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NOTE

FIRST RECORD OF *TOUIT MELANONOTUS* (WIED, 1820) (AVES: PSITTACIFORMES: PSITTACIDAE) IN CANTAREIRA STATE PARK, BRAZIL: NEW COLONIZATION OR SIMPLY UNNOTICED?

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First record of *Touit melanonotus* (Wied, 1820) (Aves: Psittaciformes: Psittacidae) in Cantareira State Park, Brazil: new colonization or simply unnoticed?

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A avifauna do Parque Estadual da Cantareira (PEC, São Paulo, Brazil) apresenta 120 anos de estudos, mas inexistiam registros do apuim-de-costas-pretas *Touit melanonotus*. Aqui, apresentamos seu primeiro registro e item alimentar (frutos de *Ocotea* sp.) no PEC, discutindo o seu potencial de cruzar paisagens urbanas ou ter passado despercebido por longo período.

Palavras-chave: Mata Atlântica; Extensão de distribuição; Endemismo; Urbanização; Ameaçada de extinção.

Touit is a genus of Psittacidae comprising small (14–18 cm) parrotlets (Straube et al. 2010) with eight species restricted to the Neotropical region (del Hoyo et al. 2019). The Brown-backed Parrotlet *Touit melanonotus* is a rare psittacid endemic of the Brazilian Atlantic Forest (Parker III et al. 1996; Sick 1997) and restricted to the Serra do Mar endemism center (Cracraft 1985), whose distribution is from southern Bahia to Santa Catarina (Vallejos et al. 2013; Leal et al. 2018). The Brown-backed Parrotlet is recorded mostly between 500 and 1,000 m altitude, although there are records from sea level to

1,700m (Leal et al. 2018). It is 15cm in length and 66.5g in weight, a forest specialist that feeds mainly on fruits and forages on varied forest strata (Parker III et al. 1996; Sick 1997; Wilman et al. 2014). Historically, human activities associated with agricultural and livestock, and recently with urbanization, however, have resulted in serious habitat loss and degradation in the Atlantic Forest (Ribeiro et al. 2009). Nowadays, this biome presents a highly fragmented landscape with few forest patches larger than 100ha, mostly confined to the Serra do Mar mountains (Ribeiro et al. 2009). Consequently, *T. melanonotus* populations are declining and are actually classified as Vulnerable in regional and global red lists of threatened species (Brasil 2014; São Paulo 2018; IUCN 2019).

The forests of Serra do Mar continuum are responsible for the maintenance and conservation of all known *T. melanonotus* populations (Leal et al. 2018). Its absence is noticeable as distance increases from the Serra do Mar continuum (see map in Schunck 2009) even in the largest forest remnants (> 5,000ha)

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in the Atlantic Plateau of São Paulo such as Morro Grande Forest Reserve (Develey & Martensen 2006) and Cantareira State Park (São Paulo 2009; Tonetti et al. 2017). This context has supported the inference about the high sensitivity of this parrotlet and its restriction for crossing the non-forest habitat matrix (Leal et al. 2018) which would make it impossible for it to pass through a highly fragmented landscape influenced by more than 40km of the urbanized area of the São Paulo “megacity”.

Frequently, low bird sampling efforts are inefficient to detect rare species of birds. There are few bird studies conducted in Morro Grande Forest Reserve (Develey & Martensen 2006; Boscolo et al. 2006) compared with Cantareira State Park (CSP) for which there is a large amount of ornithological knowledge (Tonetti et al. 2017). From the end of the 19th century to the 1960’s, several collectors sampled birds in CSP (Pinto 1938, 1944; Graham 1992). Graham performed the first avian community study (Graham 1992) and other studies were carried out between 2000 and 2017 (Antunes & Eston 2008; Antunes et al. 2009; São Paulo 2009; Tonetti & Pizo 2016; Tonetti et al. 2017). Moreover, many researchers and birdwatchers have visited CSP and have made contributions to the knowledge of the bird richness in the park. The last compilation demonstrated a total of 326 bird species confirmed in CSP (Tonetti et al. 2017), however, even after more than 120 years, *T. melanonotus* had not been recorded.

The present study has shown a first record of *T. melanonotus* in the CSP, the largest urban forest of the world (Ayres 2008). In the morning (08:18h) of 18 October 2019, we heard and observed 10 individuals of *T. melanonotus* at Pedra Grande, an administrative CSP zone (-23.438920 & -46.631539, 945m), in the municipality of São Paulo, SP, Brazil. The flock was perched in the canopy (~15m high) and feeding on fruits of *Ocotea* sp. Aubl. (Lauraceae). We saw just two birds eating fruits attached to the stalks, and they remained upside down to reach the fruits. The call was recorded and deposited in the xeno-canto library (XC521608). After six minutes of observation, the flock flew above the canopy and was not relocated. To the best understanding of this parrotlet distribution in São Paulo metropolitan region, we present other previous records made by us, together with other localities cited in literature (Table 1; Figure 1). The present record of *T. melanonotus* for CSP reinforces its classification as an important bird area for conservation (Bencke et al. 2006). This record is the closest yet to the São Paulo urban fringe (1km) (Figure 1b). Our record is 109km removed from the nearest two known populations in

Capivari-Monos Environmental Protection Area (EPA) and Curucutu administrative zone of Serra do Mar State Park (Melo et al. 2016; Schunck et al. 2019), 90km from a private area (Solo Sagrado de Guarapiranga property) (Melo et al. 2011), and 89km from Serra da Mantiqueira (Wege & Long 1995) (Figure 1).

There is little information on diet items and feeding behavior of *T. melanonotus*. Fruits of *Maytenus* sp. (Schunck et al. 2008), *Clusia criuva* (Simpson & Simpson 2012), *Rapanea acuminata* (Juniper & Parr 1998), and *Struthanthus vulgaris* (Vallejos et al. 2013) are the food items recorded for this rare parrotlet. To our knowledge, this is the first time that fruits of *Ocotea* sp. (Lauraceae) have been recorded in their diet. We observed two birds hanging upside down to reach the fruits, which adopted non-plucker behavior; although the plucker strategy has been observed for the majority of birds when eating fruits of *C. criuva* (Simpson & Simpson 2012).

The presence of these birds in CSP calls attention to two questions: (i) is it possible this species has been unnoticed in CSP for more than a century? and (ii) is it evidence that *T. melanonotus* could cross altered human landscapes between CSP and other large Atlantic Forest fragments? To respond to these questions, we suspect the vocal similarity of *T. melanonotus* to other birds could be a reason for it being misidentified in the past if only heard and not seen. In the São Paulo state, voices of syntopic birds (e.g., *Megarhynchus pitangua* and *Pionopsitta pileata*) have not been a strong source of identification errors as observed in other regions (Vallejos et al. 2013). On the other hand, *T. surdus*, a species without documentation in this state of São Paulo (Silveira & Uezu 2011), has been confounded with *T. melanonotus* by researchers in the past (Bencke et al. 2006). The rarity and difficulty of voice identification of *T. melanonotus* explains its apparent long absence from Santa Catarina state, even in a well-studied region (Vallejos et al. 2013). Although this parrotlet is recorded more in São Paulo state than in southernmost region of its geographic distribution (Simpson & Simpson 2012; Vallejos et al. 2013; Leal et al. 2018; Schunck et al. 2019), and several birdwatchers and ornithologists that visited the CSP already recorded it in other regions (Willis & Oniki 2003; Minns et al. 2009; Schunck 2009), however, its absence in CSP making us rule out the possibility that *T. melanonotus* couldn’t have been missed there for 120 years. It is strong evidence that *T. melanonotus* might be newly arrived in CSP. But only new records will conclude if CSP is functioning as a stepping-stone or provide habitat year-round for *T. melanonotus*, as a result of recent colonization.

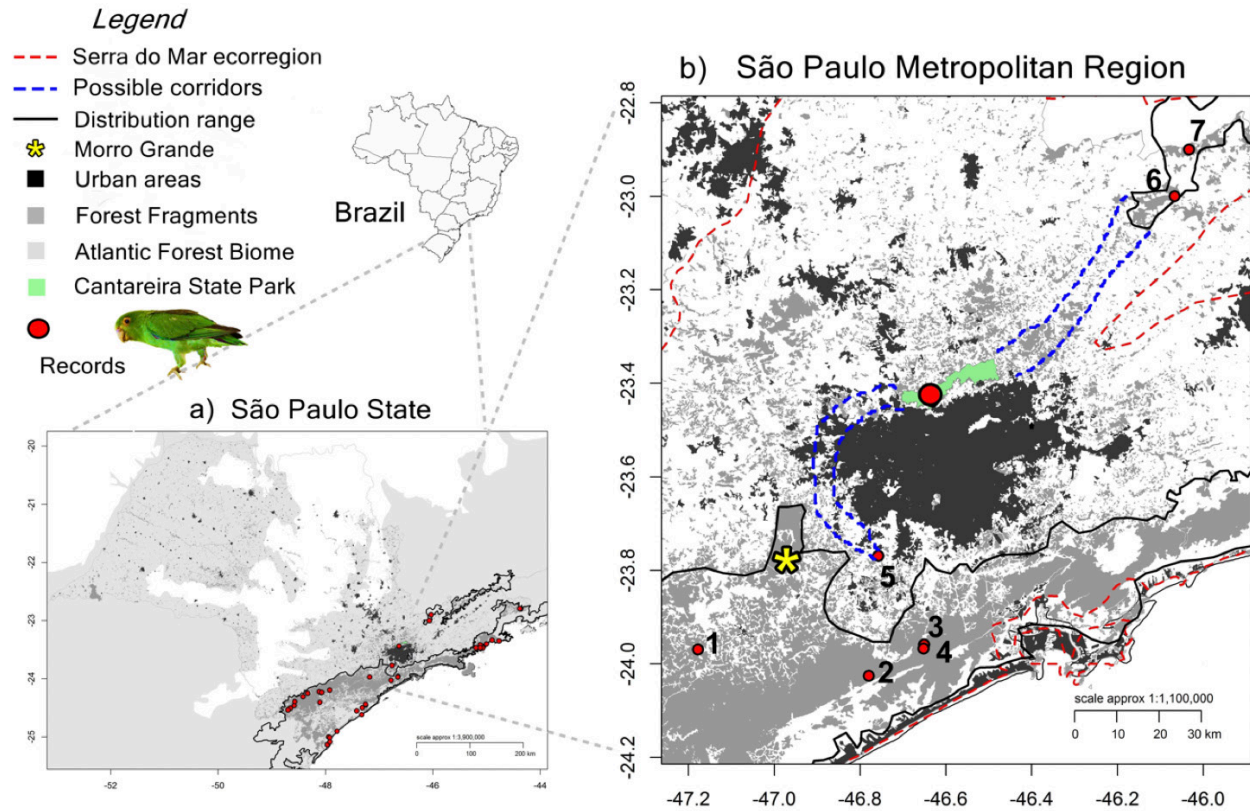


Figure 1. Distribution map of Brown-backed Parrotlet *Touit melanotus* in a—São Paulo state and | b—São Paulo Metropolitan region. Distribution range limits update from Birdlife International (2019). Big red circle, the first record in Cantareira State Park (green patch); little red circles, other records across São Paulo metropolitan region: 1—Serra do Mar Environmental Protected Area (EPA) / Jurupará State Park | 2—Curucutu administrative zone of Serra do Mar State Park | 3—4—Capivari-Monos EPA/Serra do Mar State Park | 5—private area (Solo Sagrado de Guarapiranga property) | 6—7—records from Serra da Mantiqueira mountains; yellow asterisk, Morro Grande Forest Reserve – a large forest fragment still without records of *T. melanotus*; blue dashed lines, possible ways of displacement of *T. melanotus* to arrive in Cantareira State Park; red dashed lines, Serra do Mar coastal forest limits (The Nature Conservancy 2019). More details of each one of the records in Table 1.

Table 1. Records of *Touit melanotus* surrounding the São Paulo metropolitan region and Serra da Mantiqueira, São Paulo state, Brazil.

Date	Municipality	Sites	References	Coordinates	Alt(m)	Rec	Doc	Ind
18.x.2019	São Paulo	Cantareira State Park (Pedra Grande)	Present study	-23.438 & -46.631	985	A/V	Y	10
04.i.2012	São Paulo	Capivari-Monos Environmental Protected Area/ Serra do Mar State Park (Curucutu)	Present study	-23.967 & -46.652	790	A	N	6
05.ix.2010	São Paulo	Private area – Solo Sagrado de Guarapiranga property (non-protected)	Present study	-23.769 & -46.757	740	A	Y	4
20.xii.2009	Juquitiba	Jurupará State Park	Present study	-23.969 & -47.178	650	A/V	N	26
24.iii.2009	São Paulo	Capivari-Monos Environmental Protected Area (EPA)/ Serra do Mar State Park: Curucutu	Melo et al. 2016	-23.967 & -46.652	780	A	N	4
05.xi.2009	São Paulo	Capivari-Monos Environmental Protected Area (EPA)/ Serra do Mar State Park Curucutu	Melo et al. 2016	-23.959 & -46.650	780	A/V	Y	8
01.xii.2007	Itanhaém	Serra do Mar State Park: Curucutu	Schunck et al. 2008, 2019	-24.025 & -46.779	400	A/V	Y	6
29.v.1994	São José dos Campos	Serra dos Poncianos/ Mantiqueira	Wege & Long 1995	-22.878 & -45.969#	1476	A/V	N	?

Alt(m)—altitude in meters | Rec—record type | A—aural | V—visual | Doc—documentation: Y—yes or N—no | Ind—number of individuals seen [?, not informed] | #, data collected in www.ebird.org.

Although lacking evidence that this bird could cross long distances across rural and urban matrices, it is commonly observed flying over forest canopies (Leal et al. 2018), indicating a higher capability of displacement than previously believed. Other forest psittacids, e.g., *Pionopsitta*, are already observed crossing long distances between the Serra do Mar and countryside forest fragments (Pinto 1944). In this sense, there are possibilities for the source population having originated from Serra da Mantiqueira or the Serra do Mar mountains, both localities with confirmed records (Wege & Long 1995; Schunck 2009). Nonetheless, as *T. melanonotus* has been more frequently recorded in the Serra do Mar than in Serra da Mantiqueira (Schunck 2009), provides additional evidence that these birds may have come from the first region. This record could bring to light an inference that *T. melanonotus* is able to cross through anthropic landscapes surrounding the São Paulo megacity.

To elucidate the actual means of displacement of this species, studies using geolocators would be required (Jahn et al. 2016). In September 2010, another record of *T. melanonotus* came from a private area (Solo Sagrado de Guarapiranga property) (-23.771 & -46.754; 760m; XC76242) (Melo et al. 2011), 23km from a narrow strip of the Serra do Mar and 2.9km from an urbanized area, which was recently fragmented by the construction of Rodoanel roads (Catharino & Aragaki 2008). These records in the north (CSP) and southwestern (Guarapiranga dam) of the São Paulo metropolitan region open another opportunity for application of conservation strategies in peri-urban habitats of the São Paulo megacity, a type of habitat until now without evidence of use by this species. Our records highlight that peri-urban habitat use by *T. melanonotus* demonstrates the importance of public policies that provide effective forest protection in the Green Belt of São Paulo City, which has been constantly threatened by urban sprawl and infrastructures (Bencke et al. 2006; Melo et al. 2016; Schunck & Rodrigues 2016; Tonetti et al. 2017). Habitat loss seems to be the main threat for this emblematic psittacid of the Atlantic Forest, and urban sprawl and its associated infrastructures directly and indirectly contribute to habitat loss (Leal et al. 2018). The creation of new protected areas has been recommended (Schunck 2009). We highlight the importance of creating new protected areas in the Green Belt of São Paulo City, as well as the execution of forest restoration projects in regions situated between Mantiqueira and Cantareira, and Serra do Mar and Serra da Cantareira. This measure might be fundamental to

improve habitat connectivity for many Atlantic Forest endemic birds (Uezu & Metzger 2016), and likely a corridor for *T. melanonotus*. Thereafter, such measures will help in the preservation of bird's ecosystem functions in the peri-urban forest fragments belonging to one of the main biodiversity hotspots of the world.

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