

# Parental care of Chestnut-capped Puffbird *Bucco macrodactylus* on the middle Juruá River, Amazonas, Brazil

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Received on 05 January 2016. Accepted on 15 July 2016.

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**ABSTRACT:** Chestnut-capped Puffbird *Bucco macrodactylus*, like other members of the Bucconidae family, nest in arboreal termitaria. Here we described a nest of the species, found in the floodplain of the Juruá River in December 2014. It was built inside an arboreal termite mound, 2.45 m above the ground. We determined the type and frequency of prey consumed by chicks over six days: during this time adults brought food to the nest 147 times. Prey included both vertebrates and invertebrates, though the most frequent were insects of the Order Orthoptera. Fledging may have been directly stimulated by a predation attempt made by a marsupial.

**KEY-WORDS:** feeding, nest, Orthoptera, parental care, prey.

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Chestnut-capped Puffbird (*Bucco macrodactylus*) is the smallest of the Amazonian Bucconidae, with no sexual dimorphism. It occurs in forested regions of upper Amazonia east to the Negro and Tapajós Rivers (Sick 1997, Piacentini *et al.* 2015), and is usually found in the understorey, often near water (Rasmussen *et al.* 2016a). The diet of the species consists of small vertebrates and large arthropods, with adults foraging alone (Rasmussen *et al.* 2016a).

Puffbirds build nests by digging tunnels in either the ground or arboreal termitaria (Sick 1997, Greeney *et al.* 2004, Greeney 2010). They lay two or three eggs, and the incubation period is typically about 15 days (Sick 1997). Both parents care for the chicks, sometimes with the assistance of an additional adult (Sick 1997). Breeding is well known for only a few bucconids, while for most puffbird species there are few, if any, records of nesting and parental care. The aim of this study was to determine the frequency and type of food fed to chicks of *B. macrodactylus*, a species where these aspects are poorly-known.

The nest was found on the left bank of the Juruá River in the Reserva de Desenvolvimento Sustentável Uacari, in the municipality of Carauari, Amazonas,

Brazil (5°44'2.75"S; 67°46'29.93"W). Though mean annual rainfall is 2400–2800 mm, the region has a well-defined seasonal rainfall pattern with highest pluviosity between January and May and the lowest between July and October. This results in a marked seasonal oscillation in the river water levels, with the period of low water occurring between July and October (Sombroek 2001).

Nest monitoring was conducted via direct observation and video recordings made by two camera traps, for a total of 43 h over six days, during daylight hours (6:00–18:30 h). The frequency with which the adults delivered food to the chicks and the types of prey brought were of particular interest. Additionally, the standard deviation (SD) and mean rate of feeding between morning and afternoon periods were calculated. To identify prey filmed by camera traps images obtained were later subject to detailed analysis. Measurements of nest and nest location were taken after chicks left the nest.

On 5 December 2014 an adult *B. macrodactylus* was observed with a grasshopper in its bill. It then flew to a tree and returned to the same branch shortly afterwards without the insect. A few minutes later the same behavior was recorded again, and thus we discovered a nest cavity within an arboreal termite mound holding two well-

developed chicks. The arboreal termite mound was located over a *Ficus* sp. tree, and was 2.45 m above the ground. The nest entrance diameter was 5 cm and its depth 19 cm (Figure 1A). Over the six day study period, both adults brought food to the chicks a total of 147 times, at a mean rate of 3.41 feeds/h during daylight hours. The first feeding of the day occurred at 06:00 h, and the last at 18:30 h. Over three full days the feeding rate was similar in the morning (46.5%, mean =  $15.33 \pm 2.49$ ) and in the afternoon (53.5%, mean =  $17.66 \pm 4.64$ ).

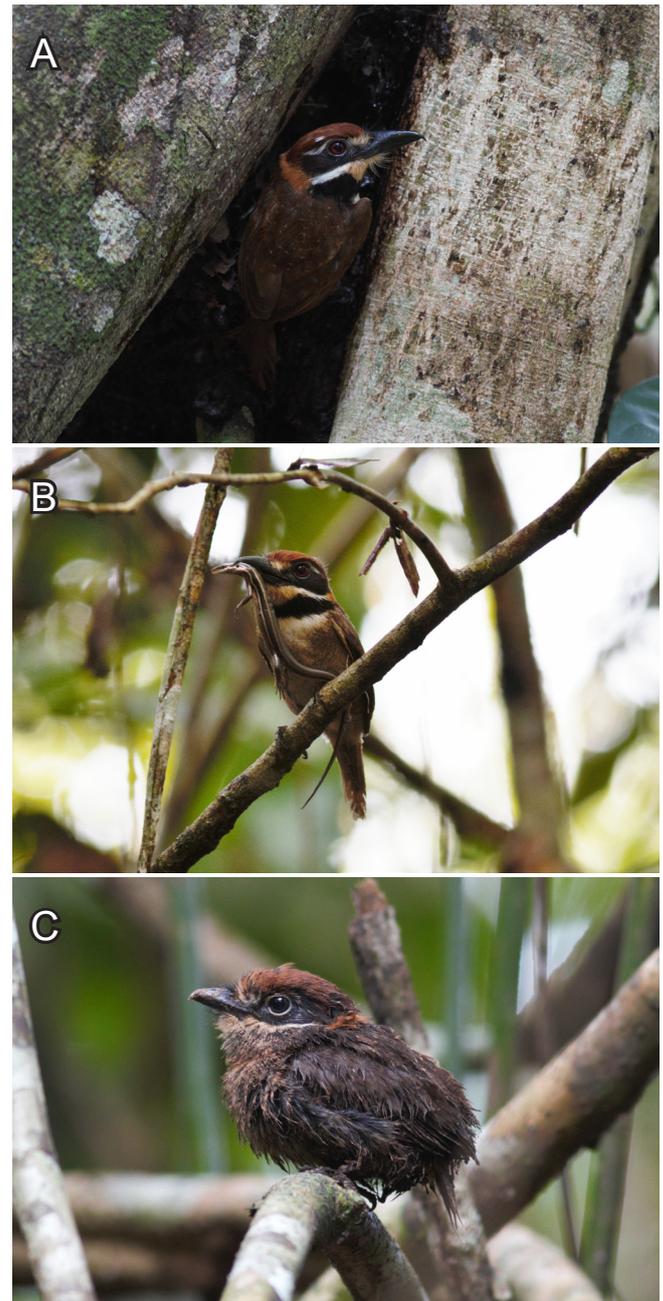
Among prey brought to the nest, 61% were identified, with the majority being invertebrates (56%), and a minor proportion of vertebrates (5%) ( $n = 89$ ). Among invertebrates, Orthoptera was the single most abundant prey (76%), minor contributions of Mantodea (3%), Lepidoptera (2%), Arachnida (1%) and Hymenoptera (1%). Vertebrates were all of the Order Squamata, of which four were individuals of the genus *Cercosaura* (Gymnophthalmidae) and one a *Varzea* sp. (Mabuyidae) (Figure 1B).

During the morning of 11 December, the camera trap recorded two unsuccessful nest predation attempts by an unidentified marsupial. On the morning of the same day, the adults were observed encouraging chicks to fledge. One of the adults arrived with food in its bill, but rather than go to the nest to deliver the food, as usual, it flew quickly to the entrance but without entering the nest. After several attempts the chicks left the nest (Figure 1C). Soon afterwards, they flew into the canopy along with their parents and were not observed again.

A single nest of *B. macrodactylus* has been described previously, from Peru, also sited in an arboreal termite mound 2.5 m above ground (Hilty 2003). However, there are no records of clutch size or information on parental care. In Ecuador, the Collared Puffbird *Bucco capensis* has also been recorded to have a clutch size of two (Rasmussen *et al.* 2016b). Monitoring nests during the period that adults feed chicks requires time, and is most easily conducted using camera traps, even though their use can make it more difficult to identify some food items. This is because when camera traps are present adults fly straight to the nest, while when researchers watch a nest, adults often pause for a few seconds near the entrance, and this allows identification of material or prey in the bill.

Orthoptera was the most commonly prey brought to the nest. This might be related to the fact that the nest was rather close (30 m) to a corn field and an area of vegetation known as Canarana (*Gynerium* sp.), where this type of prey is especially common. Rasmussen *et al.* (2016a) reported that the species feeds on small vertebrates, but during observations, parents captured lizards comparatively larger than chicks, which they apparently fed to their chicks without problems. Other

species of puffbirds feed on vertebrates of a variety of sizes, including rodents, snakes and lizards (Schubart *et al.* 1965, Sigrist 2006, Crozariol & Gomes 2010). The frequency with which adults brought food to the chicks was similar throughout the day. In reporting parental care in Long-wattled Umbrellabird *Cephalopterus penduliger*, Greeney *et al.* (2012) observed that the single chick was fed more frequently in the early morning and late afternoon. The time between feeds varied from less than



**FIGURE 1.** (A) Adult *Bucco macrodactylus* in nest entrance after feeding their chicks, Reserva de Desenvolvimento Sultentável Uacari, Carauari, Amazonas, 06 December 2014; (B) Lizard (*Varzea* sp.) captured by adult to feed one of the chicks, Reserva de Desenvolvimento Sultentável Uacari, Carauari, Amazonas, 06 December 2014; (C) Chick after it leaves the nest, but still dirty due to termite mound, Reserva de Desenvolvimento Sultentável Uacari, Carauari, Amazonas, 11 December 2014. Photos: Gabriel Augusto Leite.

a minute to more than one hour, with the difficulty of capturing prey, the effects of rain and also foraging for their own consumption presumably accounting for this variation. Rasmussen & Collar (2016) stated that when adult puffbirds take larger prey such as lizards, they may then go some hours without delivering fresh prey to their nests, but we found that the adults returned with other prey just minutes later.

The behavior of adults in attempting to make chicks fledge may have been a direct response to the predation attempted on the previous night. Predation on Bucconidae nestlings is often attributed to snakes, especially those nests in burrows on the ground (Rasmussen & Collar 2016). Such events are unlikely to occur in the presence of a human observer and underscore the value of camera traps in this kind of monitoring.

#### ACKNOWLEDGEMENTS

This work was conducted during the period that G.A.L. was receiving a FAPEAM scholarship, while the Darwin Initiative Project (DEFRA – UK, Ref. No.16-001) provided financial support to our work in this region. Authors are grateful to Tainá Rodrigues by identifying the lizards and Guy Kirwan for reviewing the English and give great suggestions on the article.

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Associate Editor: Marcos P. Dantas.