



SHORT NOTE

TOCO TOUCAN (*RAMPHASTOS TOCO*) PREDATION ON BUFF-NECKED IBIS (*THERISTICUS CAUDATUS*) EGGS AND NESTLINGSEdson Moroni^{1,2} · Augusto F. Batisteli² · Rhainer Guillermo-Ferreira²

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Abstract · Toucans (Ramphastidae) are primarily frugivorous birds that occasionally prey on eggs and nestlings of other birds, often Passeriformes. Here, we report predation events by the Toco Toucan (*Ramphastos toco*) on eggs and nestlings of the Buff-necked Ibis (*Theristicus caudatus*) at the “Buraco das Araras” ecological reserve, Mato Grosso do Sul, central Brazil. At least three of six ibis nests monitored between October 2016 and January 2017 were depredated by the Toco Toucan. In one nest, the single egg was carried to a nearby perch, where the embryo was swallowed completely. In two other nests, the nestlings were 10–15 days old when they were depredated. The toucan killed the nestlings by grabbing the head with the beak and shaking vigorously, probably attempting to break the neck. During the attack, the nestlings tried to defend themselves by snapping their bills at the toucan. Once a nestling stopped reacting (dead or dying), the toucan fed on pieces of flesh from the neck. To our knowledge, these are the largest eggs and the heaviest birds preyed upon by toucans.

Resumo · **Predação pelo tucano-toco (*Ramphastos toco*) em ovos e ninhos de curicaca (*Theristicus caudatus*)**

Tucanos (Ramphastidae) são aves tipicamente frugívoras que eventualmente predam ovos e filhotes de outras espécies de aves, geralmente de Passeriformes. Neste estudo, descrevemos eventos de predação pelo Tucano-toco (*Ramphastos toco*) em ninhos da Curicaca (*Theristicus caudatus*), na RPPN Buraco das Araras, Mato Grosso do Sul, região central do Brasil. Ao menos três dos seis ninhos de curicaca monitorados entre outubro de 2016 e janeiro de 2017 foram predados pelo Tucano-toco. Em um dos ninhos, o único ovo foi carregado para uma árvore próxima, onde o embrião foi engolido por inteiro. Em dois outros ninhos, os ninhos estavam com 10–15 dias de vida quando foram predados. O tucano matou os ninhos agarrando suas cabeças com o bico e agitando-as vigorosamente, provavelmente tentando quebrar seus pescoços. Durante o ataque, os ninhos tentaram se defender projetando seus bicos contra o tucano. Assim que as reações dos ninhos cessaram (mortos ou morrendo), o tucano alimentou-se de alguns pedaços de carne do pescoço dos filhotes. Ao nosso conhecimento, esses são o maior ovo e a maior ave predadas por um tucano.

Key words: Bird behavior · Brazil · Nest predation · Ramphastidae · Threskiornithidae

INTRODUCTION

Nest predation is the main cause of bird nest failure in the Neotropics (e.g., Peris & Aramburú 1995, Thorstrom et al. 2000, Manica & Marini 2012, Davanço et al. 2013), where most of the nest predator species are birds (Menezes & Marini 2017). However, because nest predation events are rarely witnessed (e.g., França et al. 2009a, Batisteli 2016, Batisteli & Sarmento 2016), predator identity and attack behaviors are frequently unknown.

Toucans (Ramphastidae) are typically frugivorous birds (Galetti et al. 2000), but some species complement their diet with invertebrates, small vertebrates, and bird eggs (Skutch 1971, Robinson & Robinson 2001, Ragusa-Netto 2013, Cockle et al. 2016), usually of Passeriformes (Sick 1997, Menezes & Marini 2017). To date, the largest eggs preyed upon by toucans reported on the scientific literature are that of Great Tinamou (*Tinamus major*; ca. 55 x 45 mm) (Arias-Alzate et al. 2012) and of Hyacinth Macaw (*Anodorhynchus hyacinthinus*; ca. 47 x 36 mm) (Pizo et al. 2008, Guedes 2009).

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Here, we provide the first records of Toco Toucan (body mass 540 g, Sick 1997) predation on nests of the Buff-necked Ibis (*Theristicus caudatus* Boddaert, 1783), a species that usually breeds in colonies, and whose main nest predators are raptors and mammals (Donázar et al. 1994, Donázar 1996).

METHODS

We conducted the field study at the “RPPN Buraco das Araras” ecological reserve (21°29′31″S, 56°24′11″W), Mato Grosso do Sul, central Brazil, 336 m a.s.l. The climate is classified as tropical without dry season (Af) according to Köppen with monthly mean temperatures ranging from 18.5 to 25.4°C and annual precipitation around 1600 mm (Alvares et al. 2013). The study area comprises a sinkhole with 100 m depth and 500 m of circumference (Figure 1A). The vegetation within the sinkhole is a perennial forest (i.e., evergreen forest) and its surroundings are mainly composed by Cerrado (i.e., Neotropical savannah). We monitored a colony of six Buff-necked Ibis nests from September 2016 to January 2017 as part of a long-term wildlife-monitoring program. We performed behavioral observation sessions of 3 h in the morning and 3 h in the afternoon on the same day (between 07:00 to 19:00 h), twice a week. We observed the nests with the aid of a binocular (10 × 42 mm) and a video camera (Nikon COOLPIX P900) from platforms at the top of the sinkhole, 30–150 m away from the nests.

RESULTS

The six ibis nests that we monitored were built with wood sticks on small platforms of the sandstone cliff (Figure 1B), 15–80 m away from each other. We recorded Toco Toucans preying on three of these nests, always during periods of parental absence. Toucan singles and pairs were regularly seen at the study area. However, we did not observe defense or alarm behavior by adult ibisses elicited by the presence of toucans, even during predation events. The first predation event occurred at a nest with a single egg, on 25 October. A toucan carried the egg in its beak (Figure 1C) to a nearby tree. Unfortunately, we could not observe how the toucan broke the egg shell because of the tree foliage. A few seconds later, we observed the toucan with the well-developed embryo in its beak, which was swallowed as a whole (Figure 1D).

We observed three 10–15 days old nestlings being killed by the Toco Toucan in two other nests. In a nest 140 m away from the first one, the single nestling was depredated on 2 November, at 16:26 h. The toucan performed short flights through the vegetation to approach the nest. When the toucan perched on the cliff platform where the nest was built, the nestling started snapping repeatedly its bill against the toucan, probably a defense behavior. Soon after, the toucan grabbed the nestling’s head with the beak and

started shaking it sideways, while the nestling’s body remained fairly stationary. We assumed that the toucan was trying to break the nestling’s neck. When the nestling stopped moving, the toucan fed on some pieces of the neck during a few minutes and then left. The body of the dead nestling was not in the nest the next day, probably it was removed by the parents.

The two nestlings of a third nest were depredated on 22 November. At 14:44 h, a toucan approached the nest and attempted to prey upon one of them. In the same manner as observed in the second nest, the toucan held the head of one of the nestlings with the beak and shook it repeatedly (Figure 1E). This behavior was performed approximately 20 times during 5 min. During this period, the other nestling constantly snapped its bill against the toucan. The toucan tried to drag the nestling out of the nest, but accidentally dropped it from the platform where the nest was located. The toucan started to cautiously move through the vegetation toward the bottom of the sinkhole, probably trying to retrieve the prey, but gave up and departed within a few minutes. After 7 min, one parent visited the nest and fed the remaining nestling, but no apparent alarm reaction was noted. The toucan returned and attacked the second nestling at 18:04 h, using the same head-shaking behavior 25 times during 2 min 23 sec. After subduing the prey, the toucan fed on small pieces of the nestling’s neck (Figure 1F). While feeding, the toucan was attacked by a Great Kiskadee (*Pitangus sulphuratus*) and left the nest. By dusk (18:30 h), when our observations for the day ended, the toucan had not returned.

On a fourth nest, the 10-days old nestling disappeared on 25 December. A fifth nest had two nestlings on December 22. One of them disappeared before expected fledging date, and the other one fledged successfully. The two nestlings that disappeared from the fourth and fifth nests were presumably preyed upon, but we have no cues of predator identity in these cases. A sixth nest produced two successful fledglings. A video of the toucan predatory behavior on the first and the third nests is available at <http://www.lestes.ufscar.br/index.php/2017/07/26/tucano-toco>.

DISCUSSION

Here we provide the first records of predation by a ramphastid on Buff-necked Ibis nestlings, which represent, to our knowledge, the largest toucan prey ever reported (Menezes & Marini 2017). Buff-necked Ibis eggs are also larger (66.9 × 44.3 mm, Schönwetter 1967 in Hancock et al. 1992) than those of the known largest preys *T. major* (55 × 45 mm, Arias-Alzate et al. 2012) and *A. hyacinthinus* (47 × 36 mm, Guedes 2009). Considering that feathered ibis nestlings weigh 400–1320 g (Lorenzetto pers. comm.), we estimate that the depredated nestlings weighed between 200–300 g, while Toco Toucans have a body mass of about 540 g (Sick 1997). We observed the



Figure 1. (A) The “Buraco das Araras” ecological reserve, Mato Grosso do Sul, Brazil, November 2017 (B) Buff-necked Ibis (*Theristicus caudatus*) guarding their two nestlings, (C) Toco Toucan (*Ramphastos toco*) picking up a Buff-necked Ibis egg and (D) eating the embryo, (E) attacking Buff-necked Ibis nestlings and (F) consuming a small piece of meat from the nestling’s neck. Photos: Edson Moroni.

toucan shaking the head to kill the nestlings, in the same way as captive Toco Toucans break objects and kill insects (Mikich 1991). There is a report of the Channel-billed Toucan (*R. vitellinus*) subduing a black rat (*Rattus rattus*) by hitting it against a tree branch (Silva & Azevedo 2012). However, the Buff-necked Ibis nestlings were likely too heavy to be picked up by the toucan, which may explain the beak-shaking behavior as an alternative way to kill the nestlings.

Toucans have low rates of vertebrate prey consumption (Remsen et al. 1993, Galetti et al. 2000, França et al. 2009b), but they may be important nest predators in some ecological contexts (Robinson & Robinson 2001, Pizo et al. 2008, Cockle et al. 2016). Nests built on cliffs, such as the studied ones, are likely inaccessible to terrestrial predators (e.g., mammals; Donazar et al. 1996). Among raptors, only the Chimango Caracara (*Milvago chimango*) was

previously reported preying successfully Buff-necked Ibis nests (Donázar et al. 1994, Donázar 1996, Gantz & Yañez 2003). Thus, our results provide direct observations of a second bird species depredating nests of this species. Our observations also suggest that Toco Toucans are able to prey on nests of other bird species with large eggs and nestlings.

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