G. montana © Félix Uribe

Impact of environmental factors on the presence and relative abundance of four bird species of hunting and heritage interest in Guadeloupe

 # population biology # conservation # endemic species

DATES
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COUNTRY
Guadeloupe

STUDENT
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EDUCATION LEVEL
Doctorate

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Context

In Guadeloupe, the forest environment is home to many species of birds of patrimonial and/or hunting interest, that are present on the IUCN red list of endangered species. Among these, the Zenaida dove, *Zenaida aurita* ("Least Concern" status, endemic to the Lesser Antilles), the ruddy quail-dove, *Geotrygon montana* ("Least Concern" status, with a population reported in decline), the bridled quail-dove, *Geotrygon mystacea* ("Least Concern" status, endemic to the Caribbean with a reported declining population) and the forest thrush, *Turdus lherminieri* ("Near Threatened" status, endemic to Dominica, Montserrat, Saint Lucia and Guadeloupe). These species are important for ecosystem dynamics. Indeed, the first three species of colombids are frugivorous and thus directly contribute to the regeneration of forests. These game species are under special threat as hunting pressure is added to other anthropic or natural disturbances which affect the dynamics of their populations. The forest thrush, which is mainly insectivorous, is thought to play an important role in the biological control of invertebrates. Despite all of these particularities, experts agree on a lack of reliable data regarding the spatiotemporal dynamics, ecology and demography of these species. Thus, the management of these species of birds is particularly delicate and requires an adequate characterization of their ecological needs.

Objectives

This research project aims at providing reliable information on the spatiotemporal dynamics, ecology and demography of these species, on a regional scale. The data collected will be used to:

- Evaluate the relative abundance and the detection of these four species of birds in the forests of Guadeloupe
- Determine the influence of biotic and abiotic factors on the distribution and relative abundance of these four bird species
- Evaluate the spatiotemporal co-occurrence between the four species of birds, as well as with potential predators (domestic dogs and cats, mongooses, raccoons, rodents, humans)
- Evaluate the link between the availability of food resources, the distribution and the relative abundance of the species studied
- Understand the discrimination of isotopic niches in the bridled quail-dove and the ruddy quail-dove

Methods

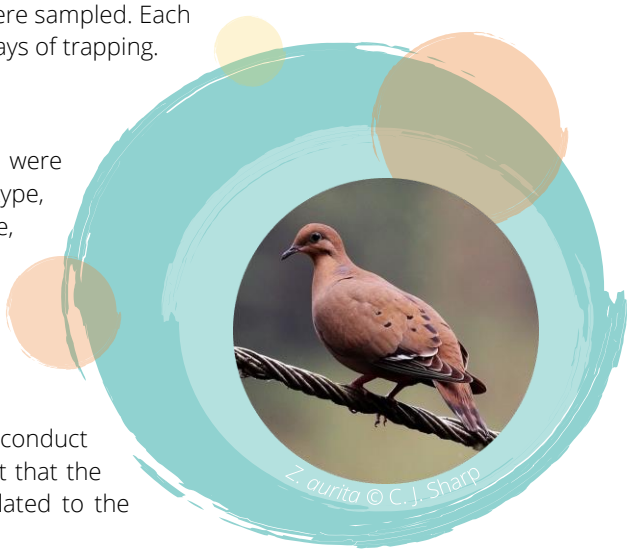
Demographic monitoring

Between February and May 2019, a total of 120 camera trap locations, spread across 24 stations (6 in dry forests, 6 in flooded forests and 12 in rain forests), were sampled. Each station consisted of five camera traps, forming in a straight line, and separated from each other by 200 m. Each camera trap was active for seven consecutive days during the bird breeding season and again for seven consecutive days outside the breeding season, resulting in a total of 1680 trapping days.

Between February and March 2020, a total of 60 camera trap locations, distributed in 12 stations (including 3 stations in dry forests, 3 stations in flooded forests, and 6 stations in rain forests), were sampled. Each camera trap was active for seven consecutive days, resulting in 420 days of trapping.

Biotic and abiotic factors

During the demographic monitoring, biotic and abiotic factors were recorded at each camera trap location in 2020, including forest type, altitude, canopy opening, temperature, time and month of capture, presence and abundance of potential predators, presence and abundance of humans, weight of litter, abundance and presence of soil macrofauna.



Isotopic analyses

Samples of feathers, a metabolically inert tissue, will be collected to conduct analyses of the isotopic signatures. Isotopic tracing relies on the fact that the stable isotopic composition of consumers' tissues is predictably related to the isotopic composition of their food.

Results

In 2019 and 2020, 6731 and 2083 recording were made, respectively, including 351 and 100 recordings of bridled quail-dove, 17 and 16 recordings of ruddy quail-dove, 330 and 166 recordings of forest thrush, 197 and 54 recordings of Zenaida dove, 72 and 16 recordings of domestic cats, 107 and 28 recordings of domestic dogs, 1056 and 300 recordings of rodents, 483 and 107 recordings of mongooses, and 101 and 38 recordings of raccoons.

Our predictions suggest that forest type, elevation, temperature and canopy opening could influence the relative abundance of bridled quail-doves and Zenaida doves. For example, the abundance of the bridled quail-dove might be negatively influenced by temperature, while an increase in temperature could positively influence the abundance of the Zenaida dove.

Outside the breeding season, the bridled quail-dove spatially coexisted with mongooses, rodents and the ruddy quail-dove. The Zenaida dove, on the other hand, spatially coexisted with domestic cats, mongooses and raccoons. These results were also valid during the breeding season, except for the absence of co-occurrence between Zenaida doves and domestic cats, as well as between the Zenaida doves and mongooses.

About the research team

Aurélie began her doctorate in 2020 at the Université des Antilles, in Guadeloupe. Her research is co-funded by the association Caribaea Initiative, the Office Français de la Biodiversité (OFB) and a ministerial scholarship.

Before starting her PhD project, Aurélie studied at the Université des Antilles. She has a bachelor's degree in Environmental Biology and Earth Sciences, and a master's degree in Biodiversity, Ecology and Evolution, specializing in Terrestrial Biodiversity Management. Aurélie joined Caribaea Initiative in 2018, during the second year of a her master's degree, when she began her research on the four species of birds in Guadeloupe, within the Office National de la Chasse et de la Faune Sauvage.

Aurélie's PhD research is co-supervised by Dr. Gladys Loranger-Merciris and Pr. Frank Cézilly, belonging respectively to the UMR ISYEB (Université des Antilles) and the UMR CNRS 6282 Biogéosciences (Université de Bourgogne, Dijon). In the field, she is mainly assisted by the environmental police officers (ONCFS), Dr Ludovic Pruneau (Université des Antilles), and Lens Jerry Saint Louis for the installation of camera traps, and by her family and relatives for the collection of macrofauna samples.