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SHORT COMMUNICATION

Expansion of the known range of *Myiornis auricularis* (Aves: Passeriformes) in the Atlantic Forest of northeastern Brazil

Ampliação da distribuição conhecida de *Myiornis auricularis* (Aves: Passeriformes) na Mata Atlântica do Nordeste do Brasil

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Abstract

We report the expansion of the known range of the eared pygmy-tyrant *Myiornis auricularis*, which had not been previously recorded in the state of Sergipe, northeastern Brazil. The present records expand the known distribution of the species to the northeast, by at least 400 km from central Bahia to Sergipe, and approximately 700 km further northeast to Pernambuco. We discuss the possible existence of a new subspecies, or even a new species, due to the isolation of this population by major rivers.

Keywords: New records, digital databases, photographic database, vocalization database.

Resumo

Relatamos a expansão da distribuição conhecida do miudinho, *Myiornis auricularis*, que não foi previamente registrado no estado de Sergipe, no nordeste do Brasil. Os registros atuais expandem a distribuição conhecida da espécie no sentido nordeste em pelo menos 400km a partir da zona central da Bahia até o estado de Sergipe e cerca de 700km até o estado de Pernambuco. Também discutimos que o isolamento das populações por parte dos grandes rios pode implicar a possível existência de nova subespécie, ou mesmo de uma nova espécie.

Palavras-chave: Novos registros, banco de dados digitalizados, banco de dados fotográficos, banco de dados de vocalizações.

Myiornis auricularis (Vieillot 1818) is one of the smallest pygmy tyrants with a body length of only seven centimeters. The species has a short tail, the abdomen is yellow, the throat is white with black stripes, the pileum is green-brownish and the auricular region has a black patch followed by the whitish nape (Sick, 2001). The species occurs invariably at the edge of lowland moist forests, preferably in the understory (Develey and Peres, 2000), mainly in the Atlantic coastal zone of South America (Silva, 1996), from Argentina and Paraguay north to central Brazil. *Myiornis auricularis* is frequently found in *Bambusa* spp. groves (bamboo and *taquara*, a Brazilian native bamboo) (Sigrist, 2013).

Currently, there are two valid subspecies, *Myiornis auricularis cinereicollis* (Wied 1831), and *M. a. auricularis* (Vieillot 1818). While *M. a. cinereicollis* occurs in eastern Brazil, in the states of Bahia, Espírito Santo and Minas Gerais, *M. a. auricularis* occurs in southern and southeastern Brazil, extending to northeastern Argentina and southeastern Paraguay (Piacentini *et al*., 2015). In

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a recent analysis of areas of endemism, Silva *et al.* (2004) did not consider *Myiornis auricularis* to be present in the Brazilian states of Sergipe, Alagoas and Pernambuco.

The data presented here confirm the new occurrences of *Myiornis auricularis* in northeastern Brazil, and the consequent expansion of its known range. We also discuss the importance of these new records and their implications for the emergence of a possible new subspecies, given the isolation of this population by biogeographic barriers.

We obtained records from digital databases, such as that of the Museum of Comparative Zoology of the University of Harvard – MCZUH; the Smithsonian National Museum of Natural History – USNM; the Museu de Biologia Professor Mello Leitão – MBML; and the Fonoteca Neotropical Jacques Vielliard – FNJV. We also considered the vocal and photographic records from WikiAves (http://www.wikiaves.com) and the vocal records from the Xeno-canto database (http://www.xeno-canto.org/).

The identification of the specimens was based on the diagnostic characteristics of the species. We analyzed the photographic images available on the Internet (Wikiaves). We differentiated the species through its morphological characteristics, including its short tail, black semilunar marking behind the auricular region followed by a whitish region, greenish-brown ridge, black and white striped throat, and yellow abdomen. We also verified the sounds available on the Xeno-canto platform (xeno-canto.org). The species was identified by its sonogram, through its characteristic vocalization, a very fine voice, tuc-tuc-tuc, and ascending brrru (Sick, 2001).

We standardized the records to the same coordinate system (Geographic Coordinates, Datum SIRGAS2000), and edited the vector in ArcGIS 9.3 (ESRI, 2009). We downloaded the IUCN (BirdLife International, 2012) polygon of the species distribution for comparative analysis.

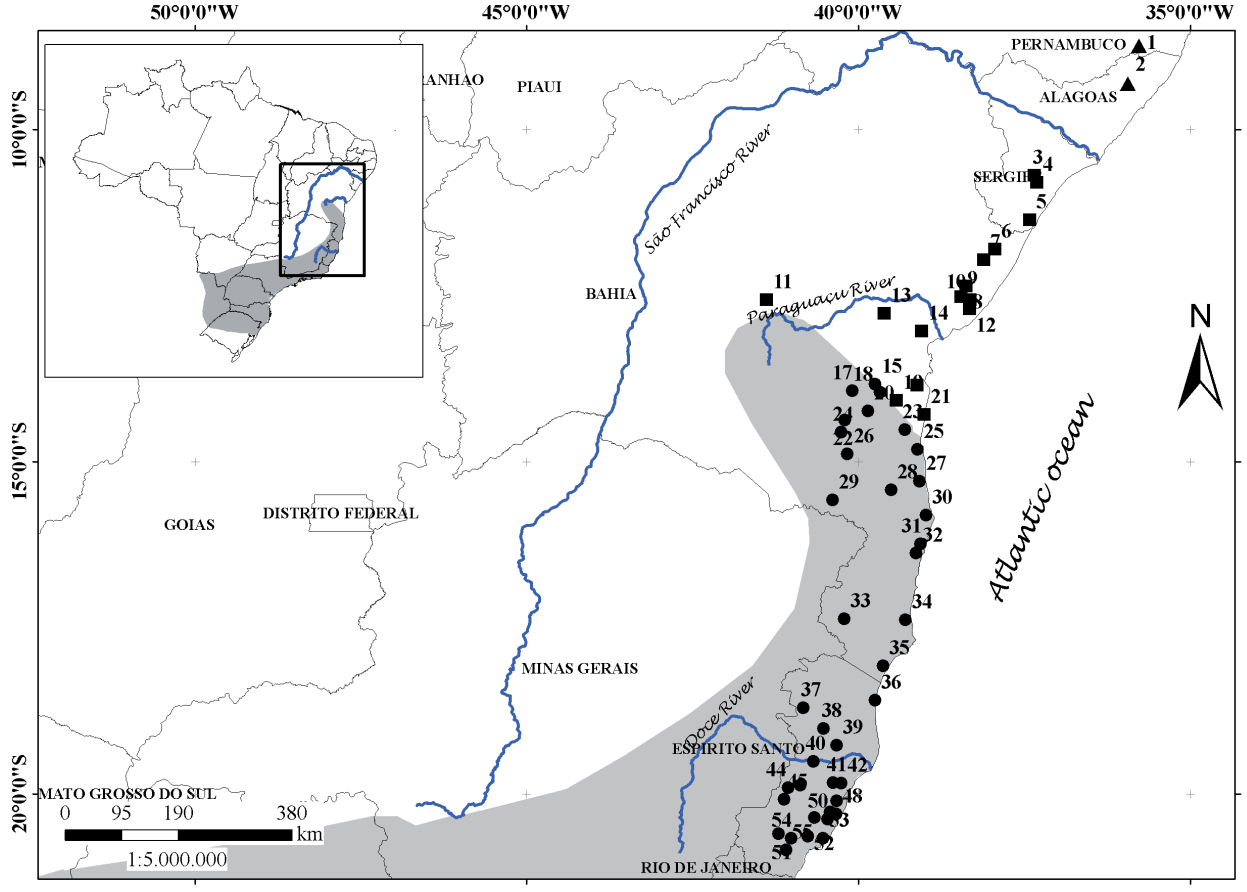

Figure 1. Records of *Myiornis auricularis* from northeastern Brazil in comparison with the distributional polygon (in gray) presented by IUCN (BirdLife International, 2012), and the records published in Sousa (2009), WikiAves (2017), Xeno-canto (2016), Museum of Comparative Zoology, University of Harvard, Smithsonian National Museum of Natural History, Museu de Biologia Prof. Mello Leitão and Fonoteca Neotropical Jacques Vielliard. Triangles indicate records in the Pernambuco Center of Endemism, squares are new records, outside the known distribution of the species and the circles are records within its known distribution. The numbers correspond to the sites listed in Table 1.

Table 1. Records of the occurrence of *Myiornis auricularis* in northeastern Brazil (Sousa, 2009, WikiAves, 2017, Xeno-canto, 2017, Museum of Comparative Zoology, University of Harvard – MCZUH, Smithsonian National Museum of Natural History – USNM, Museu de Biologia Prof. Mello Leitão – MBML and Fonoteca Neotropical Jacques Vielliard – FNJV). (*) The new records are outside the known distribution of the species. Sites numbered as in Figure 1.

Site	Brazilian state	Municipality	Number of records	Latitude	Longitude	Reference
1	Pernambuco	Jaqueira*	10	08°44'16.38"S	35°46'28.64"W	WikiAves (2017)
2	Alagoas	Murici*	1	09º 18' 24"S	35º 56' 36"W	XC284000
3	Sergipe	Itabaiana*	1	10°41'00"S	37°21'00"W	Sousa 2009
4		Areia Branca*	1	10°47'35.73"S	37°18'50.35"W	WikiAves (2017)
5		Estância*	1	11°21'7.43"S	37°24'55.89"W	FNJV 3941
6	Bahia	Esplanada*	1	11°47'46"S	37°56'42"W	XC15577
7		Entre Rios*	1	11°57'12.89"S	38° 6'24.53"W	WikiAves (2017)
8		Catu*	1	12°21'11"S	38°22'44"W	XC41358
9		São Sebastião do Passé*	23	12°30'42.42"S	38°27'17.72"W	WikiAves (2017); XC289105
10		Mata de São João*	7	12°33'34.00"S	38°18'53.70"W	WikiAves (2017)
11		Lençóis*	1	12°33'43.42"S	41°22'48.75"O	WikiAves (2017)
12		Camaçari*	1	12°41'51"S	38°19'27"W	XC284005
13		Santa Teresinha*	1	12°45'49.45"S	39°36'26.03"W	WikiAves (2017)
14		Nazaré*	1	13°1'52.28"S	39°2'35.61"W	WikiAves (2017)
15		Apuarema	1	13°49'59.07"S	39°44'43.87"W	WikiAves (2017)
16		Igrapiúna*	1	13°50'52.35"S	39° 6'47.23"W	WikiAves (2017)
17		Jequié	2	13°55'44.51"S	40°5'35.10"W	WikiAves (2017)
18		Ibirataia	13	13°56'57.62"S	39°40'23.88"W	WikiAves (2017)
19		Ibirapitanga*	1	14° 4'32.54"S	39°25'29.63"W	WikiAves (2017)
20		Itagibá	2	14°14'6.71"S	39°51'22.61"W	WikiAves (2017)
21		Itacaré*	3	14°17'12.64"S	39° 0'19.16"W	WikiAves (2017)
22		Boa Nova	2	14°22'6.85"S	40°12'25.06"W	WikiAves (2017)
23		Uruçuca	3	14°31'3.67"S	39°17'39.98"W	WikiAves (2017)
24		Poções	10	14°33'20.19"S	40°15'13.39"O	WikiAves (2017)
25		Ilhéus	10	14°48'45.71"S	39°6'33.41"W	FNJV 3938; FNJV 3942; WikiAves (2017)
26		Nova Canaã	1	14°52'46.38"S	40° 9'48.15"W	WikiAves (2017)
27		Una	1	15°17'36"S	39°04'31"W	XC68768
28		Camacan	1	15°25'20.97"S	39°30'11.92"W	WikiAves (2017)
29		Macarani	1	15°34'27.99"S	40°23'16.38"W	WikiAves (2017)
30		Belmonte	3	15°47'57.16"S	38°58'36.72"W	FNJV 29510; WikiAves (2017), XC299056
31		Santa Cruz Cabrália	27	16°14'13.17"S	39°3'50.42"W	WikiAves (2017)
32		Porto Seguro	25	16°22'24.16"S	39°7'39.13"W	FNJV 29842; WikiAves (2017); XC81625
33		Medeiros Neto	1	17°21'44.26"S	40°12'43.73"W	WikiAves (2017)
34		Prado	2	17°22'41.95"S	39°17'18.24"W	WikiAves (2017)
35		Mucuri	1	18°4'17.36"S	39°37'36.11"W	WikiAves (2017)
36	Espírito Santo	Conceição da Barra	6	18° 35' 36"S	39° 43' 56"W	WikiAves (2017); MBML4758, FNJV8984
37		Barra de São Francisco	1	18°42'17.08"S	40°49'34.38"W	WikiAves (2017)
38		São Gabriel da Palha	1	19° 0'43.40"S	40°31'32.00"W	WikiAves (2017)
39		Rio Bananal	1	19°15'47.35"S	40°19'45.65"W	WikiAves (2017)
40		Colatina	4	19°30'40.26"S	40°40'24.79"W	WikiAves (2017)
41		Pau Gigante	1	19°49'37.86"S	40°22'30.63"W	USNM 368299
42		Aracruz	22	19°50'12.42"S	40°15'24.20"W	WikiAves (2017)
43		Itarana	2	19°52'5.98"S	40°52'12.51"W	WikiAves (2017)
44		Laranja da Terra	1	19°54'21.18"S	41° 3'24.54"W	WikiAves (2017)
45		Afonso Cláudio	8	20° 4'50.67"S	41° 7'1.19"W	WikiAves (2017)
46		Serra	3	20° 6'15.73"S	40°19'21.32"W	WikiAves (2017)

Table 1. Continuation.

Site	Brazilian state	Municipality	Number of records	Latitude	Longitude	Reference
47		Cariacica	7	20°16'27.97"S	40°25'26.39"W	WikiAves (2017)
48		Vitória	1	20°17'55.29"S	40°20'4.02"W	WikiAves (2017)
49		Domingos Martins	3	20°21'26.79"S	40°39'37.90"W	WikiAves (2017)
50		Viana	1	20°22'28.31"S	40°27'35.82"W	WikiAves (2017)
51		Castelo	1	20°36'6.59"S	41°11'53.09"W	WikiAves (2017)
52		Alfredo chaves	1	20°38'17.42"S	40°45'36.53"W	MCZUH 273767
53		Guarapari	2	20°39'56.98"S	40°32'5.67"W	WikiAves (2017)
54		Vargem Alta	2	20°40'3.60"S	41° 0'46.98"W	WikiAves (2017)
55	Espírito Santo	Cachoeiro de Itapemirim	2	20°50'41.47"S	41° 5'8.46"W	WikiAves (2017)
56		São Mateus	5	18° 42' 58"S	39° 51' 32"W	MBML(4747, 4748, 4749, 4757); WikiAves (2017)
57		Linhares	61	19° 23' 28"S	40° 04' 20"W	XC292996; MBML(4736-4740, 4742, 4744-4746, 4750, 4751, 4753-4756, 4759, 7682); WikiAves (2017)
58		Sooretama	7	19° 11' 49"S	40° 05' 52"W	MBML7417; FNJV(16408, 16415); WikiAves (2017)
59		Pinheiros	1	18° 22' 13"S	40° 12' 48"W	MBML7379
60		Santa Teresa	10	19° 56' 08"S	40° 36' 01"W	MBML(4741, 4752); WikiAves (2017)

The current distribution of *Myiornis auricularis* extends north as far as the middle coastal zone of the state of Bahia (Figure 1). The following new records were detected: twelve municipalities in Bahia (Wikiaves, 2017; XC15577, XC41358, XC289105, XC284005), two municipalities in Sergipe (Fonoteca Neotropical Jacques Vielliard, FNJV-3941; Wikiaves, 2017), one municipality in Alagoas (XC284000) and one municipality in Pernambuco (Wikiaves, 2017) (Table 1). These records represent further evidence of the extension of the known distribution of the species (see BirdLife International, 2012), over 400 km northeast from central Bahia to Sergipe and approximately 700 km further to the northeast, to the state of Pernambuco.

Despite the fact that *Myiornis auricularis* may be resilient to habitat fragmentation (dos Anjos *et al*., 2010), we suggest that, in addition to this range extension, at least three distinct subsets of populations may exist in this region, separated by the major rivers of eastern and northeastern Brazil, that is, the Doce, Paraguaçu, and São Francisco rivers (Figure 1), which may reflect an ongoing process of differentiation at the subspecies or species levels. These rivers are known to be important zoogeographical barriers for a number of vertebrate groups (see Goldani *et al*., 2006; Nascimento *et al*., 2013) and may influence in the isolation of the *Myiornis auricularis* populations between the Doce and Paraguaçu rivers (Espírito Santo and Bahia), the Paraguaçu and São Francisco rivers (Bahia and Sergipe), and north of the São Francisco River in Pernambuco, as already proposed for other bird species (Silva *et al*., 2004). These barriers are complemented by latitudinal, longitudinal and altitudinal gradients in the structure and composition of the vegetation of the Atlantic rainforest (Tabarelli *et al*., 2005; Alves *et al*., 2010), which are associated with the different Brazilian centers of endemism (Thomas *et al*., 1998; Silva and Casteleti, 2003; Murray-Smith *et al*., 2009). The predominant habitat types shift among the interfluves, i.e., the Doce-Paraguaçu and Paraguaçu-São Francisco (Carnaval and Moritz, 2008), as well as in the Pernambuco center of endemism (Silva and Casteleti, 2003).

Rivers are known to act as effective zoogeographic barriers for birds (Ribas *et al*., 2011; Maldonado-Coelho, 2012), in particular in the Amazon basin, where the Amazon River and other major tributaries are highly effective as barriers to the dispersal of some groups, such as the antbirds, family Thamnophilidae (Hayes and Sewlal, 2004; Maldonado-Coelho *et al*., 2013), and the smallest forest-dwelling species (Welty and Baptista, 1988; Silva *et al*., 2004). *Xiphorhynchus fuscus* (Vieillot 1818) is widely-distributed in the Atlantic Forest, where it is considered to have three subspecies (Silva *et al.*, 2004). *Xiphorhynchus f. pintoi* occurs in central Bahia, *X. f. tenuirostris* on the Bahia coast, and *X. f. fuscus* in the Serra do Mar of southeastern Brazil (see Silva *et al.*, 2004 for details). The differences between these subspecies are so accentuated that a former subspecies, which occurs in the Pernambuco center of endemism area, was recently assigned to a new species, *Xiphorhynchus atlanticus* (Cory, 1916) (Cabanne *et al*., 2014).

Other passerines, such as *Acrobatornis fonsecai* Pacheco, Whitney & Gonzaga 1996 and *Scytalopus psychopompus* (Teixeira & Carnevalli 1989), are endemic to the lowland rainforests of coastal Bahia, between the Jiquiriçá and Jequitinhonha rivers (Silva *et al*., 2004). The genus *Pyriglena* is one other important example. *Pyriglena leucoptera* (Vieillot 1818) is widely distributed in southeastern Brazil, as far north as the coast of central Bahia, on the Paraguaçu River (IUCN, 2015). *Pyriglena atra* (Swainson 1825) is restricted to the Atlantic coast of the Paraguaçu-São Francisco interfluve (Sick, 2001; IUCN, 2015). *Pyriglena leuconota* (Spix, 1824), in turn, has a widely and disjointed distribution in the southern, western, and northern Amazon basin, in addition to a subspecies, *P. leuconota pernambucensis* Zimmer 1931 (IUCN, 2015), which is found further east, in the Pernambuco center of endemism. This disjunct distribution appears to be phylogenetically important (Maldonado-Coelho *et al*., 2013).

Overall, then, major rivers are important physical barriers to small bird populations (Welty and Baptista, 1988; Haffer, 1992; Hayes and Sewlal, 2004). In addition, the major differences found among centers of endemism, including intrinsic differences in habitat type (Sick, 2001; Silva *et al*., 2004; Cabanne *et al*., 2014), may be contributing to the differentiation of the populations of *M. auricularis*. Given this, we would recommend further research to investigate the possibility of a process of differentiation at either the subspecies or species levels, based on the considerable vocal and morphological variation among populations (Piacentini *et al*., unpublished data), as well as genetic analyses, to corroborate the hypothesis of the existence of new subspecies, or even a new species. Ultimately, we would also emphasize the importance of enhancing the availability of data through websites and digital databases, together with continuous ornithological monitoring, to guarantee more reliable and current records of the distribution of each species.

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