

## RECENT OCCURENCES OF THE GREAT ANTSHRIKE *TARABA MAJOR* (VIEILLOT, 1816) (AVES: THAMNOPHILIDAE) IN NATURAL ENVIRONMENTS OF THE LARGEST URBAN AREA IN SOUTH AMERICA

**FABIO SCHUNCK**

Brazilian Committee for Ornithological Records (CBRO), Av. Eugênio Bartolomai 386, CEP 04785-040, São Paulo, SP, Brasil, fabio\_schunck@yahoo.com.br

**MARCUS AZEVEDO**

Clube de Campo de São Paulo (CCSP), Praça Rockford, 28, CEP: 04826-410, São Paulo - SP, Brasil

**Abstract:** The Great Antshrike *Taraba major* is a forest bird widespread in seasonally dry environments throughout tropical America. In the state of São Paulo, southeast Brazil, the species has historically been restricted to western regions. Still, the number of detections in the eastern region has been increasing in recent decades. We compiled and evaluated available records for the species in the Metropolitan Region of São Paulo (MRSP) and one record for the coast to understand how it has been accessing the largest urban area in South America. We found 15 records made in the last eight years at 11 locations, including riparian environments, solitary birds, subadult birds, and a predominance of unique records, indicating its occurrence in MRSP is recent. The concentration of records in the northwest region of MRSP may indicate a possible entry route, facilitated by the absence of a dense forest barrier and the presence of the region's main river. Occurrences close to the main rivers of MRSP suggest the use of riparian forests for movement and permanence. The presence of a bird species typical of interior dry forests in a region of humid forests (including the coast) shows a high capacity for dispersion and possibly adaptation, in addition to possible changes in the fragmented natural environments of MRSP. This study contributes to a better understanding of the successful colonization of MRSP by inland birds, as well as the potential for future colonization resulting from climate change.

**Keywords:** Atlantic Forest, Brazil, Metropolitan Region of São Paulo.

### OCORRÊNCIAS RECENTES DO CHORÓ-BOI *TABARA MAJOR* (AVES: THAMNPHILIDAE) EM AMBIENTES NATURAIS DA MAIOR ÁREA URBANA DA AMÉRICA DO SUL

**Resumo:** O choró-boi *Taraba major* é uma espécie de ave florestal que possui uma ampla ocorrência nos ambientes mais secos da América do Sul, incluindo o Brasil. No estado de São Paulo, sudeste do Brasil, historicamente essa espécie esteve restrita às regiões interioranas, mas nas últimas décadas o número de detecções vem aumentando na região leste. Organizamos e avaliamos os registros disponíveis para a Região Metropolitana de São Paulo (RMSP) e um registro para o litoral, com o objetivo de entender como essa espécie vem acessando a maior área urbana da América do Sul. Encontramos 15 registros feitos nos últimos oito anos, em 11 localidades, incluindo ambientes ripários, aves solitárias, aves subadultas e uma predominância de registros únicos, indicando uma ocorrência recente. A concentração de registros na região noroeste da RMSP pode indicar uma possível rota de entrada, facilitada pela ausência de uma barreira florestal densa e a presença do principal rio da região. A ocorrência próxima dos principais rios da RMSP pode indicar o uso das matas ripárias para locomoção e permanência. A presença de uma ave típica das matas secas do interior em uma região de matas úmidas (incluindo o litoral) mostra uma alta capacidade de locomoção e possivelmente adaptação, além de possíveis mudanças nos ambientes naturais fragmentados da

RMSP. Esse estudo poderá ajudar à entender tanto as colonizações bem sucedidas de aves do interior na RMSP, como principalmente o potencial de futuras colonizações decorrentes das mudanças climáticas.

**Palavras-chave:** Mata Atlântica, Brasil, Região Metropolitana de São Paulo.

## INTRODUCTION

The Great Antshrike *Taraba major* (Vieillot, 1816) occurs from southern Mexico to northern Argentina, including some islands off north South America such as Trinidad and Tobago (Zimmer & Isler, 2020). It can be found in almost all states of Brazil, with exceptions being the southernmost of the country (Sick, 1997). Occurrences in the state of São Paulo, Southeast Brazil, are concentrated in the central-western region and, mainly, the central-northern region, where occur drier vegetation (Willis & Oniki, 2003). The species live in different types of environments, such as dense second-growth forests, gallery forests, edges of dry forests, cerrado and caatinga, as well as swampy savannas and palm-grove (Sick, 1997; Willis & Oniki, 2003; Sigrist, 2006; Zimmer & Isler, 2020). It feeds primarily on insects, but also consumes mollusks, crustaceans, and small vertebrates, such as mammals, frogs, lizards, and fish, as well as vegetable matter (Zimmer & Isler, 2020). It lives in the forest understory, where it usually follows mixed flocks and ant-following birds (Willis & Oniki, 2003; Sigrist, 2006; Zimmer & Isler, 2020). It is a resident species in most of its range, but some evidence suggests seasonal movements in northern Argentina (Zimmer & Isler, 2020).

The Metropolitan Region of São Paulo (MRSP) is located in the eastern region of São Paulo State and is the largest urban area in South America with around 22 million inhabitants (IBGE, 2024). The region contains important natural forest remnants and a diverse bird community, with more than 600 species already recorded (Willis & Oniki, 2003), including species typical of the interior of the state that have colonized MRSP in recent decades, such as the Green Ibis *Mesembrinibis cayennensis* (Gmelin, 1789) (Antunes et al., 2008), the White-eyed Parakeet *Psittacara leucophthalmus* (Statius Muller, 1776) (Figueiredo & Lo, 2000), the Narrow-billed Woodcreeper *Lepidocolaptes angustirostris* (Vieillot, 1818) (São Paulo 2022), and the Curl-crested Jay *Cyanocorax cristatellus* (Temminck, 1823) (São Paulo, 2022). Comparison of the historical data presented by Willis & Oniki (2003) with current data from bird observers and photographers (eBird, 2024; WikiAves,

2024), reveals that the number of field records of the Great Antshrike in eastern São Paulo State has increased substantially in the last 15 years. Thus, some locations near MRSP, such as the Serra do Japi region, where the species had not been recorded until the 1990s (Silva, 1992; Willis & Oniki, 2003), have become part of its new area of occurrence (eBird, 2024; WikiAves, 2024). Based on this scenario, we compiled and evaluated available records of the Great Antshrike in MRSP to understand how this species has been accessing the largest urban area in South America.

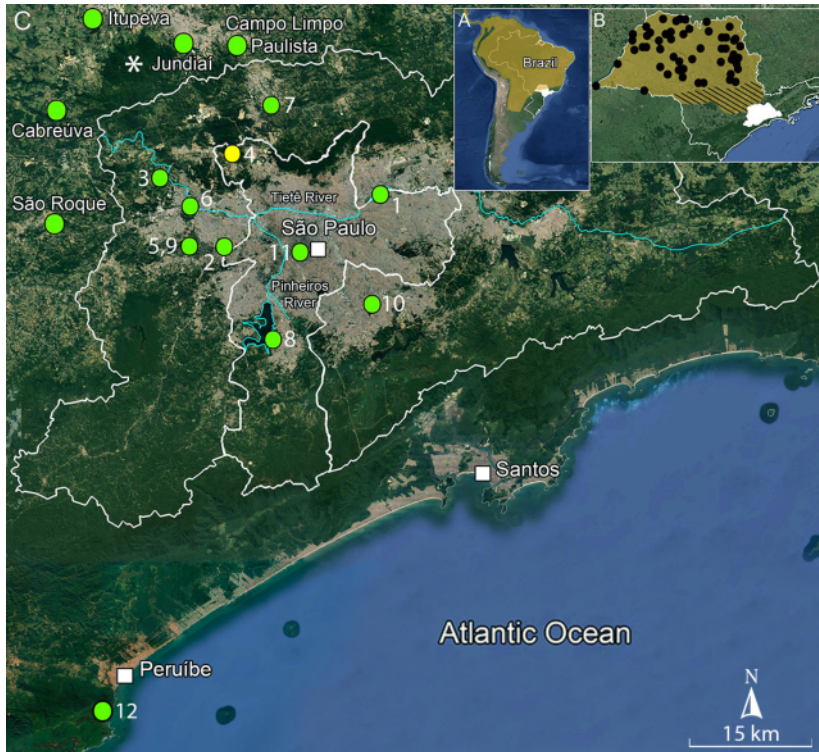
## MATERIAL AND METHODS

### STUDY AREA

The Metropolitan Region of São Paulo (MRSP) is located in the Serra do Mar region (~700-800m average altitude) and encompasses 7,944 km<sup>2</sup> and 39 municipalities in eastern São Paulo State, Southeast Brazil (EMPLASA, 2022). The region is part of the Atlantic Forest domain and is surrounded by native forests, forming a green belt that is part of the Atlantic Forest Biosphere Reserve (Costa, 1997) (Fig. 1). The climate is humid subtropical or warm temperate, and temperatures vary between 0° C in winter and above 27° C in summer (Alvares et al., 2013).

### SECONDARY DATA

The digital databases Web of Science, Scopus, and Google Scholar were searched using combinations of the following keywords in Portuguese and English: *Taraba major*, choróboi/Great Antshrike. Ornithological collections were checked through the Global Biodiversity Information Facility (GBIF; <https://www.gbif.org/>). Also consulted were the digital databases of Centro de Estudos Ornitológicos (a non-governmental organization in the city of São Paulo that performs ornithological surveys; <https://www.ceo.org.br/>), Ornis (<https://www.ornisnet.org/>), and SpeciesLink (<https://www.splink.cria.org.br/>), as well as the online birdwatching platforms WikiAves (<https://www.wikiaves.com.br/>) and e-Bird (<https://ebird.org/>), of wildlife vocalizations Xeno-canto



**Fig. 1.** Occurrence of the Great Antshrike *Taraba major*. A. Range in South America (brown) according to BirdLife International (2023). B. Area of occurrence in the state of São Paulo, Southeast Brazil, with black dots representing data from the literature, field, and museums, compiled until 2002 by Willis & Oniki (2003); the brown area is the distribution with data from the last 15 years available on the online platform WikiAves (WikiAves, 2024) and the brown hatched area is the area of expansion in the eastern region of São Paulo State in recent decades, based on data from WikiAves, with the location of the Metropolitan Region of São Paulo - MRSP shown in white. C. Locations of Great Antshrike occurrence in MRSP (larger white outline) and the municipality of São Paulo (smaller white outline); green dots are documented records; yellow dot is an undocumented record. The numbering indicates the chronological sequence of the records as shown in Table 1. The green lines indicate the Tietê and Pinheiros rivers and the Guarapiranga reservoir. The asterisk next to Jundiá indicates Serra do Japi (© Google Earth, Landsat / Copernicus 2015).

**Fig. 1.** Ocorrência do choró-boi *Taraba major*: A. Área de ocorrência na América do Sul (marrom) segundo BirdLife International (2023); B. Área de ocorrência no estado de São Paulo, sudeste do Brasil, onde os pontos pretos são dados da literatura, campo e museu, organizados até 2002 por Willis & Oniki (2003), a área marrom é a distribuição com dados dos últimos 15 anos disponíveis na plataforma online WikiAves (WikiAves, 2024) e a área marrom hachurada é a área de expansão das últimas décadas do Choró-boi na região leste de São Paulo, com base nos dados do WikiAves, com destaque para a localização da Região Metropolitana de São Paulo - RMSP (área branca); C. Localidades de ocorrência do choró-boi na RMSP (contorno branco maior) e no município de São Paulo (contorno branco menor): Pontos verdes são registros documentados; Pontos amarelos são registros não documentados. A numeração indica a sequência cronológica dos registros conforme a Tabela 1. As linhas verdes indicam os rios Tietê, Pinheiros e a represa do Guarapiranga. O asterisco ao lado da localidade Jundiá indica a Serra do Japi (© Google Earth, Landsat / Copernicus 2015).

(<https://xeno-canto.org>), and of biodiversity iNaturalist (<https://www.inaturalist.org/>), up to 11 October 2024.

#### FIELD DATA

Although the present study did not per-

form any field sampling designed to detect the Great Antshrike in MRSP, the field information considered herein comes from a 25 year of field ornithological studies by the authors in different locations within MRSP (e.g., Schunck et al., 2019; Azevedo et al., 2021), mainly in the region of the Guarapiranga reservoir.

## RESULTS

### SECONDARY DATA

Bibliographic research on the occurrence of the Great Antshrike in MRSP returned two records (Dores et al., 2020; São Paulo, 2022), both at Parque Ecológico do Tietê, a reserve located in the municipality of São Paulo (Fig. 1C, number 1, Tab. 1). Ornithological collections on the occurrence of the Great Antshrike in MRSP did not return any records.

The online platforms returned 14 records made between 2015 and 2024 (nine from WikiAves and eight from eBird, with some records posted on both platforms), at eight locations (seven municipalities) within MRSP, including the Parque Ecológico do Tietê and one municipality (Peruíbe) outside the MRSP, on the south-central coast of São Paulo (Fig. 1). Of this

total, ten records have some type of documentation (nine photos and two audio recordings) and nine give the sexes of the birds, with three males and five females among the records of just one bird detected, and a male and a female among the records of two birds detected. Two of the male records were of subadults, one with brown feathers on its wings and red/brown eyes (WA3640916) and the other, probably older, with few brown feathers and completely red eyes (WA4646936). Only three locations had more than one sequential record, but only one of these (Fig. 1C, number 9) had records made in two different years (2020 and 2023). The altitudes of the MRSP records ranged from 710 to 1,065 m, and seven were in environments near a water body (river or lake). The record made in Peruíbe

**Tab. 1.** Records of the Great Antshrike *Taraba major* in the Metropolitan Region of São Paulo and Peruíbe, on the coast. An asterisk next to a location name indicates the presence a water body (river or lake). Type of record/documentation: R, vocalization recording; P, Photography; NI, Not informed; A, Audio record. Sex: C, couple; F, female; M, male.

**Tab 1.** Registros do choró-boi *Taraba major* na Região Metropolitana de São Paulo e Peruíbe, no litoral. Asterisco junto ao nome da localidade indica a presença de algum tipo de corpo d'água no local, seja rio ou lago. Na coluna Tipo de Registro/Documentação: R. vocalização gravada; P. fotografia; UN. Não informado; A. registro auditivo. Na coluna Sexo: C. casal; F. fêmea; M. macho.

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N°	Date DD/MM/YEAR	Locality	Municipality	Geographic Coordinates	Altitude (m)	Author	Type of record/documentation	Sex	Source
1	17/06/2015	Parque Ecológico do Tietê*	São Paulo	23°29'15.05"S 46°30'57.28"W	730	Romeu Gama	R		WA1731058
2	27/12/2016	Residencial Eldorado	Osasco	23°35'9.93"S 46°47'54.73"W	790	Júlio Dias Oliveira	P	C	WA3640916 WA3640915
3	25/12/2018	Not informed	Santana de Parnaíba	23°26'44.47"S 46°55'7.13"W	710	Fabiano Martins Bispo	P	F	WA3770764
4	20/09/2019	Parque Anhanguera	São Paulo	23°27'22.89"S 46°46'8.12"W	1065	Various authors	NI		S59952812
5	01/12/2020	Condomínio Terras do Madeira*	Carapicuíba	23°33'48.9"S 46°52'22.9"W	740	Rafaella Mata	P	F	WA4100275 S76930459
6	14/12/2021	Not informed	Barueri	23°30'21.58"S 46°52'41.85"W	765	Pedro Cristales	P	M	WA4646936
	22/12/2021	Not informed				Edilson Pichiliani	P	M	WA4655776
7	01/06/2022	Not informed	Franco da Rocha	23°19'57.02"S 46°43'27.98"W	735	Jean Barcik	NI		S113082277
	02/06/2022					Paola Alves	R		WA4870400, S111941966
8	28/08/2023	Clube de Campo de São Paulo*	São Paulo	23°44'25.71"S 46°43'5.06"W	750	Marcus Azevedo	P	F	present study
9	30/08/2023	Condomínio Terras do Madeira	Carapicuíba	23°33'48.9"S 46°52'22.9"W	740	José Carlos Carvalho	A		S148545600
	03/09/2023					Various authors	A		S148911570
10	19/10/2023	Parque Central*	Santo André	23°40'37.03"S 46°31'49.74"W	795	Marcelo Feliti	P	M	WA5681222
11	21/09/2024	Parque Ibirapuera*	São Paulo	23°35'10.3"S 46°39'32.8"W	750	Various authors	P	F	<a href="#">S195996466</a>
12	11/10/2024	Guaraú*	Peruíbe	24°22'02.7"S 47°01'34.3"W	15	Elen Dias and Luiz Carlos Balbino	P	F	S198397581 WA6404998



**Fig. 2.** Adult female Great Antshrike *Taraba major*, recorded at Clube de Campo de São Paulo, municipality of São Paulo. A. Bird sitting next to a feeder and B. Bird sitting on the ground, next to a feeder (Marcus Azevedo).

**Fig. 2.** Fêmea adulta de choró-boi *Taraba major* registrada no Clube de Campo de São Paulo, município de São Paulo. A. Ave pousada ao lado de um comedouro e B. Ave pousada no chão, ao lado de um comedouro (Marcus Azevedo).

(WA6404998) was at sea level, in a resting forest (Fig. 1C, number 12, Tab. 1).

**FIELD DATA**

Around 2 pm on August 28, 2023, the author M.A. detected an adult female of the Great Antshrike in the plant nursery of Clube de Campo de São Paulo, a private property located on the edge of Guarapiranga reservoir in the southern region of the municipality of São Paulo and the south-center of MRSP (23°44'25.71" S, 46°43'5.06" W, 750 m) (Fig. 1C, Number 8). The bird was sitting about 1.5 m above the ground at the edge of the riparian forest with dense vegetation and then descended to the ground approaching a bird feeder in the area, where it remained for less than a minute, returning to dense vegetation (Fig. 2A and B). The bird was observed at the site for three consecutive days, as it fed on small insects that it captured in the dense vegetation; it was no longer observed in the following days, even with the use of playback.

**DISCUSSION**

The occurrence of the Great Antshrike in MRSP appears to be a recent phenomenon, as it has only been recorded in the last eight years,

and with few records (14) and locations (8), despite more than 200 years of ornithological studies in the region (Willis & Oniki, 2003; Schunck, 2008).

Most of the records of the Great Antshrike in MRSP are concentrated in its northwest region, near neighboring municipalities that also started to have records for this species from 2013 onwards (i.e., Itupeva, Jundiaí, Campo Limpo Paulista, Cabreúva, and São Roque; Fig. 1C), indicating that it is a likely "gateway" for these birds. The northwest region of MRSP has fewer geographic barriers than the north and northeast regions, which contain the Serra da Cantareira forest block. In addition, the northwest region contains the Tietê river, the main river in the state of São Paulo that connects the drier region of the interior with the humid region of the east, which may facilitate the movement of these birds.

Records made in 2023/2024 in the southern region of MRSP, at the Guarapiranga reservoir (São Paulo) and Parque Central (Santo André), show an expansion of the species' occurrence towards the south, probably following the Pinheiros river and benefiting from the marginal vegetation of reservoirs and artificial lakes (Fig. 1C, numbers 8 and 10).

The record made in Peruíbe in 2024



shows that this species has already crossed the limit of the MRSP towards the south, being the first documented record for the coast of São Paulo. To reach Peruíbe, the respective individual had to cross the dense forest of Serra do Mar, a behavior similar to that observed by an individual of Large-billed Antwren in July 2023 (Quaresma et al., 2024) (Fig. 1C, number 12). The single record of Peruíbe can still be treated as a vagrant bird, but nothing prevents it from being the beginning of a colonization process, similar to what was observed in the MRSP.

Most of the records made at MRSP were of solitary birds (including some subadults) and were the only records at their respective locations (including Clube de Campo de São Paulo on Guarapiranga reservoir, which has been studied ornithologically over the last 25 years; Azevedo et al., 2021; Fig. 1C, Number 8), indicating that the birds were probably dispersing and had not yet established a territory. A single location (in the municipality of Carapicuíba) presented two records in different years, which may indicate the residence of this species, but better verification is needed including documentation of reproduction. Until that time, all available records could be considered of wandering birds.

This late arrival of the Great Antshrike to MRSP draws attention when compared to other birds typical of the interior of the state, such as the Narrow-billed Woodcreeper, which was first recorded in the municipality of São Paulo in the early 1990s (São Paulo, 2022). This difference may be associated with the distinct type of habitat of each species and the conservation history of these habitats, with the Great Antshrike being from denser forest and the Narrow-billed Woodcreeper from open forest, such as cerrado (Sick, 1997). According to Willis & Oniki (2003), the Great Antshrike originally occurred in the most central region of São Paulo State, far from MRSP (Fig. 1 B). Then, with the extensive deforestation in São Paulo over past centuries (Dean, 2004), the species may have become even more isolated from the eastern region due to the reduction of forests in the interior. However, some forest environments, including riparian forests, have been regenerating in recent decades (naturally and through conservation actions) in the state of São Paulo (Silva et al., 2016), generating corridors for fauna that may be serving as a connection between the drier remaining environments in the interior and the wetter environments in the eastern region. MRSP has seen significant forest fragmentation, with many forests consequently undergoing environmental changes, including changes in temperature and vegetation structure. This change can benefit the adaptation of inland birds, as the

environments become warmer and more open, that is, more similar to the forests of the interior of the state. This process may also have happened or maybe still occurring, with other typically forest bird species from the interior of the state, such as the Barred Antshrike *Thamnophilus doliatus* (Linnaeus, 1764), detected for the first time in MRSP in 2006 (Antunes & Eston, 2008) and already established as occurring on the coast of the state of São Paulo from 2008 (Santos et al. 2008; eBird, 2024; WikiAves, 2024). A strong indication that the arrival of the Great Antshrike in MRSP is associated with corridors formed by riparian environments is its common occurrence in this type of habitat. Seven of the records for the species in MRSP are close to a water body, mainly along the Tietê and Pinheiros rivers, which cross the region, and another six are in riparian environments next to water bodies (Fig. 1C, numbers 1,5,8,9,10 and 11).

The presence of a bird species typical of drier interior environments in forests in the eastern region of the state of São Paulo (including the coast), shows both a high capacity for locomotion, probably through existing forest corridors, and a possible capacity for adaptation, including its varied diet and the occupation of altered environments, something not yet described for the Great Antshrike. The plasticity presented by this species can facilitate the colonization of new regions, as has already happened with other species that have established themselves in MRSP, and will be even more important in times of climate change and land use changes. Understanding and investigating the reasons behind new ornithological occurrences in MRSP is fundamental, as it can help direct the planning of conservation and protection actions for both these colonizing birds and the community of birds residing in the last natural remnants existing both within and around the largest urban area in South America.

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