



SHORT NOTE

NEW INFORMATION ON THE COURTSHIP FEEDING BEHAVIOR OF COTINGAS OF THE GENUS *CARPORNIS* FROM BRAZILFernando Igor de Godoy¹ · Arthur Macarrão Montanhini¹ · Fabio Schunck^{2*}¹Independent researcher - Piracicaba, SP, Brazil.²Comitê Brasileiro de Registros Ornitológicos - CBRO (www.cbro.org.br).E-mail: Fabio Schunck · fabio_schunck@yahoo.com.br

Abstract · Birds have varied pre-reproduction behaviors, including courtship feeding—the delivery of a nuptial gift to the female by the male. The Neotropical family Cotingidae includes species that perform a variety of pre-reproduction behaviors, such as plumage displays; however, documentation of these behaviors for the genus *Carpornis*, endemic to the Brazilian Atlantic Forest, is limited. The only previous observation of courtship feeding behavior for these berryeaters was in 1979. Here, we describe the courtship feeding behavior of the two species of *Carpornis* based on observations made in the states of São Paulo and Bahia (Brazil) of males presenting nuptial gifts to females.

Resumo · Novas informações sobre o comportamento de alimentação de namoro das cotingas do gênero *Carpornis* no Brasil

As aves possuem comportamentos pré-reprodutivos variados, como a alimentação de namoro, no qual o macho entrega um presente nupcial para a fêmea. A família Cotingidae é formada por aves neotropicais que realizam comportamentos pré-reprodutivos variados, como exibições de plumagem, mas o gênero *Carpornis*, endêmico da Mata Atlântica, ainda possui poucas informações disponíveis. O único possível comportamento de alimentação de namoro observado para este gênero foi feito em 1979. Com base neste cenário, apresentamos descrições deste comportamento para as duas espécies do gênero *Carpornis* do Brasil. As observações foram realizadas nos estados de São Paulo e Bahia, onde os machos foram observados entregando presentes nupciais para as fêmeas.

Key words: Atlantic Forest · Natural History · São Paulo · Serra do Mar · Threatened species

Birds have varied and elaborate pre-copulatory behaviors, including courtship and chase presentations (Lack et al. 1941, Alcock 2016). One such behavior, known as courtship feeding or delivery of nuptial gifts, is performed by many bird species and provides nutrients and energy to the female (Royama 1966, Lewis et al. 2011, Alcock 2016). Among the best-known families displaying pre-copulatory behaviors are birds of paradise (Paradisaeidae), manakins (Pipridae) and cotingas (Cotingidae) (Sick 1967, Snow 1982, Ligon et al. 2018). The Neotropical family Cotingidae includes mainly frugivorous species that inhabit humid forests (Snow 1982). They have varied pre-copulatory behaviors, such as displaying in leks and auditory, as well as aerial and plumage displays. However, basic information on the reproductive behavior of many species is still lacking (Kirwan & Green 2011).

The genus *Carpornis* includes two species endemic to the Brazilian Atlantic Forest: the Black-headed Berryeater (*C. melanocephala*), which occurs in the lowlands and is categorized as Vulnerable at both global and state levels (IUCN 2022, São Paulo 2018), and the Hooded Berryeater (*C. cucullata*), which occupies montane regions and is categorized as Near Threatened (Sick 1997, Vale et al. 2018, IUCN 2022). Information on their molt, nests and eggs, and observations of adults feeding young are the only available data on the reproduction of both species (Snow, 1982, Kirwan 2009, Belmonte-Lopes et al. 2011, Kirwan & Green 2011, Maurício 2013). There is only one description of possible pre-copulatory behavior for one of these species, the Hooded Berryeater (Snow 1982): “Once a female was seen with a male. For most of the time she perched quietly near him, occasionally uttering a low, inward grating note. The male also perched quietly for a time, uttering a similar note, then moved round the female, flying a few yards and perching, and then flying on to another perch, in a roughly circular course round her. The female eventually flew off out of sight and after a short time the male flew off in the same direction. On a later visit to the Serra do Mar, in October 1979, I briefly watched a male, with a bright red fruit held in its bill, pivoting jerkily from side to side while perched a few inches from a female on the same branch, about 18 ft [c. 6 m] up in a small forest tree. The male then abruptly flew off, leaving the female on the perch where she remained for 2 minutes before flying off in the same direction as the male. Later, the male called persistently in the same general area.”

Samper (1992) first described courtship feeding in the family Cotingidae for the Orange-breasted Fruiteater (*Pipreola jucunda*), and commented that Snow had evidence of this behavior for the genus *Carpornis*. He also noted that *Carpornis* was possi-

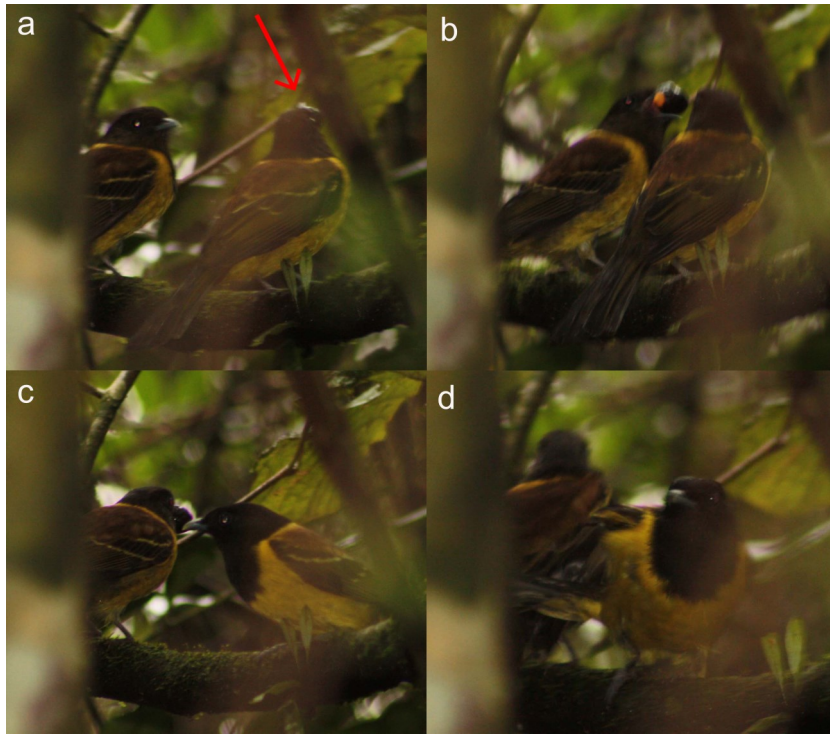


Figure 1. Sequence of courtship feeding behavior performed by a Hooded Berryeater (*Carpornis cucullata*) pair documented in the field. The red arrow indicates the fruit in the male's beak. Sequence of images: a, b, c, and d. Photos: Fernando Igor de Godoy.

bly closely related to *Pipreola*, a hypothesis previously advanced by Snow (1982), but rejected by Tello et al. (2009) and Berv & Prum (2014), whose molecular phylogenies placed these genera in different subfamilies. Based on Snow's (1982) observations of the behavior exhibited by the Hooded Berryeater, Kirwan (2009) stated that due to the similarities between the plumages of *Carpornis* and *Pipreola*, birds of these two groups could be among those few cotingas having courtship feeding. Finally, Kirwan & Green (2011) commented that *Pipreola* is one of the few genera of cotingas for which courtship feeding is known or suspected. Based on this scenario, we present descriptions of the courtship feeding behaviors exhibited by the Hooded Berryeater and the Black-headed Berryeater in Brazil.

We made three field observations of the Hooded Berryeater in and around Parque Estadual da Serra do Mar (PESM), a protected area located in Serra do Mar of the state of São Paulo, southeastern Brazil. The first observation was made by FIG on 12 December 2009 at 10:15 h, in a region adjacent to PESH known as Área de Proteção Ambiental (APA) Capivari-Monos (23°54'60.00"S, 46°38'0.00"W, 740 m a.s.l.). An adult male that was observed vocalizing frequently responded quickly to playback, landing about 5 m from the observer. The bird was startled upon noticing the observer and flew away. The bird then returned in response to a second playback but hid among vegetation, while holding a dark fruit in its bill. An adult female approached and landed next to the male who, in turn, delivered the fruit to the accepting female. Then, the male turned around 180 degrees, leaned down and spread its wings and rectrices, displaying its front and back to the female (Figure 1). After a few seconds, both flew away together. Following a third playback (song and call), the same pair was observed again. The female made a few short flights chasing the male, which fed her three large and shiny fruits that it had collected from a nearby tree, while she remained in the same place (Figure 1b). About 10 min later, the female was observed with what seemed to be

nest material (Figure 2).

The second observation was made by FS on 14 March 2010 at 09:00 h, about 14 km south of the first locality in Núcleo Curucutu of PESH (23°59'42.6"S, 46°44'44.1"W, 837 m a.s.l.). A pair was observed in the forest understory near a fruiting tree. They then moved to another tree about 4 m from the first, where they landed side by side. The male delivered a large, dark fruit to the female's bill, which she accepted and swallowed. Then, the male jumped onto a branch in front of the female, turned around, leaned down and began to swing its spread tail from side-to-side at the height of the female's head, in a position similar to that in Figure 1d. His movements were fast and synchronized, and lasted about 10 s (Figure 3a-d). At the end of the presentation, the male flew away followed by the female and they were not seen again.

The third observation was made by FIG on 19 November 2010 at 09:30 h, in APA Capivari-Monos. An adult female was observed chasing an adult male with short flights for about 10 min in the understory of a secondary forest. After the birds separated, the male could be heard singing repeatedly nearby.

Consulting 2,230 images of the Hooded Berryeater available in two main online ornithological databases (2,043 on Wikiaves, WA, <https://www.wikiaves.com.br/>; 187 on eBird, ML, <https://ebird.org/home>; last accessed 8 June 2020), we found five photographic records of behaviors similar to our field observations. We contacted the authors of the reports for further details. The first record was made on 5 August 2009 in the state of Paraná, Southern Brazil. Two birds were observed perched on a tree, a possible male above and a possible female or young (with greenish head) below. The lower individual leaned forward, partially spreading its wings and flapping them quickly while remaining in the same place, as if attracting the attention of the other bird (WA 43151 and 43159). During this display, the bird emitted a very distinct call, rendered "crrrréee." The other individual observed this



Figure 2. Female Hooded Berryeater (*Carpornis cucullata*) carrying material possibly for nest construction. Photo: Fernando Igor de Godoy.

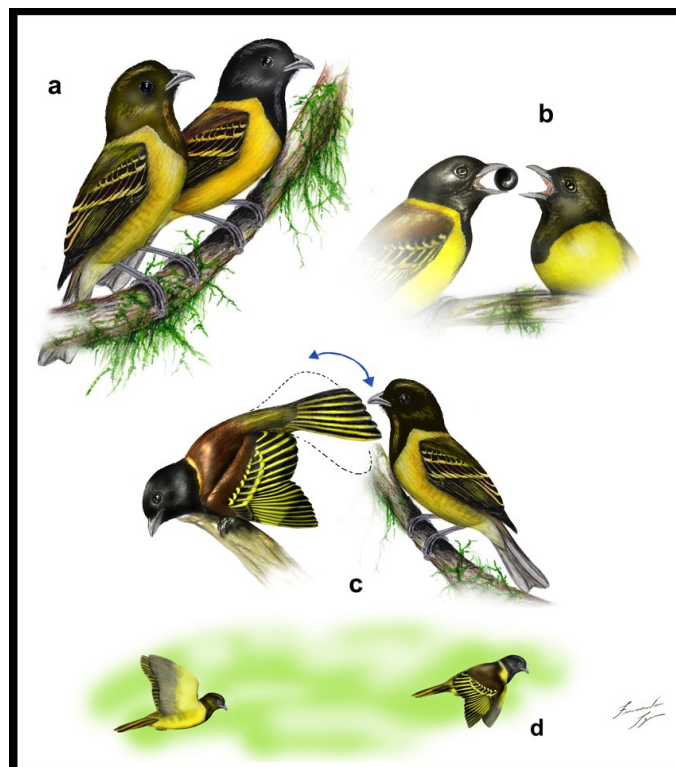


Figure 3. Illustrative sequence of pre-copulatory behavior performed by a Hooded Berryeater (*Carpornis cucullata*) pair observed in the field. Black-headed male and greenish-black-headed female. Sequence of images: a, b, c, and d. Art: Fernando Igor de Godoy.

exhibition, which lasted for about 15 s. Shortly afterwards, the two individuals flew off together and disappeared (Walther Grube pers. comm.). Although the images do not permit an accurate determination of the sexes and ages of the birds, it is possible that it was a female displaying to a male or a subadult still accompanying the parents and begging for food. This is a common behavior for birds (Winkler 2016) and has already been mentioned for the Hooded Ber-

ryeater in Paraná (Kirwan 2009).

The second record was made in the state of São Paulo on 29 January 2010 at around 10:30 h. An adult male was observed alone (WA 105554), moving through the forest, and reappearing at another point nearby with a female (WA 106675). Both individuals landed on a tree and moved from branch to branch until approaching one another. The male then delivered a fruit to the female and they flew off (Paulo



Figure 4. Adult male of the Black-headed Berryeater (*Carpornis melanocephala*) delivering a fruit to an adult female. Black-headed male and greenish-black-headed female. Sequence of images: a, b, c, and d. Photos: Arthur M. Montanhini.

Guerra pers. comm.). The third record was made in the state of Santa Catarina (South Brazil) on 9 December 2015. The male of a Hooded Berryeater pair was observed perched next to the female (WA 1955619) holding a large fruit in its bill. The fourth record was made in the state of São Paulo on 15 July 2018. The image shows two birds perched a certain distance from each other with one (possibly a female) having a fruit in its bill (WA 3039367). Because it is believed that the species does not reproduce during the period of the year when this image was taken (July), it may just be two birds feeding in a fruit tree, a common behavior for this species (FS pers. obs.). The fifth record was made in Macaé de Cima, state of Rio de Janeiro, on 29 November 2019. A male delivered a fruit to an apparent female, then turned its back and flew off (ML 190675171 and 194120061). We also found two records of adult birds feeding subadults (WA 1416771 and 328-0937), identifiable by the striated breast plumage (Snow 1982).

The only field observation for the Black-headed Berryeater was made on 13 November 2019, in Reserva Particular de Patrimônio Natural Estação Veracel (16°20'30.56"S, 39°7'35.98"W, 100 m a.s.l.), a private reserve at Porto Seguro on the southern coast of the state of Bahia, northeastern Brazil. At around 05:30 h, AMM heard the species vocalizing. In response to playback, an adult male landed on a nearby branch. About 5 min later, a female landed besides the male and, after a few seconds, the male regurgitated what appeared to be an entire fruit and offered it to the female, who swallowed it (Figure 4). Both remained on the perch for a few more seconds before the male moved to a lower branch. No other display behavior was observed.

Consulting the 578 images of the Black-headed Ber-

ryeater available on Wikiaves and the 76 on eBird (last accessed 8 June 2020), we found no images indicating any type of behavior similar to the observations that we made in the field. The possibility of this species also performing courtship feeding behavior was considered because there was some evidence for the Hooded Berryeater (Snow 1982), and because of its systematic proximity to *P. jucunda* (Samper 1992), later rejected by Berv & Prum (2014).

The reports of Snow (1982), our field observations, and the complementary information from WikiAves, in a period of 37 years, are all —except one— within the believed reproductive period for these species, which is during the spring and summer months of the Southern Hemisphere (Snow, 1982, Kirwan 2009, Sigrist 2009, Maurício 2013). These data complement each other and unequivocally demonstrate that males of the Hooded Berryeater and Black-headed Berryeater perform the pre-copulatory courtship feeding behavior by delivering nuptial gifts to the female. The display performed by the male, moving its tail from side-to-side in front of the female, recalls the behavior of other species of birds that perform pre-nuptial displays, such as some manakins (e.g., *Pipra filicauda*) and birds of paradise (e.g., *Seleucidis melanoleucus*). However, this is an unusual behavior for the family Cotingidae (Snow 1982, Sick 1997, Kirwan 2009, Kirwan & Green 2011, Winkler et al. 2020). We did not observe copulation after courtship feeding and we still do not have recordings of the vocalizations emitted by the birds during the display. These issues need to be further investigated.

The data presented here confirms the performance of courtship feeding behavior by the Hooded Berryeater and the Black-headed Berryeater. This behavior had been previously reported only once within Cotingidae (for *P. jucunda*).

This information removes the doubt that has persisted in the literature since the observations made by Snow (1982) of the Hooded Berryeater in October 1979 in southeastern Brazil. The broad interest in the family Cotingidae is highlighted by the abundance of works published in recent decades. Ornithological studies carried out in the Atlantic Forest should be considered as a priority due to the highly fragmented condition of the forest, which threatens many of its inhabitants with extinction, such as the Black-headed Berryeater (IUCN 2022, São Paulo 2018).

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