

Alarm Call Dialects of The Black-crowned Antshrike

Introduction

- The Black-crowned Antshrike (Western Slaty-Antshrike) is a small tropical bird species in the family *Thamnophilus*.
- Opportunistic forager and will feed on a variety of small insects though they prefer larger prey such as millipedes, grasshoppers and scorpions.¹
- Native to parts of Central and northern South America and is a sedentary species.
- After fledging, juveniles will remain within their parents' nesting territory in most cases until the next breeding season.
- Juveniles will typically establish their own territory within the same or a neighboring population.⁸
- Very vocal species with many calls and songs.
- Both males and females will sing and call year-round and are vocally active throughout the day.⁵
- Primary alarm call, called the reverse song or 'chirr', is given by an adult.
- Alarm call begins with loud 'Erk' followed by many 'uh' notes.
- Tarwater (2008) found that the Antshrikes will alarm call louder and more frequently based on the proximity of a predator to the Antshrikes nest and how big of a threat the predator poses.
- Antshrike alarm calls are learned throughout the juvenile stages.



Male Black-crowned Antshrike photographed by Tom Friedel

Methods

- Searched for previous literature using key terms such as alarm call dialects, Antshrike behavior, Black-crowned Antshrike, Antshrike distribution, etc.
- Searched for reverse song recordings on Xeno Canto.
- Used Raven by the Cornell Lab of Ornithology to analyze aspects of the reverse song. Aspects analyzed were max frequency of the 'Erk', length of the 'Erk', and number of trailing 'uh' notes.
- Used the `avov()` function in `r` to run an Anova test for each aspect vs. location of the call
- Ran a Tukey HSD test in `r` on data that was determined to be significant by the Anova.
- Used the `ggplot()` function in `r` to create box plots from the results of each Anova test.

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Results

- Geographical separation of Antshrike populations by the Andes mountain range and distance between Central and northern South America, suggests the potential for the formation of song and call dialects.
- Undernutrition due to environmental disturbances along their forest edge habitat may lead to a reduced ability to learn songs, allowing for formation of dialects.
- The Anova tests revealed only the variation in number of trailing 'uh' notes between locations was statistically significant.
- Further analysis via the Tukey HSD test showed that the difference in number of trailing 'uh' notes between the Ecuador and Panama calls had a p-value of 0.039 and between Columbia and Ecuador calls had a p-value of 0.07.

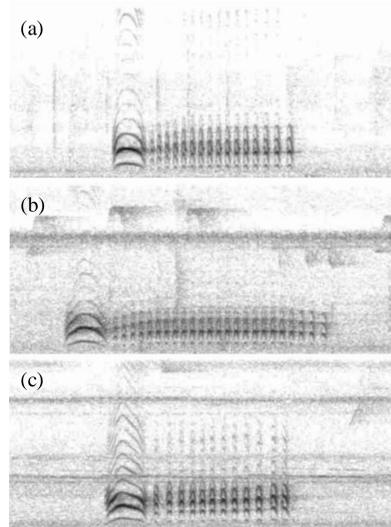


Fig. 1. Sonograms of the reverse song call of the Black-crowned Antshrike. (a) Call recorded in 2019 in Colon, Panama. (b) Call recorded in 2008 in Los Rios, Ecuador. (c) Call recorded in 2018 in Santander, Columbia.

Discussion

Juvenile Antshrikes begin learning their calls starting the day they hatch. After fledging, the juveniles will continue to learn their calls and begin practicing them until they have established their own territories.⁴ This period between hatching and maturing where calls are learned is called the sensitive phase. Studies have shown that small periods of undernutrition in birds still in the sensitive phase may hinder their ability to accurately learn their songs and calls.⁶ Because of their tendency to live along forest edges, their habitat is more likely to be disturbed by agriculture and other urbanizations. This may affect the parents' ability to catch sufficient prey for their offspring which could result in a small period of undernutrition and thus, affect the offspring's song learning. This could produce dialects based on type and period of resource disturbance.

For a dialect to be able to form between populations, the birds in each population must be quite sedentary and therefore there would be little potential that would hear and learn each other's songs. Williamson & Fagan (2017) found that Black-crowned Antshrikes were hesitant to even cross small forest gaps to investigate a potential threat and defend their territory. This supports my theory that population mixing may not occur. These sedentary patterns and the sensitive phase for song and call learning ending before the end of their first year, lowers the chances that song mixing will occur between populations. Isler et al. (1997) has shown some variation in loud songs and calls across the lower Central America and Ecuador range though the sample size was not large enough to have a definitive result.

My statistical analysis of different aspects of the Antshrikes alarm calls showed that there is no significant variation in length or frequency of the 'Erk' portion of the call. One reason for this could be that the recordings that were used weren't completely clear and not all recordings contained data for higher frequencies of the recording. However, the number of trailing 'uh' notes between locations did have significant variation when comparing the calls from Ecuador and Panama which can be seen in fig 1. This could be the result of a call dialect, though because of the limited sample size, it's hard to say for certain.

Furthering research on dialects of this species would be useful for conservation efforts as mate preference based on song or call could be linked to fitnesses within the populations. If individuals from different populations were to be used for captive breeding efforts, females may select a male with lower fitness because they don't fully recognize his song or call. This would in turn, reduce the populations overall fitness and chances of survival over time.

Expected Results

I hypothesized that there could be potential for an alarm call dialect due to geographical separation that would prevent populations from mixing their songs and that environmental disturbances could reduce a juvenile Antshrikes ability to properly learn their songs and calls enough to create dialects between populations.

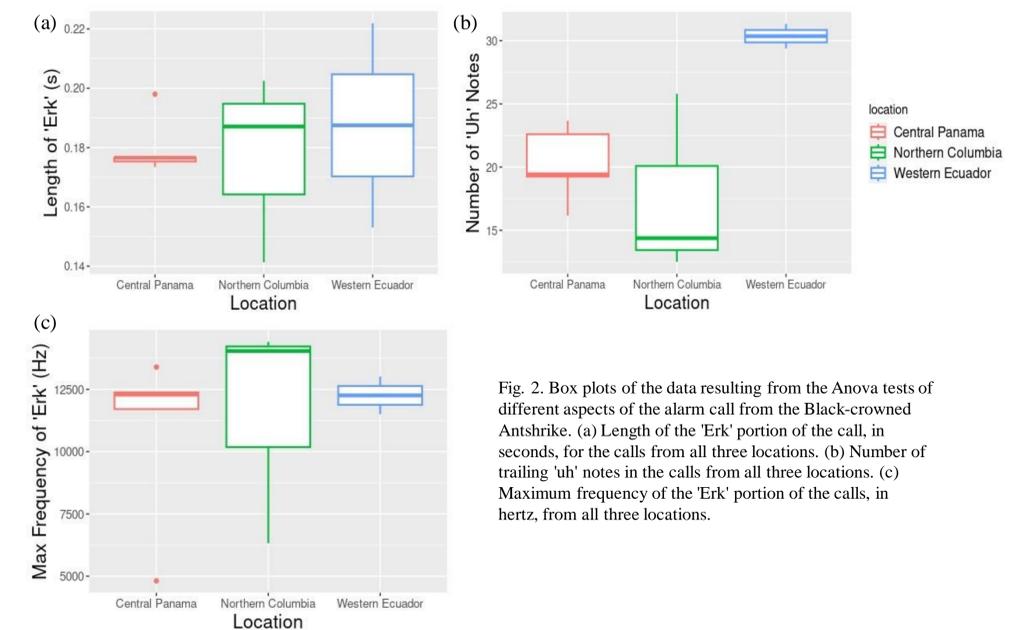


Fig. 2. Box plots of the data resulting from the Anova tests of different aspects of the alarm call from the Black-crowned Antshrike. (a) Length of the 'Erk' portion of the call, in seconds, for the calls from all three locations. (b) Number of trailing 'uh' notes in the calls from all three locations. (c) Maximum frequency of the 'Erk' portion of the calls, in hertz, from all three locations.

References

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Black-crowned Antshrike Alarm Calls

Ecuador



Columbia



Panama



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