negative affect on the nestlings.

Fledging

The first nestling left the nest between 12h13 and 15h08 on 22 July. The actual fledging was not witnessed, but the bird was subsequently found c.15 m from the nest on a bare branch, calling very loudly. The female was nearby with food and shortly fed the nestling. Thereafter, the nestling began moving away from the nest area, making short but strong flights between large branches. Occasionally the female fed the fledgling, which vocalised almost continuously, usually a series of loud whistles, but also giving the begging call when a parent was nearby with food. The adults continued to feed the remaining nestling after the first bird had fledged.

The second chick fledged next morning. It came to the nest entrance begging loudly, though no adult was visible nearby. After 20 seconds it flew directly to a bare branch over the landslide c.12 m away. After a few minutes it began giving loud whistles. After 15 minutes the male arrived with food, and the fledgling immediately commenced the begging call until being fed. Several minutes later both birds flew off.

Figure 4. Recently fledged White-faced Nunbird *Hapaloptila castanea* (Nicholas Athanas)

The fledglings were very similar in appearance to the adults (see Fig. 4). The bill was slightly shorter and the tail was still growing, being only about half as long as that of the adults. Plumage was almost identical, although some grey feathers were visible in the orange breast. The second fledgling was clearly less developed than the first. It had an even shorter tail, more grey on the breast and was not as strong a flyer.

Post-fledging

The birds did not return to the nest area after fledging. They were seen regularly over the next few days within 200–400 m of the nest, and the parents continued feeding them. They were fairly easy to find because the family was very vocal. After c.1 week, they were seen only occasionally, with a handful of sightings over the next few months. There was one report in November 2000 of all four

birds, suggesting that both young survived, despite the second being less developed at fledging.

The following year, in September–December 2001, there were numerous observations of a pair of *H. castanea* in the vicinity of the old nest. However, no evidence of breeding was noted and the old nest cavity was not reused.

Discussion

Our observations are consistent with published data concerning the breeding biology of the Bucconidae[3], with a few exceptions. First, the pair began nesting during the wettest months at Tandayapa (normally March–May), rather than at the start of the dry season. Second, there was no collar of leaves or twigs placed around the nest entrance. Indeed, there was never any obvious attempt by the pair to conceal the nest. Third, the young *H. castanea* remained in the nest for the exceptionally long period of 37–38 days, whereas previous studies have found a nestling period of just 20–30 days. Finally, the newly fledged nunbirds were never seen to take food from the bill of a parent in sally-flight. Food was always given directly into the gape of the fledgling.

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