Emu - Austral Ornithology

ISSN: 0158-4197 (Print) 1448-5540 (Online) Journal homepage: https://www.tandfonline.com/loi/temu20

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To cite this article: Mieko Ferreira Kanegae, Marina Teiles, Severino de Albuquerque Lucena & José Carlos Motta-Junior (2010) Behavioural and morphological observations of the Collared Crescentchest (*Melanopareia torquata*) in a Cerrado area of south-eastern Brazil, Emu - Austral Ornithology, 110:2, 142-145, DOI: 10.1071/MU09016

To link to this article: https://doi.org/10.1071/MU09016

Published online: 22 Dec 2016.

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www.publish.csiro.au/journals/emu

Short Communication

Emu, 2010, **110**, 142–145

Behavioural and morphological observations of the Collared Crescentchest (*Melanopareia torquata*) in a Cerrado area of south-eastern Brazil

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Abstract. The Collared Crescentchest (*Melanopareia torquata*) is endemic to the Cerrado Biome, and distributed mainly in Brazil, but extending to Bolivia and Paraguay. Although considered of least concern globally, it is threatened in the state of São Paulo in south-eastern Brazil. In this study we examined the morphology and some aspects of behaviour of the Collared Crescentchest. Birds were captured with mist-nets using playback in September–December 2006 and October–November 2007. For each captured bird, we took a range of morphological measurements, looked for brood-patches and moult, and took a blood sample for genetic determination of sex. Of the 35 individuals captured, only five were female, probably as a result of behavioural differences between sexes, with males apparently responding more readily to the playback. Furthermore, birds with white dorsal patches exhibited more aggression or risk taking behaviour than birds without patches. However, there was no sexual dimorphism in any of the morphological or colour traits measured (although the female sample was small). Brood-patches were present mainly in October and November, but we did not detect any cloacal protuberance. Among the four species that comprise the family Melanopareiidae, this is the first record of brood-patches in males.

Additional keywords: natural history, São Paulo, savanna.

Introduction

The Collared Crescentchest (*Melanopareia torquata*) is endemic to the Cerrado Biome (Cardoso da Silva and Bates 2002). Three subspecies are recognised: (1) *M. t. bitorquata* (d'Orbigny & Lafresnaye, 1837) in eastern Bolivia (east of Santa Cruz); (2) *M. t. rufescens* (Hellmayr, 1924) in central Brazil (from southern Para to the east of Mato Grosso do Sul, Minas Gerais and the interior of Sao Paulo) and eastern Paraguay; and (3) *M. t. torquata* (Wied, 1831) east of Brazil in the south of Piaui and west of Bahia (Krabbe and Schulenberg 2003). They inhabit savanna grassland (Sick 1997) and are typically observed near or on the ground or among tall grasses (Krabbe and Schulenberg 2003). Owing to this combination of habits, the species is rarely seen and is more readily detected by vocalisations (Ridgely and Tudor 1994). The species is thought to have low dispersal ability and to be vulnerable to fragmentation of habitat (Krabbe and Schulenberg 2003). The first description of its nest, egg and nestling were recorded in September and October 2006, in central of Brazil (Gressler and Marini 2007). In November 2007 two nests of the species were also monitored, in São Paulo State (Kanegae *et al*., in press).

The Cerrado Biome of South America is the most threatened savanna in the world, originally covering ~2×10^6 km^2 (Cardoso da Silva and Bates 2002). Currently ~34% of its original area remains, of which only 2.2% is protected in conservation units (Machado *et al*. 2004). The vegetation consists of a mosaic of habitats, ranging from open grasslands (campo limpo) to forest (cerradão), and includes a range of intermediate types, such as *campo sujo*, *campo cerrado* and *cerrado sensu stricto* (Ribeiro and Walter 1998; also see Materials and methods). As the Cerrado Biome has been increasingly devastated, mainly due to the accelerated conversion to agriculture and pasture (Machado *et al*. 2004), Collared Crescentchests have become extirpated or rare in some parts of their original range (Willis and Oniki 2003). Although not considered threatened globally (BirdLife International 2009), it has been classified as locally endangered in a list of

10.1071/MU09016 0158-4197/10/020142

animals of São Paulo State threatened with extinction (São Paulo 2008).

Considering the lack of knowledge of the natural history of Collared Crescentchests (Krabbe and Schulenberg 2003), its threatened status in São Paulo and ongoing loss and fragmentation of habitat within the Cerrado Biome, we examined sexual dimorphism, moult, territorial defence, singing behaviours and the breeding period of the subspecies *M. torquata rufescens*.

Materials and methods

The study was carried out in the Estação Ecológica de Itirapina (EEI), a conservation area of 2300 ha located in São Paulo State, in south-eastern Brazil (22°15′S, 47°49′W). This area represents one of the last grassland and savanna remnants in the state (Gianotti 1988). We worked in contiguous areas that form a mosaic of campo sujo and campo cerrado habitats. Campo sujo has more open vegetation, without trees, composed of a sparse shrub and herbaceous layer; campo cerrado has higher density vegetation dominated by a shrub and herbaceous layer, with tree-cover of 2–15% (Ribeiro and Walter 1998).

We captured birds in September–December 2006 and October–November 2007, during the morning (0600–1200 hours) and afternoon (1600–1800 hours). Birds were captured in mist-nets using playback to attract them to the nets; playback started as soon as the bird was detected and ended with its capture. We played back calls using a Panasonic voice recorder (model RR – US450) with songs from different individuals that we had recorded previously within the EEI. Capture effort in 2006 and 2007 was 45.0 and 57.9 net-hours respectively. Captured birds were banded with a metal ring on one leg (provided by Centro Nacional de Pesquisa para Conservação das Aves Silvestres – CEMAVE) and a unique combination of coloured rings on the other leg.

For each bird captured, we took blood samples (0.1 mL) from the jugular vein for genetic determination of sex (after Griffiths *et al*. 1998). The following morphological traits were measured: weight, using a Pesola spring balance (50 g, accurate to ±1 g); body measures, using a Mitutoyo digital calipter (150 mm, accuracy is ±0.01) body length (mm): measured by placing the bird horizontally on its back on a ruler and measuring from the tip of the beak to the extreme end of the tail; wing (mm): the distance from the carpal joint to the tip of the longest primary on the closed wing; tail (mm): from the back of the rump to the end of the longest feather; tarsus (mm): from the articulation of the tibiotarsus to the tarsometatarsus; bill (mm): from the rictus to tip of beak; and nostril (mm): from the anterior edge of the nostril to tip beak. Morphological measurements of males and females were compared using Mann–Whitney U-tests.

In 2007, we noted variation in the partly concealed white dorsal patch, which is located on the interscapular region on the upper back (Ridgely and Tudor 1994). The patch cannot be directly observed when the bird is perched because it is hidden under some brownish feathers located on the upper part. The patch can be seen when these upper brownish feathers are raised. To quantify, we classified patch size into three categories: broad patch (>70% of the feathers white), small patch (with 10–30% of the feathers white), and no white patch (without any white feather). We did not observe an intermediate patch size (i.e. birds fell into one of the two extreme categories (wide or small)).

As the number of individuals we measured for the white patch size was small ($n = 21$), we also included similar patch measurements from 22 skins (14 males and eight females) of *M. torquata rufescens* (the same subspecies that was studied in the field) in the Zoology Museum of Universidade de São Paulo.

The frequency and types of songs (duets or single) was recorded during 2006 and 2007, when the population size and home range of Collared Crescentchests was evaluated (Methods in Kanegae 2009).

We also tested the relationship between the size of the white dorsal patch and capture time (from the opening of the mist-net), using analysis of variance (ANOVA) and Tukey tests with a significance level of 5%. Statistical analyses were conducted using BioEstat 4.0 (Ayres *et al*. 2005). Means are presented ± standard error.

We examined each bird for moult of body, wing and tail. We considered a bird in moult when at least 10 feathers were growing in one or more areas of the body (Marini and Durães 2001). Moult of wing was verified when it occurs in both wings or in tail, symmetrically (Sick 1997). We also investigated the presence of cloacal protuberances and brood-patches. The presence of them suggests that the species is in the reproductive period.

Results

Captures and recaptures

During 2006 and 2007, we captured 35 adults (1 female and 13 males in 2006, 4 females and 17 males in 2007), 6 of which were subsequently recaptured. We captured 19 individuals in campo sujo habitat, and 16 in campo cerrado.

All birds recaptured were males. One individual, caught in November 2006 was recaptured 1 month later, 38 m from the location where it was first captured. Another individual, captured in November 2006, was recaptured 11 months later, 167 m from the location of first capture. The other five recaptures occurred less than 1 month from initial capture (mean ± s.d., 17 ± 7.9 days) at an average distance from the original capture points of 80 m (±52.1 s.d.).

Sex, morphology and sexual dimorphism

Of the 35 birds captured and sexed using genetic methods, only 5 were females and 30 were males. There were no significant differences in any morphological variables between males and females (Table 1), although the sample size for females is quite small.

We investigated the white patch in 18 individuals (16 males and 2 females) captured in 2007. Of them, six males had a broad white patch, seven males had a small-width patch, and three males and two females had no white patch. Overall, only three of 16 males (18.8%) lacked a white patch, whereas both females lacked a patch. In the 22 museum specimens (8 females and 14 males), five females had no white patch (62.5%) and three had a broad white patch (37.5%), whereas among the males, three males had no white patch (21.4%), six had a small patch (42.9%), and five had a broad patch (35.7%). Although these

Table 1. Mean (±s.e.) of morphological traits for 5 females and 30 males of Collared Crescentchest in the Estação Ecológica de Itirapina (EEI) between September and December of 2006 and 2007

Morphological characteristics	Males	Females	Mann–Whitney U-tests	
Body mass (g)	13.5 ± 0.12 (n = 30)	15.6 ± 0.58 (n = 5)	U = 65	P = 0.64
Body length (cm)	12.5 ± 0.7 (n = 30)	14.5 ± 0.23 (n = 3)	U = 53	P = 0.30
Wing length (cm)	42.4 ± 0.2 (n = 30)	49.7 ± 0.98 (n = 5)	U = 72	P = 0.89
Tail length (cm)	55.4 ± 4.1 (n = 30)	62.9 ± 1.57 (n = 5)	U = 55	P = 0.30
Bill length (cm)	12.6 ± 0.8 (n = 16)	12.0 ± 0.65 (n = 4)	U = 42.5	P = 0.11
Tarsal length (cm)	17.0 ± 0.7 (n = 30)	18.9 ± 0.54 (n = 5)	U = 44.5	P = 0.13

data suggest that males often have a white patch, and that males tend to have broader patches than females, there is considerable overlap between the sexes.

Brood-patches and moult

Both males and females were found to have brood-patches. In 2006, 12 individuals (males) with brood-patches were captured (1 in October, 4 in November, 7 in December) and 3 individuals without brood-patches were captured during September. In 2007, we captured 14 individuals with brood-patches (9 in October, 5 males and 4 females, and 5 males in November) and 6 individuals (males) without brood-patches (in October). Of 35 birds captured, only 9 individuals (2 females and 7 males, 25.7%) did not have a brood-patch during October–December (Fig. 1). Of the 6 males recaptured, most either developed (n = 3) or maintained (n = 2) their brood-patches during October and November (Table 2), suggesting that these months coincide with the breeding season. However, another potential indicator of reproductive period, the cloacal protuberance, was not recorded in any individual captured.

The body moult was observed in 17 individuals, and was most frequent in November and December (Fig. 1). Other feather moults were less common: seven individuals had wing moult and two individuals had tail moult, both of which were more common in December. We also recorded four individuals with overlapping body and tail moult and two individuals had all three feather moults (body, wing and tail).

Territorial defence and vocalisations

Estimates of the white patch correlated with the time to capture in the mist-net (F = 17.87; P < 0.01). Birds without a white patch took significantly longer to be captured than individuals with either a broad (q = 9.26, P < 0.01) or small patch (q = 9.14, P < 0.01), but there was no significant difference in capture time (q = 16.43, ns) between birds with broad (mean 20.0 ± 8.7 min, n = 6 males) and small white patches (mean 36.3 ± 19.8 min, n = 7 males).

We sometimes observed pairs singing duets in antiphonal, with both sexes giving the same song, a typical whistle ‘tü’ (n = 25; 9.4% of birds recorded). Occasionally pairs sang in a different way, with one individual singing the typical whistle ‘tü’ and the other making a different ‘pirrr’ call (observed on nine out of 191 records). This behaviour was observed when we approached the nest (pers. obs.) or used playback in the territory.

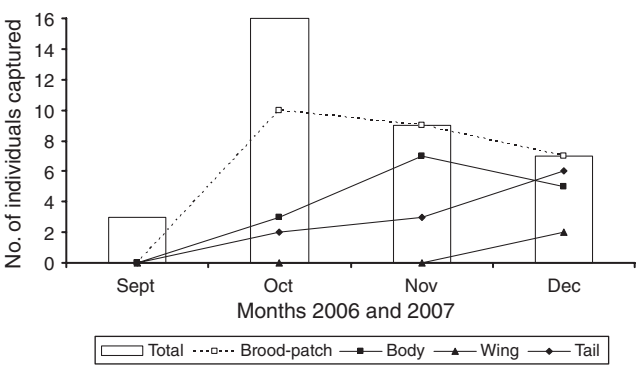

Fig. 1. Variation of number of individuals captured (total = 35 individuals), presence of brood-patch and feather moult (body, wing and tail).

Discussion

The predominance of males captured suggests that males are the main defenders of the territory, as they responded more to the playback of song than females. The males seem to remain their territories over time. We also found a difference in risk taking or aggression by birds in relation to the size of the white dorsal patch. There are several possible explanations for this. First, the size of the white patch could be an indication of male status. For example, the white patch may be displayed to females during courtship (Bókony *et al*. 2006), or it may be an advertisement to other males of some competitive ability, such as territory defence (Contreras-Garduño *et al*. 2008). This type of male status signalling is well established in many other bird systems (reviewed by Senar 1999). Second, the white patch may increase in size with age, as observed in male House Sparrows (*Passer domesticus*), in which older males have larger eye masks, and also have greater reproductive success than younger males (Nakagawa and Burke 2008). Although our measurements from museum data suggest that the size of the white patch is not related to sexual dimorphism, further in-depth studies are needed to differentiate between these potential explanations and explain the observed plumage variation.

Table 2. Six males recaptured and the change in their brood-patches

Captures	Brood-patch captures	Recaptures (days)	Brood-patch recaptures
6 October 2007	Absent	27 October 2007 (21)	Present
7 October 2007	Absent	26 October 2007 (19)	Present
11 October 2007	Absent	31 October 2007 (20)	Present
13 October 2007	Absent	16 October 2007 (3)	Absent
18 October 2007	Present	2 November 2007 (15)	Present
8 December 2006	Present	13 November 2007 (25)	Present

Female song has been little studied in tropical regions. This behaviour is rare in northern temperate regions, where singing is almost exclusively performed by males (Slater and Mann 2004). In the tropical region there are few reports of Passeriformes pairs defending the territory and singing throughout the year (Stutchbury and Morton 2001). However, it appears that Collared Crescentchests sing throughout the year (Sick 1997) and we also recorded both males and females singing duets. Similar to other bird species in Cerrado (Marini and Durães 2001), brood-patches are most prominent in the Collared Crescentchests during October–November, and there is little evidence of moult during this time. Finally, we observed brood-patches in both males and females, which is a novel observation for the family Melanopareiidae. The four species of *Melanopareia* have recently been placed in their own family (Irestedt *et al*. 2002; Chesser 2004), separate from the Rhinocryptidae (tapaculos), with which they have traditionally been placed (Remsen *et al*. 2010). The Brazilian Ornithological Records Committee considered the Collared Crescentchests as the only member of the family Melanopareiidae in Brazil (CBRO 2009). Together, this work contributes to furthering our understanding of behavioural and morphological sex differences in a little-studied species of the Cerrado Biome.

References

Ayres, M., Ayres, M. Jr, Ayres, D. L., and Santos, A. S. (2005). 'BioEstat 4.0: Aplicações Estatísticas nas Áreas das Ciências Biológicas e Médicas.' (Sociedade Civil Mamirauá, Imprensa oficial do Estado do Pará: Belém, Brazil.)

Bibby, J. C., Burgess, N. D., Hill, D. A., and Mustoe, S. H. (2000). Bird Census Techniques. (The British Trust for Ornithology and The Royal Society for The Protection of Birds: London, UK.)

BirdLife International (2009). Species factsheet: Collared Crescentchest *Melanopareia torquata.* Available at http://www.birdlife.org/datazone/species/index.html?action=SpcHTMDetails.asp&sid=5131&m=0 [Verified 10 February 2010].

Bókony, V., Lendvai, Á. Z., and Liker, A. (2006). Multiple cues in status signalling: the role of wingbars in aggressive interactions of male House Sparrows. *Ethology* **112**, 947–954. doi:10.1111/j.1439-0310.2006.01246.x

Cardoso da Silva, J. M. C., and Bates, J. M. (2002). Biogeographic patterns and conservation in the South American Cerrado: a tropical savanna hotspot. *Bioscience* **52**, 225–233. doi:10.1641/0006-3568(2002)052[0225:BPACIT]2.0.CO;2

Chesser, R. T. (2004). Molecular systematics of New World suboscine birds. *Molecular Phylogenetics and Evolution* **32**, 11–24. doi:10.1016/j.ympev.2003.11.015

Comitê Brasileiro de Registros Ornitológicos (2009). Listas das aves do Brasil. Version 09/08/2009. Available at http://www.cbro.org.br [Verified 12 November 2009].

Contreras-Garduño, J., Buzatto, B. A., Serrano-Menezes, M. A., Najera-Cordero, K., and Córdoba-Aguilar, A. (2008). The size of the red wing spot of the American rubyspot as a heightened condition-dependent ornament. *Behavioral Ecology* **19**, 724–732. doi:10.1093/beheco/arn026

Gianotti, E. (1988). Composição florística e estrutura fitossociológica da vegetação de Cerrado e mata ciliar da Estação Ecológica de Itirapina (SP). M.Sc. Thesis, Universidade Estadual de Campinas, São Paulo.

Gressler, D. R., and Marini, M. Â. (2007). Nest, eggs and nestling of the Collared Crescentchest Melanopareia torquata in the Cerrado region, Brazil. *Revista Brasileira de Ornitologia* **15**, 574–576. Available at http://www.ararajuba.org.br/sbo/ararajuba/artigos/Volume154/ara154not1.pdf [Verified 10 February 2010].

Griffiths, R., Double, M., Orr, K. C. Y., and Dawson, R. J. G. (1998). A DNA test to sex most birds. *Molecular Ecology* **7**, 1071–1075. doi:10.1046/j.1365-294x.1998.00389.x

Irestedt, M., Fjeldså, J., Johansson, U. S., and Ericson, P. G. P. (2002). Systematic relationships and biogeography of the tracheophone suboscines (Aves: Passeriformes). *Molecular Phylogenetics and Evolution* **23**, 499–512. doi:10.1016/S1055-7903(02)00034-9

Kanegae, M. F. (2009). Tamanho populacional, seleção de habitat e área de vida de espécies de aves endêmicas e ameaçadas do Cerrado na Estação Ecológica de Itirapina, São Paulo. Ph.D. Thesis, Universidade de São Paulo, São Paulo. Available at http://www.teses.usp.br/teses/disponiveis/41/41134/tde-08072009-104148/ [Verified 10 February 2010].

Kanegae, M. F., Telles, M., Lucena, S. A., and Motta-Junior, J. C. Observations on the Breeding Biology of the Collared Crescentchest (*Melanopareia torquata*). *Wilson Journal of Ornithology*, in press.

Krabbe, N., and Schulenberg, T. (2003). Family Rhinocryptidae (Tapaculos). In 'Handbook of the Birds of the World. Vol. 8: Broadbills to Tapaculos'. (Eds J. del Hoyo, A. Elliott and D. A. Christie.) pp. 748–787. (Lynx Edicions: Barcelona.)

Machado, R. B., Ramos Neto, M. B., Pereira, P., Caldas, E., Gonçalves, D., Santos, N., Tabor, K., and Steininger, M. (2004). Estimativas de perda da area do Cerrado brasileiro. (Conservation International do Brasil: Brasilia, Brazil.) [In Portuguese]

Marini, M. Â., and Durães, R. (2001). Annual cycles of molt and reproduction of passerines from central-south Brazil. *The Condor* **103**, 767–775. doi:10.1650/0010-5422(2001)103[0767:APOMAR]2.0.CO;2

Nakagawa, S., and Burke, T. (2008). The mask of seniority? A neglected age indicator in house sparrows Passer domesticus. *Journal of Avian Biology* **39**, 222–225. doi:10.1111/j.2008.0908-8857.04171.x

Remsen, J. V. Jr, Cadena, C. D., Jaramillo, A., Nores, M., Pacheco, J. F., Robbins, M. B., Schulenberg, T. S., Stiles, F. G., Stotz, D. F., and Zimmer, K. J. (2010). A classification of the bird species of South America. (American Ornithologists' Union.) Available at http://www.museum.lsu.edu/~Remsen/SACCBaseline.html [Verified 12 January 2010].

Ribeiro, J. F., and Walter, B. M. T. (1998). 'Fitofisionomias do Bioma Cerrado. Cerrado: Ambiente e Flora.' (Eds S. M. Sano, and S. P. Almeida.). pp. 89–166. (Embrapa-CPAC: Planaltina, Brazil.)

Ridgely, R. S., and Tudor, G. (1994). 'The Birds of South America. Vol. 2: The Suboscine Passerines.' (Oxford University Press: Oxford, UK.)

São Paulo (2008). Decreto N° 53.494, de 2 de Outubro de 2008. Declara as Espécies da Fauna Silvestre Ameaçadas, as Quase Ameaçadas, as Colapsadas, Sobrexplotadas, Ameaçadas de Sobrexplotação e com dados insuficientes para avaliação no Estado de São Paulo e dá providências correlatas. Available at http://www.cetesb.sp.gov.br/licenciamentoo/legislacao/estadual/decretos/2008_Dec_Est_53494.pdf [Verified 10 February 2010].

Senar, J. C. (1999). Plumage colouration as a signal of social status. In 'Proceedings of the 22nd International Ornithological Congress', August 1998, Durban, South Africa. (Eds N. J. Adams and R. H. Slotow.) pp. 1669–1686. (BirdLife: Johannesburg, South Africa.)

Sick, H. (1997). 'Ornitologia Brasileira.' (Editora Nova Fronteira: Rio de Janeiro, Brazil)

Slater, P., and Mann, N. I. (2004). Why do the females of many bird species sing in the tropics? *Journal of Avian Biology* **35**, 289–294. doi:10.1111/j.0908-8857.2004.03392.x

Stutchbury, B. J. M., and Morton, E. S. (2001). 'Behavioral Ecology of Tropical Birds.' (Academic Press: San Diego.)

Willis, E. O., and Oniki, Y. (2003). 'Aves do Estado de São Paulo.' (Divisa: Rio Claro, Brazil.)

Manuscript received 28 February 2009, accepted 20 October 2009