Comparative phylogeographic and demographic analyses reveal a pervasive sister relationship between bird populations of the northern and south-central Atlantic Forest

Fernanda Bocalini[1,2*], Sergio D. Bolívar-Leguizamón[1], Luís F. Silveira[1], Gustavo A. Bravo[1,3,4]

1 Museu de Zoologia da Universidade de São Paulo, Ipiranga, São Paulo, SP, Brazil.

2 Departamento de Zoologia do Instituto de Biociências, Universidade de São Paulo, 05508-090, São Paulo, SP, Brazil

3 Department of Organismic and Evolutionary Biology, Harvard University, Cambridge, USA.

4 Museum of Comparative Zoology, Harvard University, Cambridge, USA.

*Contact: fernanda.bocalini@usp.br

INTRODUCTION

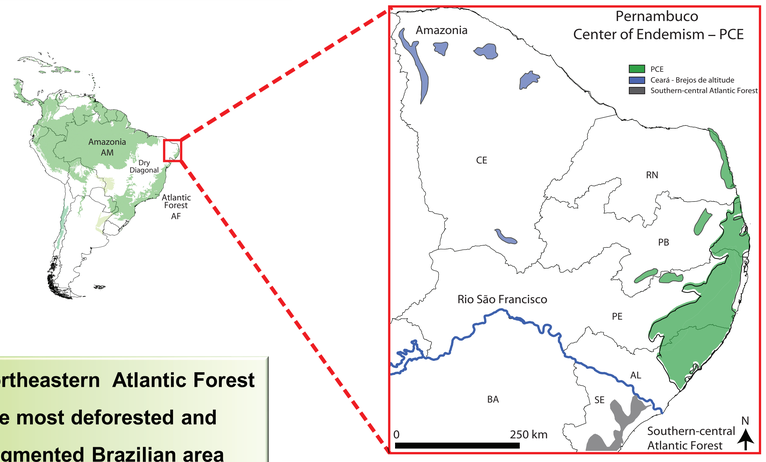


Fig. 1. Map showing the location of the Pernambuco Center of Endemism (PCE). The PCE corresponds to the forested area north of Rio São Francisco, including isolated enclaves of humid forest at higher elevations ("brejos de altitude").

- Northeastern Atlantic Forest
- The most deforested and fragmented Brazilian area
- Numerous endemic species
- Unknown biogeographic affinities
- Diversification scenarios: Pleistocene Forest Refugia (PFR), Riverine Barriers (RB)
- Role of past connections between the PCE and AM and the elevational distribution of species

Questions

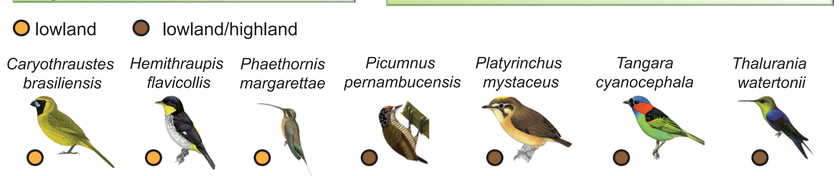
i) Are patterns of populational divergence and demographic history concordant with RH or RBH?

ii) Is there any relationship between the origin of lineages and current elevation range?

METHODS

- 7 taxa endemic to PCE
- 490 tissue samples
- Some taxa occur primarily in the lowlands, whereas others occur both in the lowlands and highlands

- Ultraconserved Elements (UCEs)
- SNPs ~ 3600 loci + ND2
- Population Structure (sNMF, DAPC)
- Species Tree (SNAPP)
- Demography (G-PhoCs and *momi2*)



POPULATION STRUCTURE

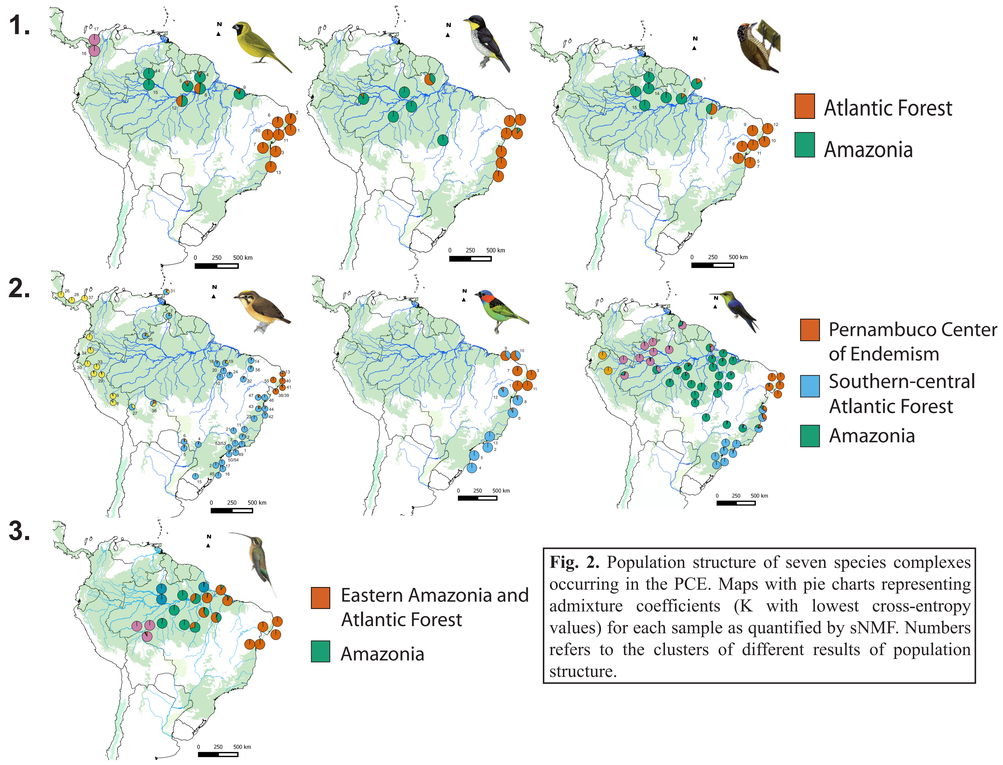


Fig. 2. Population structure of seven species complexes occurring in the PCE. Maps with pie charts representing admixture coefficients (K with lowest cross-entropy values) for each sample as quantified by sNMF. Numbers refers to the clusters of different results of population structure.

BIOGEOGRAPHIC RELATIONSHIPS

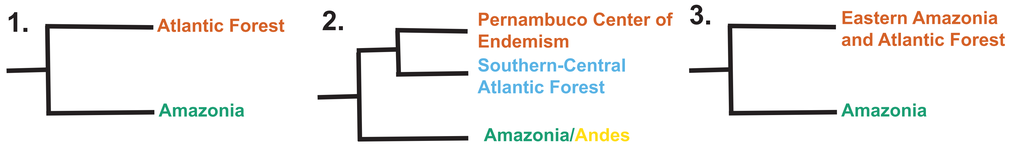


Fig. 3. Schematic summary of the species tree inference results employed with SNAPP. Numbers denote the different groups defined on figure 2.

Acknowledgments

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DEMOGRAPHIC HISTORY

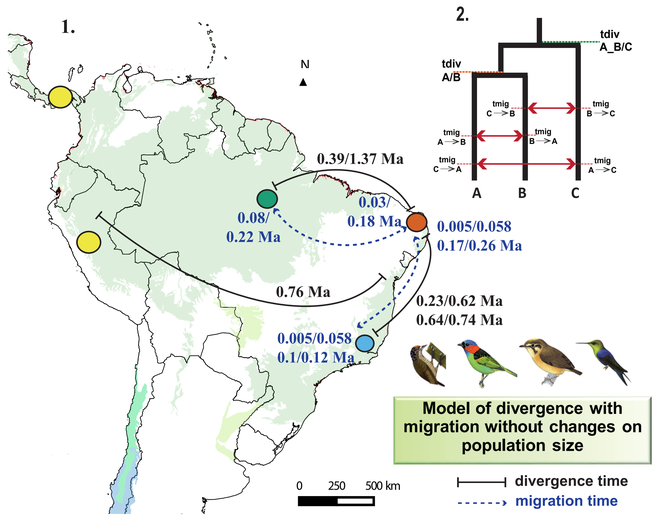

Fig. 4. (1) Summary map showing the putative divergence and migration times between the main areas of this study as inferred by *momi2*. Values represent the chronological order estimated across the four species complexes. (2) Schematic view of the best demographic model inferred in the four species.

CONCLUSIONS

- PCE populations were more closely related to Southern-central AF populations than they were to those in AM, regardless of their elevational range
- Divergence times between AF populations placed during the Mid-Pleistocene
- Splits consistent with a pattern of allopatric divergence with gene flow until the upper Pleistocene with no signal of changes in population size
- Pleistocene refugium driving the current genetic diversity in the PCE, and no evidence for the role of the Rio São Francisco as a primary barrier
- Connections with Amazonia also played a significant role