






First records of Buff-fronted Owl, *Aegolius harrisii* (Cassin, 1849) (Aves, Strigiformes), from the state of Maranhão, northeastern Brazil, and the northernmost record for the Cerrado domain

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Abstract

We present the first record of *Aegolius harrisii* (Cassin, 1849) from the state of Maranhão, extending the known distribution of the species 283 km to the west in the Brazilian Northeast. This record also represents the northernmost locality of the species within the Cerrado phytogeographic domain, which coincides with the ecotone between the Cerrado, Caatinga, and Amazon domains. Given the considerable gaps in the data on the occurrence of this owl in the Brazilian Northeast, we would recommend more surveys in specific areas with similar phytophysiognomies.

Keywords

Aegolini, Caatinga, distribution, filling gap, Maranhão Babaçu Forest, range extension, Strigidae

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Introduction

Buff-fronted Owl, *Aegolius harrisii* (Cassin, 1849), is the only species of its genus found in South America (Holt et al. 2020) and is one of 22 species of Strigidae known to occur in Brazil (Piacentini et al. 2015). Three subspecies are currently recognized: *A. h. harrisii* (Cassin, 1849), which is distributed from northwestern Venezuela to central Peru; *A. h. dabbeni* Olog, 1979, found in northwestern Argentina and southern Bolivia; and *A. h. iheringi* (Sharpe, 1899), which ranges from eastern Bolivia and Paraguay, to eastern and central Brazil,

and south to Uruguay and northeastern Argentina (Holt et al. 2020).

Until the first decade of the 21st century, *A. harrisii* was known only from a few localities within its wide geographic distribution, in particular in Brazil. Since then, additional data have been gathered and new aspects of the natural history of this species, including its vocalizations and habitat preferences, have been described (e.g. Braun et al. 2003; Córdoba and Ahumada 2005; Bodrati and Cockle 2006; Ubaid et al. 2012; Bravo and

Barrio 2014; Ramoni-Perazzi et al. 2014; Ruiz-Esparza et al. 2017; Penagos et al. 2018). Although these studies have provided important insights into the ecological preferences of the species, most of its life history traits remain poorly understood, and the number and size of its populations are probably underestimated (Enríquez 2015; Girão and Albano 2010; Rosa et al. 2015).

In the Brazilian Northeast, *A. harrisii* has been recorded in the states of Alagoas (<https://www.wikiaves.com.br/969427>), Bahia (Studer and Teixeira 1994), Ceará (Girão and Albano 2010), Paraíba (Pereira et al. 2012), Pernambuco (<https://www2.ib.unicamp.br/fnjv/collection.php?fnjv=1338>), and Sergipe (Ruiz-Esparza et al. 2017). There are, however, considerable gaps in the distributional data in the central and western portions of Northeast Region. Herein, we provide the first record of *A. harrisii* from Maranhão and review the available data on its distribution.

Methods

Our study was conducted in the municipality of Caxias, Maranhão, Brazil. Caxias is within the Cerrado phytogeographic domain, although it is influenced by the neighboring Amazon and Caatinga domains. Based on the classification of the world's ecoregions (Olson et al. 2001), the study area is located within the Maranhão Babaçu Forest, which also defined as a transition zone between the Amazon and Caatinga ecoregions. The vegetation of the municipality of Caxias includes a range of different phytophysiognomies, ranging from more open environments, such as the Cerrado *sensu stricto* (scrub

savanna) to dense forest formations, such as the Cerradão (savanna woodland) and gallery forests, which are dominated by buriti palm (*Mauritia flexuosa* L.f.).

The team at the Centro de Estudos Superiores de Caxias, Universidade Estadual do Maranhão, Laboratory of Ornithology has monitored the bird fauna of Caxias since January 2017 in a number of forest fragments within the municipality. During this time, we sporadically made nocturnal surveys, typically one night every three months.

The locality of our new records reported here has a gently sloping relief, covered with predominantly secondary vegetation that has a mean canopy height of 15 m. The dense understory is dominated by vines and lianas, with abundant tucum palm (*Astocaryum* G.Mey.). During the rainy season, the saturation of the water table makes the area swampy, with the water draining off slowly into temporary ponds or nearby reservoirs. The vegetation is densest in the low-lying areas where the canopy is higher, whereas on the higher ground, grasses and small trees predominate, with exposed soil in some areas. There are a number of small villages in the surrounding area, where slash-and-burn subsistence farming is common, in addition to areas of cattle pasture.

We compiled available distributional data on *A. harrisii* from the literature and the ornithological collections (Table 1) of the Museu Paraense Emílio Goeldi (MPEG; Belém, Brazil) and the Museu de Zoologia da Universidade de São Paulo (MZUSP; São Paulo, Brazil). We also consulted six online databases: Macaulay Library (2020), WikiAves (2020), Xeno-canto (2020), speciesLink (2020), Global Biodiversity Information Facility (GBIF.

Table 1. Records of *Aegolius harrisii* from the Brazilian Northeast. Only the oldest reference and/or voucher is shown for localities when more than one record is available. Numbers in Map column are linked to Figure 2.

Map	Latitude	Longitude	Locality	Municipality	State	Year	Author(s) / voucher [†]
★	−04.9500	−043.4661	Araras	Caxias	Maranhão	2018	Present study / ML268699911
1	−09.7494	−037.4352	Unspecified*	Pão de Açúcar	Alagoas	2013	Têia, P / WA969427
2	−09.2325	−038.9041	Unspecified*	Macururê	Bahia	1974	Vielliard, J / FNVJ1341
3	−012.6972	−038.3330	Vargem da Meira	Camaçari	Bahia	1985	Studer and Teixeira (1994)
4	−014.5313	−040.3650	Unspecified*	Poções	Bahia	2018	Gonçalves, M / WA3103058
5	−014.4119	−040.1161	Unspecified*	Boa Nova	Bahia	2000	MZ76481
6	−013.5608	−044.7980	Unspecified*	Correntina	Bahia	1993	Antas et al. (1993)
7	−04.8530	−039.5744	Unspecified*	Madalena	Ceará	1975	Vielliard, J / FNVJ1339
8	−04.1000	−039.0500	Inhuporanga	Caridade	Ceará	1990	Studer and Teixeira (1994)
9	−07.2330	−039.5000	Chapada do Araripe	Crato	Ceará	1996	Girão and Albano (2010)
10	−04.4836	−039.5841	Serra do Machado	Canindé	Ceará	2004	Girão et al. (2007)
11	−04.5000	−039.5666	Unspecified*	Itatira	Ceará	2004	Girão, W / XC6421
12	−04.2405	−038.9397	Serra de Baturité	Guaramiranga	Ceará	2007	Girão et al. (2006) / XC10624
13	−03.5400	−040.4536	Unspecified*	Meruoca	Ceará	2010	Brito, C / XC329839
14	−03.8113	−039.4736	RPPN Mãe-da-Lua	Itapagé	Ceará	2012	Reides, H / WA571064
15	−05.1416	−040.9161	Serra das Almas	Crateús	Ceará	2019	Girão, W / WA3528147
16	−07.3563	−037.6136	Unspecified*	Imaculada	Paraíba	2009	Pereira et al. (2012)
17	−07.9822	−038.2894	Unspecified*	Serra Talhada	Pernambuco	1975	Vielliard, J / FNVJ1338
18	−08.8827	−036.4969	Fazenda Fojos	Garanhuns	Pernambuco	2018	Oliveira (2018) / WA2978376
19	−010.7466	−037.3769	Parque dos Falcões	Itabaiana	Sergipe	2014	Ruiz-Esparza et al. (2017)

*Unspecified localities were georeferenced at the municipal seat.

[†]Fonoteca Neotropical Jacques Vielliard (FNVJ), Macaulay Library (ML), Museum of Zoology of the University of São Paulo (MZ), WikiAves (WA), Xeno-canto (XC).

org 2021), and Fonoteca Neotropical Jacques Viellard (2020). We also revised the inventory of the bird fauna of the state of Maranhão, based on Oren (1991), together with the new records from the sources identified above. We produced the map in QGIS v. 3.14 Pi (QGIS Development Team 2020). We deposited our photograph of *A. harrisii* in the Macaulay Library (2020) database and the voice recording in the Xeno-canto (2020) database.

Results

Aegolius harrisii (Cassin, 1849)

Figures 1–3

New records. BRAZIL – Maranhão • Caxias, Araras Village; –04.9500, –043.4661; 100 m a.s.l.; 5.V.2018; 1 adult; ML268699911 • same locality; 1.VI.2018; 1 adult; XC570829.

One individual (Macaulay Library: ML268699911) was a single bird vocalizing spontaneously at the forest edge adjacent to a dirt road. It was perched in the tree subcanopy at a height of 6 m, where it vocalized for approximately 10 min. The other individual (XC570829) was also observed alone in its perch in a tree at a height of 8 m. It responded to playback by vocalizing and observed for approximately 30 min before it flew away into the forest.

Identification. We identified *A. harrisii* by a set of

remarkably diagnostic features which include: the characteristic vocalization unlike any other species in the region; the facial disc outlined in black with buff trim which contrasts with the dark head; the yellowish-buff fore-crown and collar on the hindneck and chocolate-brown upperparts; the brown lores to the base of the bill; the blackish tail, with two broken, white bars and white tip; the primaries notched with white and the wing-coverts with white spots; and the tarsi feathered cream-yellow.

Discussion

Our new records represent an extension of the geographic range of *A. harrisii* by approximately 283 km to the northwest of the nearest previous record at Crateús, in Ceará state. In northeastern Brazil, *A. harrisii* has been recorded previously from the states of Bahia, Ceará, Pernambuco, Paraíba, Alagoas, and Sergipe (Table 1; Fig. 2), but not in Maranhão.

Aegolius harrisii was first recorded in northeastern Brazil in 1974, in the municipality of Macururê, Bahia (Fonoteca Neotropical Jacques Viellard: FNJV1341). Since this initial record, *A. harrisii* has been reported regularly from new localities within the region (Fig. 3). It has only been in the past five years, however, that the first records have been obtained from the state of Alagoas (Rodrigues 2013) and the Atlantic Forest of



Figure 1. *Aegolius harrisii* (ML268699911) from municipality of Caxias, state of Maranhão, Brazil.

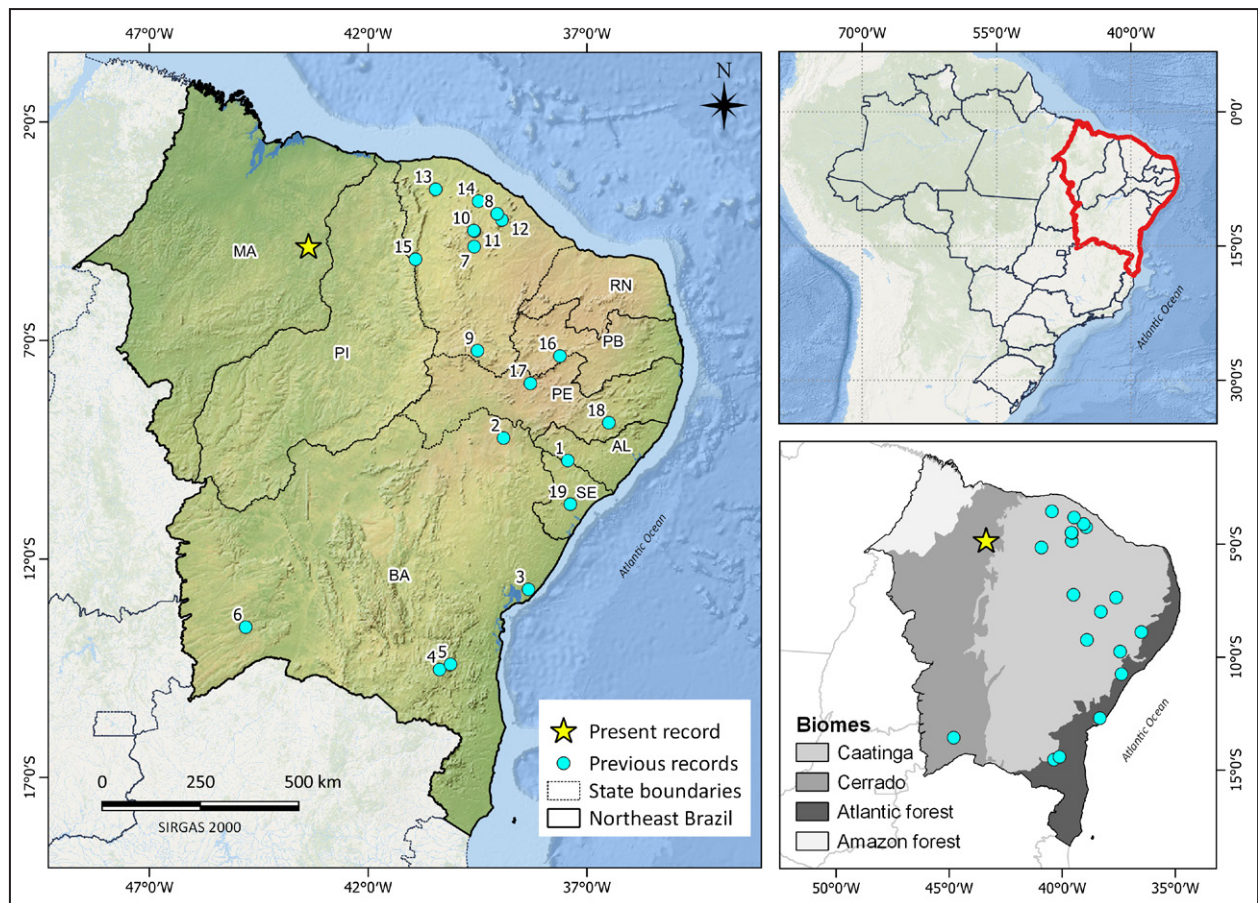


Figure 2. Localities of *Aegolius harrisii* in northeastern Brazil. Blue circles indicate the existing records; the star shows the new locality in the state of Maranhão.

Sergipe (Ruiz-Esparza et al. 2017). In Pernambuco (Oliveira 2018) and Alagoas (Rodrigues 2013), *A. harrisii* has been documented by photographs but without additional information provided on the habitat. From the state of Paraíba, this species was first recorded in an area of

Caatinga (Pereira et al. 2012), as in the municipality of Serra Talhada Pernambuco, where *A. harrisii* was first recorded in 1975 by the ornithologist Jacques Vielliard (Fonoteca Neotropical Jacques Vielliard: FNVJ1338).

Records of *A. harrisii* from the Brazil Northeast are

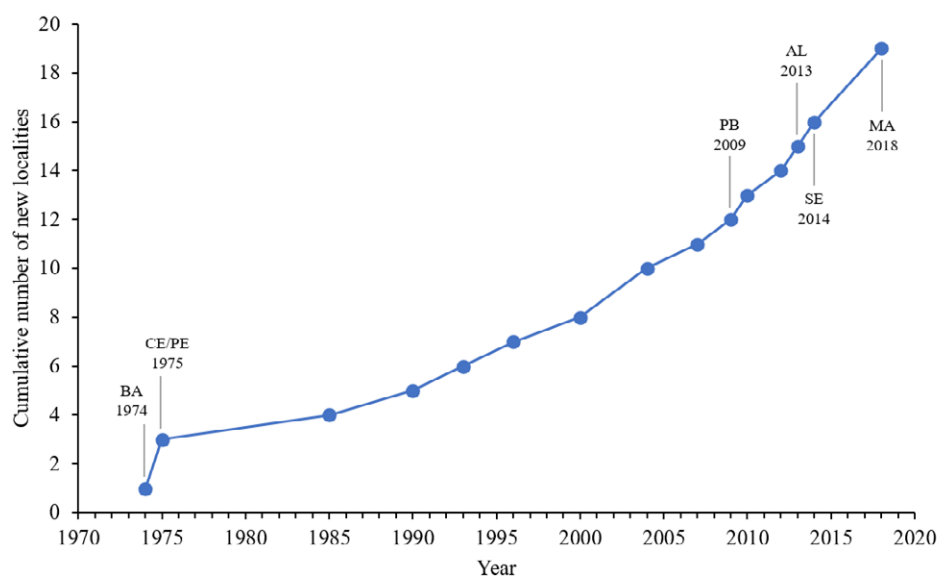


Figure 3. Cumulative number of the new occurrence localities of *Aegolius harrisii* in northeastern Brazil. The dots on the line indicate the year of the first record in the respective state. Bahia (BA), Ceará (CE), Pernambuco (PE), Paraíba (PB), Alagoas (AL), Sergipe (SE), and Maranhão (MA).

concentrated in the region's Caatinga and Atlantic Forest domains, with only two records from the Cerrado (Antas et al. 1993; new records). A prominent gap exists in the central-western portion of this region (Fig. 2), and the occurrence of *A. harrisii* in the states of Rio Grande do Norte and Piauí has yet to be confirmed.

Aegolius harrisii appears to prefer arboreal vegetation of varying densities and with a low canopy, including riparian forest and forest edges and at different stages of succession (Kaminski 2009; Santos 2009; Girão and Albano 2010; Rebelato et al. 2011; Ubaid et al. 2012; Rosa et al. 2015; Santos et al. 2014; Dornas et al. 2017). While little is known of the ecological requirements of this species, it does appear to be relatively flexible and able to occupy a wide range of varied phytophysognomies. In São Paulo state, *A. harrisii* has been recorded in small fragments of Cerrado within a mosaic of gallery forests and plantations of *Pinus* L. and *Eucalyptus* L'Hér., which indicates that this species may tolerate a certain level of habitat disturbance (Ubaid et al. 2012). In Goiânia, Goiás, this owl was observed occupying a hole in the trunk of a macaúba palm (*Acrocomia aculeata* (Jacq.) Lodd ex R.Keith) in a deforested area near the urban zone (Dornas et al. 2017). These findings are relatively consistent with our study, in which *A. harrisii* was recorded in fragments of secondary forest in the vicinity of an anthropogenic landscape of villages and pastures.

Enríquez (2015) concluded that one of the factors determining the major gaps in the known distribution of *A. harrisii* was the fact that the behavior of the species is relatively discreet and poorly known, which may mean that it is often overlooked during surveys. In addition, Ubaid et al. (2012) pointed out that the vocalization of this owl is similar to those of a number of amphibian species, with which it may be confused, especially when heard over a distance.

The scarcity of basic ecological data for most Brazilian owls is one of the principal obstacles for the development of adequate plans for the management and conservation of owl species (Motta-Júnior 1996). Our new Maranhão records of *A. harrisii* represent an important first step toward the understanding of the habitat preferences of this species in the transition zone between three of the Brazil's principal biomes. Ultimately, we hope that this study provides an incentive for more systematic surveys within the areas of northeastern Brazil that lack data, including the major gas in Bahia and Maranhão, as well as in Piauí and Rio Grande do Norte.

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F. Silveira helped with information on the specimens deposited in the MZUSP. Stephen Ferrari kindly reviewed the English version of the manuscript. Finally, we express our thanks to two anonymous reviewers for their comments and suggestions that improve the manuscript.

Authors' Contributions

AFTS, HRSM and FKU wrote the manuscript; FKU prepared figures, photographed, recording, deposited the media in online databases, and revised the draft.

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