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Data in Brief Submission

Article Title

Dataset on audio records of animals from the northeast Andes of Colombia I: The bird sounds of Boyacá Department

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Abstract

This dataset is the first effort to combine the audio biodiversity of a taxonomic group in a selected location, the Boyacá department in Colombia. We conducted a detailed review of the sound recordings for birds from the Boyacá department within three repositories, the environmental sound collection of the Humboldt Institute, the Macaulay Library of the Cornell Lab of Ornithology, and the xeno-canto platform of the Naturalis Biodiversity Center. We selected recordings that were identified up to species and have the complete metadata information. Using latitude and longitude information, we assigned each recording to one of the three regions and one of the 12 biotic units reported for Boyacá. We reported a total of 2321 recordings belonging to the Andean region (1892), Orinoquian region (425), and Carare-Lebrija-Nechi-Sinu (4). The sounds of Boyacá birds have been sampled for approximately three decades, with two peaks of activity in early 2000's and 2018. We also included a map with the distribution of biotic units and sound recordings of our dataset. This dataset can be used to extract acoustic traits to test hypotheses of turnover in the acoustic space or traits by species, or to compare acoustic traits between species. It can also allow decision-makers to support biodiversity-based economies such as avitourism.

Keywords

Bioacoustics, bird acoustics, ecoacoustics, sound collection, sounds recordings.

Specifications table

Subject	Agricultural and Biological Sciences
Specific subject area	Ecology, Evolution, Behaviour and Systematics.
Type of data	Table Figure
How data were acquired	Field recordings, Web searching, Specify query.
Data format	Table with raw data and a figure
Parameters for data collection	We considered sounds from the department of Boyacá, Colombia identified until species category, within the class Aves. Each record had to have a catalogue number to avoid duplicates. Finally, each record must include geographic coordinates standardized in decimal degrees. The search and compilation include sounds up to September 2019.
Description of data collection	To build our dataset, we conducted a query in the Specify application within the IAvH-CSA database for birds "class Aves" in "Boyacá," which creates a DarwinCore file with a catalogue number, taxonomy, and location information. Then, we conducted a search in Macaulay Library from the Location "Boyacá, Colombia (CO)." Finally, we used the advanced search option in XC sorting by country "Colombia," and Locality "Boyacá." We combined the three matrixes in a single table and confirmed the elevation with the GPS Visualizer tool (http://www,gpsvisualizer.com). Biotic units and regions were adjusted following the IDEAM and Laboratory of Applied Biogeography and Bioacoustics of the Humboldt Institute [2].
Data source location	Department of Boyacá, north-eastern Andes of Colombia which has an extent of 23,189 km^2. The coordinates systems in the tables are standardized in decimal degrees and the reference datum WGS84. Latitude: 4.7949 and 7.0001 min and max, respectively. Longitude: -74.5103 and -72.1059 min and max, respectively. Elevation: 130-3959 m asl.
Data accessibility	Data are available with this article.

Value of the Data

- Provide a dataset of the sounds of nature from Boyacá that allows researchers to explore other dimensions of biodiversity in terms of phenotypical traits regarding communication and behaviour; our macroecological dataset will concentrate searches on many different topics, including ecology and biogeography.

- Allows researchers extracting acoustic traits to test hypotheses, also decision makers can employ it to support biodiversity-based economies such as avitourism or other ecosystem services in their territory, as well as outreach initiatives in the department.

- Includes several biotic units, elevational gradient, and many species, which is an invaluable opportunity to test hypotheses of turnover in the acoustic space in terms of the acoustic community, controlling taxonomically by including only the avifauna. In addition, future development of automatically identification based on bird acoustics could be pointed to the better represented taxa in here.

- This is the first effort to combine the audio biodiversity of a taxonomic group in a selected location, making available data from the Boyacá department and encouraging other similar initiatives.

- Provide a spatial and temporal dataset to compare acoustic traits from different locations ranging from 130 to 3960 m, and years ranging from 1992 to 2019; important data to test hypotheses regarding land cover change and response to climate change.

1. Data

The dataset contains a detailed review of bird audio records from the Boyacá department, north-eastern Andes of Colombia as a noteworthy way to assess biodiversity in this region of South America (Supplementary File 1). It only includes bird sounds identified up to species category from the Environmental Sound Collection of the Humboldt Institute (Colección de Sonidos del Instituto Humboldt IAvH-CSA) [1], the Macaulay Library of the Cornell Lab of Ornithology (ML: https://www.macaulaylibrary.org), and the xeno-canto platform of the Naturalis Biodiversity Center (XC: https://www.xeno-canto.org), up to September 2019. There are 2321 records of bird sounds in Boyacá, regarding 340 bird species in 52 families and 21 orders. The majority of the sound records (1306 recordings) are included in IAvH-CSA, followed by ML (621), and XC (394). Our dataset includes sound records from July 1992 to September 2019, with peaks of sampling in 2003 (389) and 2018 (560). Sound records were concentrated mainly in the Andean region (1892), with some representative in the Orinoquian region (425), and few records from Carare-Lebrija-Nechi-Sinu (4). Ten of the twelve biotic units had representative bird sounds, but three biotic units include the majority of records (~75%): Altoandino Cordillera Oriental (849), Guane-Yariguíes (512), and Piedemonte Orinoquia (419). The geographical distribution of all sound records in the dataset was represented in Figure 1, indicating the repository and representativeness by biotic unit.

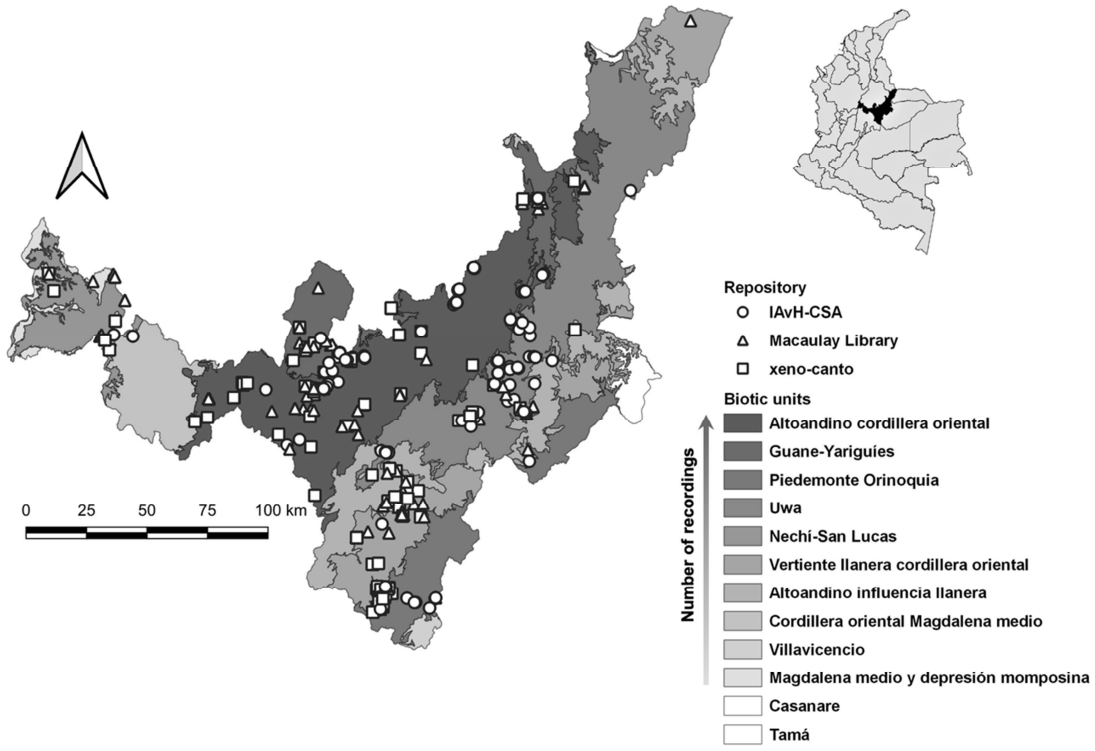

Fig. 1. Map representing audio records of birds in Boyacá, Colombia. Darker colors within the gray scale indicate biotic units with a higher number of recordings.

2. Experimental Design, Materials, and Methods

2.1. Study area

We focused on the Boyacá department, in the north-western Andean region of Colombia, which covers an area of 23,189 km^2 (Fig. 1). The department of Boyacá extents from the lowland middle Magdalena Valley, throughout the north at Eastern Andes (Cordillera Oriental) and to the foothills of the Orinoquian region. It includes an elevational gradient from around 130 m to snow peaks at 5490 m, including Paramo ecosystems. The department is limited with Santander, Norte de Santander, Antioquia, Cundinamarca, Casanare, and Arauca departments. At the extreme north-east limits, Boyacá extent to the international border with Venezuela, a place with few ornithological explorations [4–6].

2.2. Data collection

We conducted a detailed review of the audio recordings of birds in Boyacá. Although nature soundscape includes much more than birds [7], specific vocalizations of this taxa are the better known and are widely used for ecological tests and conservation initiatives. Passive acoustic monitoring initiatives in Boyacá can gather extensive and interesting data [8], but we did not include this technique because we considered only the sounds identified until the species category.

We gathered the recording data from three repositories up to September 2019: IAvH-CSA, ML, and XC. The IAvH-CSA included the data gathered from a recent exploration in a project in Boyacá by the authors. Such exploration uses high-quality recorders (SoundDevice MixPre3-I, Marantz PMD661-MKII), recording in wav format 48 kHz - 24-bit/sec, and coupled with unidirectional shotgun microphones (Sennheiser ME67) or parabolic system (Telinga 22' with a cardioid mic). The remain repositories, ML and XC, include citizen science multimedia recorded by a wide range of instruments, ranging from phones to high-quality recorders with or without external microphones, but submitted mainly in wav and mp3 format, respectively. All three repositories are mainly focused in directional recordings, which means each recording were obtained by aiming an individual (sometimes a group of individuals) in the field and try to reduce the signal-to-noise ratio (trying to not include external sounds but the aimed individual). Once uploaded in ML and XC, each recordist could categorize their recordings by quality, based in the signal-to-noise ratio. We did not apply any filter regarding this category because it seems very subjective to us.

After exploring the repositories, we combine and exclude duplicates of recordings by reviewing the catalogue number and remarks in each dataset. We updated the taxonomy following the South American Classification Committee [3]. We confirm elevation information with the GPS visualizer tool (http://www.gpsvisualizer.com), and for each record, we adjust with a join of the dataset and Biotic units and regions [2], with Arcgis 10.2 analysis tools. Regions were Andean, Orinoquian, and Carare-Lebrija-Nechi-Sinu. Biotic units were Altoandino Cordillera Oriental, Altoandino influencia llanera, Cordillera Oriental Magdalena medio, Guane-Yariguíes, Nechí-San Lucas, Uwa, Vertiente llanera Cordillera Oriental, Magdalena medio y depresión momposina, Piedmente Orinoquia, and Villavicencio.

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Competing Interests

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

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