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PENSOFT

Occurrence of *Oxyruncus cristatus* (Swainson, 1821), Sharpbill (Aves, Oxyruncidae), in the Belem area of endemism and first records from Maranhão, Brazil

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Abstract

We document the first record of *Oxyruncus cristatus* Swainson, 1821, Sharpbill, in the Brazilian state of Maranhão. This represents the first documented occurrence of this species in the Bélem area of endemism. The species was monitored in a fragment of lowland forest where it remained throughout the year, contradicting the altitudinal migrations described for the Amazonian subspecies, *O. c. tocantinsi* Chapman, 1939. It is possible that migratory movements are facultative in *O. cristatus*, or even that extensive deforestation can suppress migratory behavior, based in scattered records.

Keywords

Altitudinal migration, endemic species, geographic distribution, *Oxyruncus cristatus tocantinsi*

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Introduction

Oxyruncus cristatus Swainson, 1821, Sharpbill (Aves, Oxyruncidae), is a small passerine bird with a singular appearance, inhabiting tall rainforests, and typically distributed along an altitudinal gradient (Brooke 2020). *Oxyruncus cristatus* has a disjunct distribution found in a number of regions over the Neotropics, and it is locally rare in all the areas where it occurs (Kirwan and Green 2012; Brooke 2020). This is the only species of the family Oxyruncidae but there are six recognized subspecies (Brooke 2020), although the taxonomy is poorly resolved and the number of subspecies is still debated (BirdLife International 2021; Clements et al. 2021; Gill et al. 2021).

Oxyruncus cristatus populations found in eastern Amazonia south of the Amazon belong to the subspecies *O. c. tocantinsi* Chapman, 1939, which is often considered a junior synonym of *O. c. hypoglaucus* (Salvin & Godman, 1883) (Gill et al. 2021). The available records of the *tocantinsi* subspecies are mainly from the Serra dos Carajás, one of the few upland areas in eastern Amazonia, with a mean altitude of 700 m a.s.l. (Pacheco et al. 2007). However, the type locality of *O. c. tocantinsi* is in the lowlands on the margin of the Tocantins River (Chapman 1939), based on the holotype label, which was collected by Alfonso Ollala in Baião (Pará, Brazil).

The holotype was deposited in the American Museum of Natural History, in New York (AMHN 431219). The municipality of Baião includes both sides of the Tocantins River, although Ollala did not specify from which side the specimen was collected.

The Tocantins River is one of the principal biogeographic barriers of the Amazon region which forms the western limit of the Bélem area of endemism (BAE). The BAE has a unique biota and ecological processes characteristic of the eastern extremity of Amazonia. This region is also the most impacted portion of Amazonia, with approximately 76% of the original forest cover currently lost (da Silva et al. 2005; de Moraes et al. 2020). Only two undocumented records of *O. cristatus* are known from the BAE, from the municipalities of Tailândia and Tomé-Açú, both in Pará (Portes et al. 2011).

Da Silva (1993) suggested that *O. cristatus* of Serra dos Carajás is an altitudinal migrant, due to the lack of records from the lowlands during the breeding season from July to December. Da Silva concluded that *O. cristatus* moves to upland areas of Serra dos Carajás to nest and has a pattern of seasonal movements similar to that observed in the sympatric *Procnias albus wallacei* Oren & Novaes, 1985 and *Contopus nigrescens canescens* (Chapman, 1926). However, Kirwan and Green (2012) cautioned that there are few data on the migratory behavior of *O. cristatus* to confirm this pattern.

Our study provides new records of *O. cristatus* from the lowlands of the BAE. These records are the first documented evidence of the occurrence of the species in the Brazilian state of Maranhão. We also discuss the implications of the evidence on the migratory patterns of the species in the Amazon region.

Methods

Our observations were made in a 1360 ha forest fragment at 200–300 m a.s.l. at Fazenda Boa Esperança. This site is of a high conservation value and is owned by Suzano Papel e Celulose SA. This forest fragment is surrounded by eucalyptus plantations and cattle pasture and is located in the south of the BAE, in the municipality of Cidelândia, Maranhão, Brazil (−05.0604, −047.6918). Vocalizations were recorded non-systematically in June 2021 using a passive acoustic monitoring device adapted from a smartphone. Once detected, the species was monitored using playbacks during the subsequent five months.

Data on the occurrence of *O. cristatus* were compiled from GBIF (2021) to determine the potential patterns of altitudinal distribution of the species over the course of the annual cycle. Given the lack of published occurrence data with altitudes included, elevations were extracted based on geographic coordinates from the SRTM altitude map (Farr et al. 2007), which has a 1 km spatial resolution, using the "raster" package (Hijmans et al. 2012) in R (RStudio Team 2020).

Results

***Oxyruncus cristatus* Swainson, 1821**
Figures 1, 2

New records. BRAZIL – **Maranhão** • Cidelândia, Fazenda Boa Esperança; −05.0442, −047.7088; 260 m a.s.l.; 27.VI.2021; LAM obs.; (ML447665501) • same locality; 10.VII.2021; LAM obs.; 1 adult • same locality; 10. VIII. 2021; LAM obs.; 1 adult • same locality; 16.X.2021; LAM obs.; 1 adult • same locality; 14.XI.2021; LAM

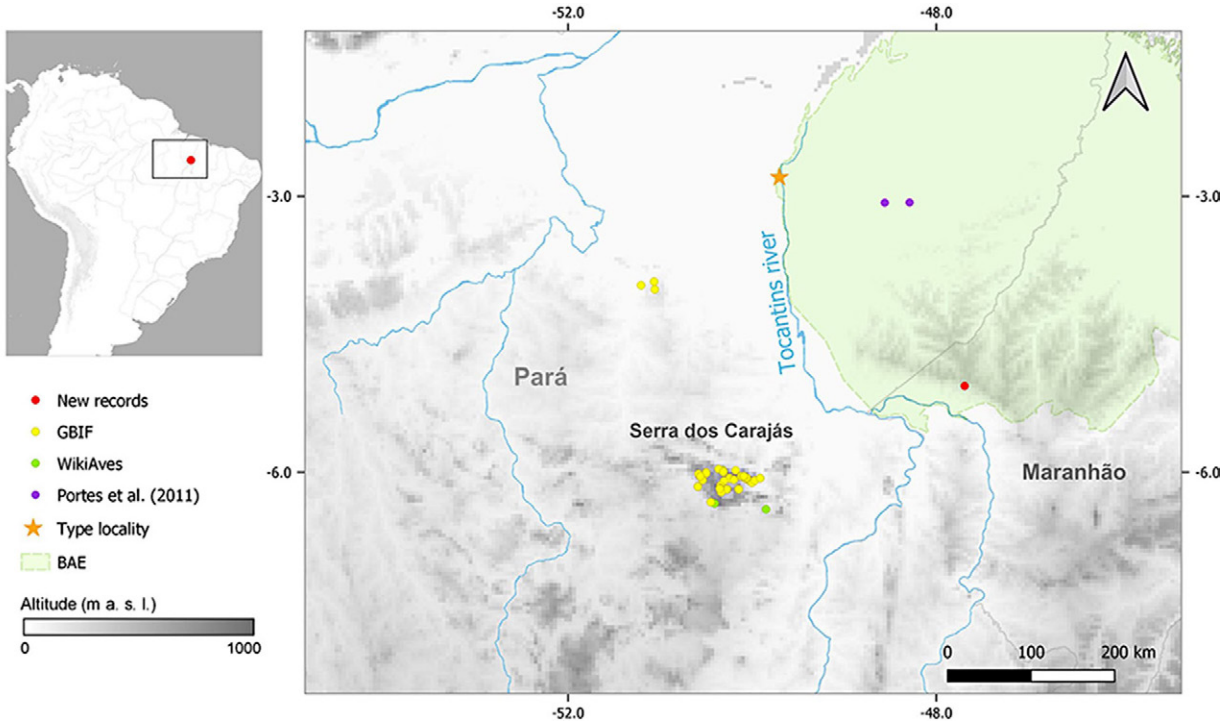

Figure 1. Occurrence records of *Oxyruncus cristatus tocantinsi*, including the new locality from the Belém Area of Endemism.

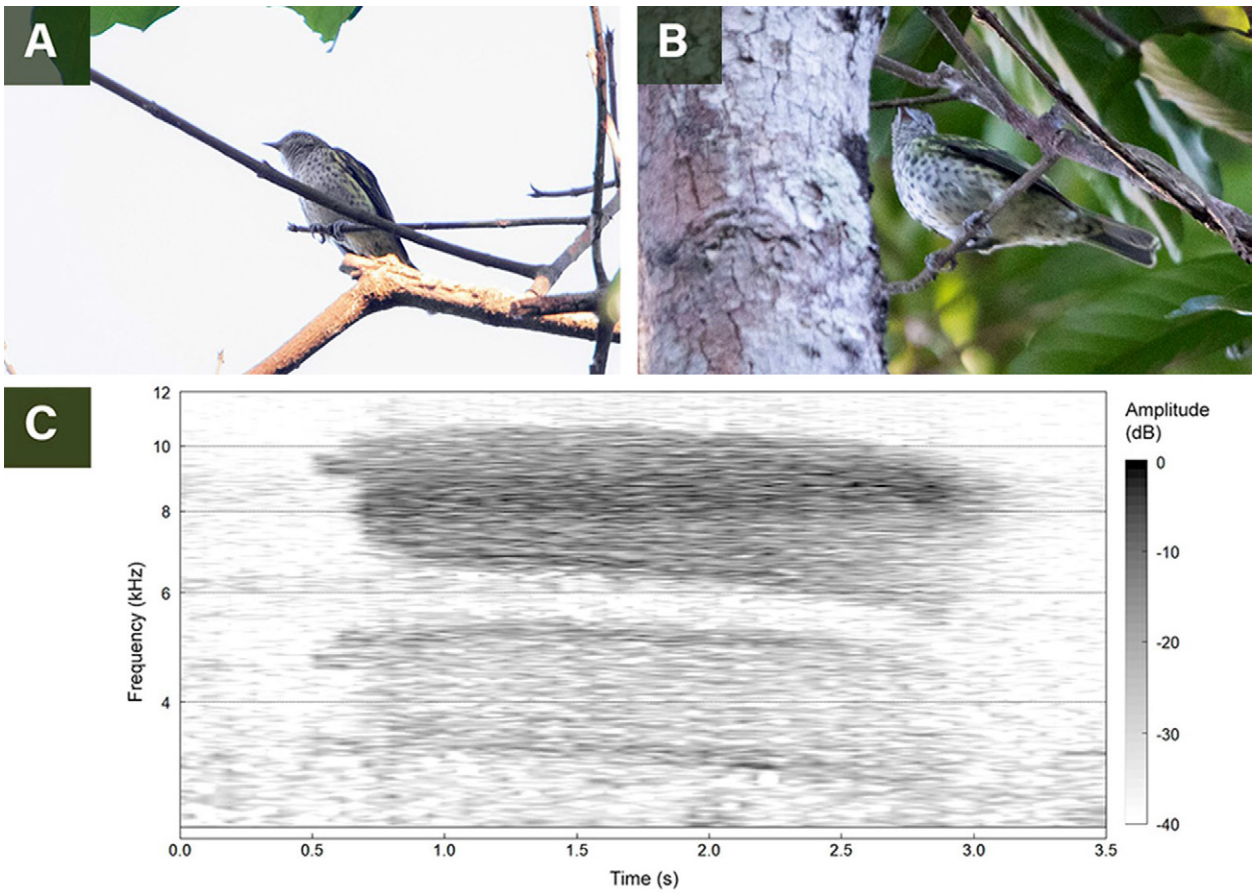

Figure 2. A, B. *Oxyruncus cristatus* photographed at Fazenda Boa Esperança, Municipality of Cidelândia, Maranhão, Brazil. **C.** Spectrogram of the vocalization of the individual recorded in this study.

obs.; 1 adult (ML 447659311) • same locality; 02.VII.2022; L.A. Morais obs. • same locality; 05.VIII.2022; LAM obs. • Cidelândia, Fazenda Boa Esperança; −05.0677, −047.6801; 240 m a.s.l.; 05.VIII.2022; Luis Morais obs.

All the new records were from the same forest fragment. The passive audio recordings from 27 June 2021, detected *O. cristatus* vocalizations in the morning between 6 and 9 am. On 10 July 2021, a bird was observed and photographed vocalizing on emergent perches in the forest canopy (Fig. 2A). On the afternoon of 5 August 2022, two individuals were seen in different localities, one in the locality of the previous records, another single individual was seen foraging in the canopy together with *Loriotus cristatus* (Linnaeus, 1766) and *Terenotriccus erythrurus* (Cabanis, 1847), on the other side of the forest fragment (~4.1 km away). The observed birds always constantly responded to the playback.

Identification. The vocalizations recorded consists of a high descending note (~2.4 seconds) with a wide band of resonant frequencies composed of two harmonics, in which the highest is dominant (Fig. 2C). The individual observed and photographed (Fig. 2A, B) had an olivaceous green dorsum, white breast, flanks with small rounded black spots, reddish iris, and sharply pointed beak. The vocalizing bird was identified as *O. c. tocantinsi* by the white coloration of the underparts, the frequency-saturated vocal pattern.

Habitat. The birds were observed consistently within the forest canopy of a primary *terra firme* rainforest with tall trees. *Contopus n. canescens* also was observed in the same forest fragment.

The evidence, including our new records and 2791 records indexed in GBIF (2021), do not support the existence of a seasonal pattern of altitudinal migration in *O. cristatus* (Fig. 3).

Discussion

Our new data confirm the occurrence of *O. cristatus* in the Brazilian state of Maranhão (de Carvalho et al. 2020) and represent the easternmost locality of the Amazonian populations of the species. Our records extend the known area of occurrence of *O. c. tocantinsi* 335 km southeast of the type locality at Baião, 268 km east of Serra dos Carajás, and 230 km southeast of Tailândia and Tomé-Açú (Portes et al. 2011). Our new data are the first documented occurrence records of the species in the BAE, which suggests that *O. cristatus* may either occur at extremely low densities or at few, widely dispersed localities within this region.

Da Silva (1993) hypothesized that the *O. c. tocantinsi* populations undergo altitudinal migrations to the upland areas of Serra dos Carajás during the breeding season between July and December, but then disperse into the lowlands of Amazonia during non-breeding season.

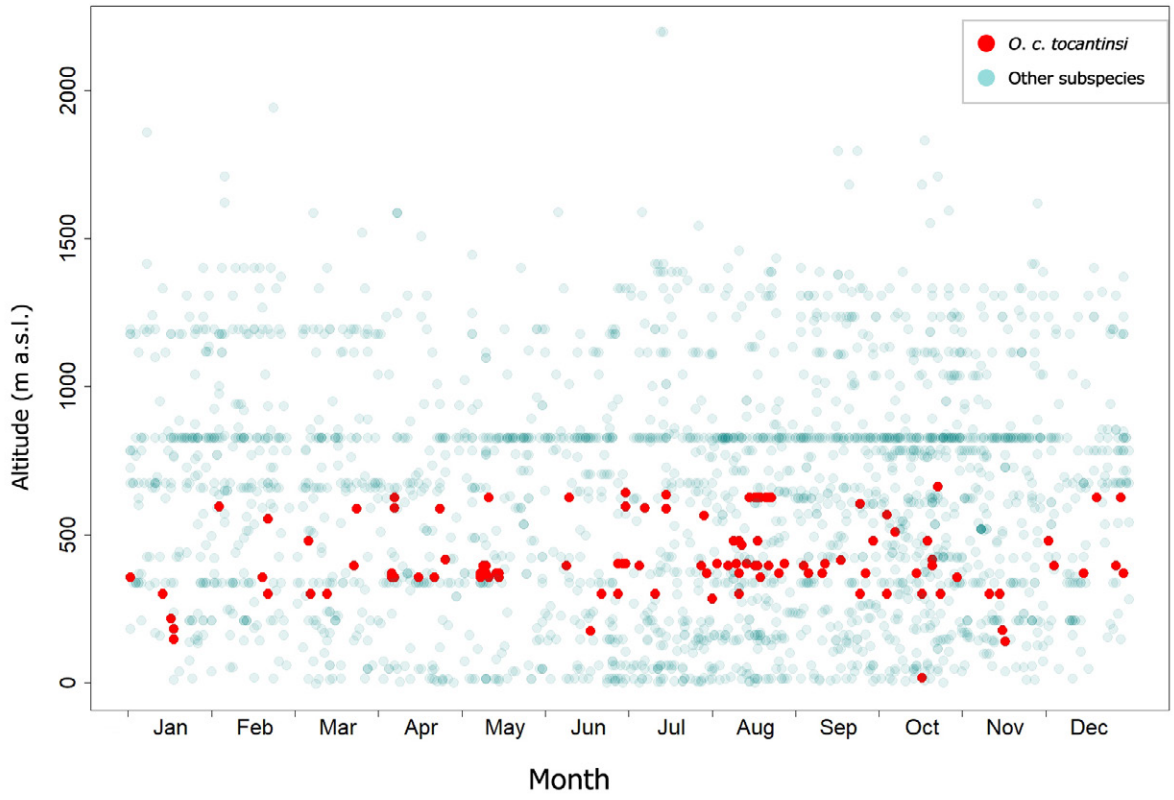

Figure 3. Annual altitudinal variation within the records of *Oxyruncus cristatus*, with emphasis on *O. c. tocantinsi*.

However, the available occurrence data do not support an altitudinal migration pattern with the annual cycle (Fig. 3). Furthermore, the birds that we monitored during our study remained in the area throughout the breeding season show no evidence of migratory movements, contrary what da Silva (1993) thought. The vocalizations captured during our passive recordings and the assiduous response to the playback may indicate that the birds were breeding in the study area.

The non-migratory pattern we observed may be due to intensed deforestation occurring within the region of our study. The forest fragment of our study area is isolated within a matrix of plantations and secondary vegetation, with no fragments of well-preserved forest in the immediate vicinity. Most documented cases of altitudinal migration are partial or facultative, and Neotropical forest-dwelling birds tend to avoid traveling long distances over open areas in fragmented landscapes, preferring to stay in forest remnants (Hsiung et al. 2018). Thus, two hypotheses are proposed: altitudinal migrations are not obligatory in *O. cristatus*, and/or intense local deforestation limits this species' dispersal capacity in the region.

In addition, it is unclear how populations of altitudinal migrants respond to habitat fragmentation (Hsiung et al. 2018), and more systematic studies are needed to define the migratory dynamics of *O. cristatus* and its sensitivity to habitat loss.

Our records of *O. cristatus* extend the known geographic distribution of the species and provide new insights into its migratory patterns. Our records also demonstrate the ecological importance of the biologically rich BAE in general, and Maranhão in particular, reinforcing the need for more effective conservation in these areas.

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Authors' Contributions

Conceptualization: LAM. Data curation: LAM. Formal analysis: LAM. Funding acquisition: FKU. Visualization: LAM, FKU. Writing – original draft: LAM, FKU. Writing – review and editing: LAM, FKU.

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