

Effects of pairing *Thamnophilus ambiguus* males with females on the behavioral responses by males to playback

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ABSTRACT: The behavioral responses of the Sooretama Slaty-antshrike (*Thamnophilus ambiguus*) to playback were tested in a Restinga (sand-coastal plain) area in southeastern Brazil. Field data were collected for seven mornings, from 5:30 h to 11:00 h. Frequency data and the time period between playing the species' song (playback) and the sighting of individuals were recorded by the observer. The following parameters related to behavioral responses to playback were recorded: 1) the bird flew to a visible roost but not sang (sighting); 2) the bird sang as response to playback (vocalization) and; 3) the bird sang and approached to the observer (bird approaching). The time of response to playback of males paired with females was significantly shorter than that of unpaired males, albeit with no significant difference in the sighting and bird approaching frequency. In conclusion, males paired with females become more aggressive and show a faster territorial defense response than solitary males.

KEY-WORDS: restinga, Sooretama Slaty-antshrike, territorial behavior, Thamnophilidae.

Brazil has 1919 bird species recorded, which makes it a mega-diverse country regarding bird species richness (Piacentini *et al.* 2015). Various methods, including linear transects, fixed listening stations, and even walks and direct sighting, are used for bird inventories (Develey 2003). Regardless of the species survey method adopted, the acoustic identification of the species increases the detection efficiency and may also reveal behavioral characteristics of the species.

Vocalization is a form of bird communication among individuals and may be used by researchers as a method for species identification. Vocalization recording and playback the vocalization of the species is another method that is often used to increase the chances of detecting rare species, and is highly effective at detecting territorial species (Bibby *et al.* 1998). For example, given the difficulty in sighting individuals in forest areas, only audio records of different species in these areas may allow the identification of 90% of the species (Mosher *et al.* 1990, Sick 1997). Vocalization patterns may also be used to understand behavioral patterns (Boscolo *et al.* 2006). Thus, the use of playback may be a tool that helps determine the territories of some species and even tests some behavioral patterns, including the movement ability of a species (Sieving *et al.* 1996).

Some species respond to playback more easily than others, and some do not respond at all. Some respond

efficiently, although they are difficult to sight even when attracted to the playback location because they have discrete habits. Conversely, other species show a more pronounced behavioral response to playback and are easier to sight. However, differences in behavioral responses between individuals of the same species are unknown. The present study aimed to evaluate the behavioral responses of the Sooretama Slaty-antshrike (*Thamnophilus ambiguus*) to playback. For this purpose, the behavioral responses to playback of males paired with females and solitary males were analyzed.

The study was conducted at the Paulo César Vinha State Park (PEPCV) located in the municipality of Guarapari, state of Espírito Santo, Brazil. A total of 225 bird species were recorded at the PEPCV in a survey conducted by Venturini *et al.* (1996), accounting for 22.1% of all bird species reported for the Atlantic Forest (MMA 2000).

Fieldwork was conducted from 12 to 18 September 2014. This time period coincides with the beginning of the reproductive activities of several species in the study area, for example, *Formicivora rufa* (Dutra 2014) and *Mimus gilvus* (Araújo 2016). Eighteen *T. ambiguus* males who were previously captured and marked with metal bands provided by the *Centro Nacional de Pesquisa e Conservação de Aves Silvestres (CEMAVE)* and unique combinations of three colored plastic bands were selected.

Nine individuals were paired with females, and the other nine were solitary males. All individuals were previously sighted defending their territory.

Field data were always collected in the period from 5:30 h to 11:00 h in the morning. A Sony (ICD-PX312) recorder was used to playback *T. ambiguus* vocalizations for 120 s, and 10 × 42 binoculars were used for sighting birds. The playback was used only once a day in each territory. Playback started together with a timer when arriving at the territories of different individuals. Behaviors were recorded by *ad libitum* method (Altmann 1974) from the start of playback. The following parameters related to behavioral responses to playback were recorded: 1) the bird flew to a visible roost but not sang (sighting); 2) the bird sang as response to playback (vocalization) and; 3) the bird sang and approached to the observer (bird approaching). Bird approaching was defined as individuals approaching the observer within 5 m. For each behavioral response, we recorded the time (latency) between the playback and bird response.

Normal distribution was verified with Kolmogorov–Smirnov tests. Differences in the mean times of sighting, vocalization response and approach response were assessed using unpaired t test. All analyses were performed according to Zar (2010) using the Systat Software, version 12.0 (Wilkinson 2007) considering $\alpha < 0.05$ as the significance level.

At least two of the three types of behavioral responses (sighting and vocalization) analyzed were observed every time the species song was played back. Paired males showed the three types of behaviors with a 100% frequency. Solitary males showed a 55.5% response to bird approaching. Females were sighted before males in 33.3% of the responses of the paired males.

No significant differences between mean values of sighting ($t = -1.50$, $df = 16$, $P = 0.15$) and bird approaching ($t = 0.95$, $df = 16$, $P = 0.36$) were found when comparing paired and solitary males. However, paired males responded to vocalizations faster than solitary males ($t = -2.80$, $df = 16$, $P = 0.01$).

Pyriglena leucoptera (Thamnophilidae) individuals responded to playback 75% of the time in the study conducted by Barreiros *et al.* (2008) also testing reaction. This result was similar to the 85% response rate of this species found by Boscolo *et al.* (2006). Response to playback was observed 56% of the time in a study conducted in an urban area, wherein a bird approaching response was observed in only 30% and the birds were sighted in 25% of the attempts (Barreiros *et al.* 2008). The response rate to playback by *T. ambiguus* was 100% in the present study. However, this rate most likely resulted from exclusively testing the playback in territories known to be occupied by individuals of the species.

The faster response of paired males may result from

the threat posed by playback vocalizations perceived as another male invading their territory. Thus, the faster response may be considered a territorial and mating defense strategy. Possibly, this is also a behavior to prevent extrapair copulation, as observed for other territorial species (Møller 1990, Duca & Marini 2014).

Results showed that the responses of males of *T. ambiguus* to playback were faster when paired with a female, which corroborated previous studies on territorial behavior (Araújo-Lima & Duca 2015). Female presence in territories also affected the aggressive behavior to observer approach by territorial males, by increasing the response to playback with an increased frequency. Therefore, *T. ambiguus* can potentially be used in future studies to analyze various physiological, morphological, and behavioral parameters associated with territorial behavior.

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REFERENCES

- Altmann, J. 1974. Observational study of behavior, sampling methods. *Behaviour*, 49: 227–267.
- Araújo, L. C. 2016. *Conservação do Sabiá da praia Mimus gilvus (Aves: Mimidae) em uma reserva de restinga na região sudeste do Brasil*. Ph.D. Thesis. Vila Velha: Universidade Vila Velha.
- Araújo-Lima, V. & Duca, C. 2015. Análise comparativa das abundâncias de *Formicivora rufa* e *Thamnophilus ambiguus* em uma área de restinga no sudeste do Brasil. *Ornithologia*, 7: 29–33.
- Barreiros, M. H. M.; Souza, R. C.; Santos, R. A. S. & Priant, A. C. G. 2008. *Influência do play-back no comportamento de aves no Campus Urbanova na Universidade do Vale da Paraíba*. Abstracts of the VIII Encontro Latino Americano de Pós-Graduação.
- Bibby, C.; Jones, M. & Marsden, S. 1998. *Expedition field techniques: bird surveys*. London: Royal Geographical Society.
- Boscolo, D.; Metzger, J. P. & Vielliard, J. E. 2006. Efficiency of playback for assessing the occurrence of five bird species in Brazilian Atlantic Forest fragments. *Anais da Academia Brasileira de Ciências*, 78: 629–644.
- Develey, P. F. 2003. Métodos para estudos com aves, p. 153–168. In: Cullen, L.; Rudran, R. & Pádua, C. V. (eds.). *Métodos de estudos em biologia de conservação da vida silvestre*. Curitiba: Fundação O Boticário.
- Duca, C. & Marini, M. Â. 2014. Territorial system and adult dispersal in a cooperative-breeding tanager. *Auk*, 131: 32–40.
- Dutra, W. B. 2014. *Demografia e territorialidade de Formicivora rufa (Wied, 1831) (Aves, Thamnophilidae) em área de restinga no sudeste do Brasil*. M.Sc. Dissertation. Vila Velha: Universidade Vila Velha.
- MMA (Ministério do Meio Ambiente). 2000. *Avaliação e ações prioritárias para a conservação da biodiversidade da Mata Atlântica e Campos Sulinos*. Brasília: Secretaria de Biodiversidade e Florestas.
- Møller, A. P. 1990. Changes in size of breeding territories in relation to the nestling cycle. *Animal Behaviour*, 40: 1070–1079.

- Mosher, J. A.; Fuller, M. R. & Kopeny, M. 1990.** Surveying woodland raptors by broadcast of conspecific vocalizations. *Journal of Field Ornithology*, 61: 453–461.
- Piacentini, V. Q.; Aleixo, A.; Agne, C. E.; Maurício, G. N.; Pacheco, J. F.; Bravo, G. A.; Brito, G. R. R.; Naka, L. N.; Olmos, F.; Posso, S.; Silveira, L. F.; Betini, G. S.; Carrano, E.; Franz, I.; Lees, A. C.; Lima, L. M.; Pioli, D.; Schunck, F.; Amaral, F. R.; Bencke, G. A.; Cohn-Haft, M.; Figueiredo, L. F. A.; Straube, F. C. & Cesari, E. 2015.** Annotated checklist of the birds of Brazil by the Brazilian Ornithological Records Committee. *Revista Brasileira de Ornitologia*, 23: 91–298.
- Sick, H. 1997.** *Ornitologia brasileira*. Rio de Janeiro: Editora Nova Fronteira.
- Sieving, K. E.; Willson, M. F. & Santo, T. L. 1996.** Habitats barriers to movement of understory birds in fragmented south-temperate rainforest. *Auk*, 133: 944–949.
- Venturini, A. C.; Ofranti, A. M. S.; Varejão, J. B. M. & Paz, R. 1996.** *Aves e mamíferos da restinga: Parque Estadual Paulo César Vinha - Setiba, Guarapari - ES*. Vitória: Secretaria de Estado de Desenvolvimento Sustentável.
- Wilkinson, L. 2007.** SYSTAT 12.0. SYSTAT Software, Inc., San Jose.
- Zar, J. H. 2010.** *Biostatistical analysis*. 5th edn. Upsaddler Road: Prentice Hall.

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