

Evolutionary Biogeography: ***Biodiversity Data from Field to Yield***

Date & time: Tuesday, October 2 – Saturday, October 6, 2018 (5 full days)

Location: Programa de Pós-Graduação em Sistemática e Evolução, Universidade Federal do Rio Grande do Norte, Natal, Brazil

Teachers: Alexandre Antonelli & Alexander Zizka, University of Gothenburg, Gothenburg Global Biodiversity Centre, and iDiv.

<http://antonelli-lab.net> <http://ggbc.gu.se> <https://www.idiv.de/>

Background

The public availability of large-scale species distribution data has increased drastically over the last ten years. In particular, the digitalization of collections from museums and herbaria, the input from human and machine observations, and the aggregation of information in public databases such as the Global Biodiversity Information Facility (GBIF) have contributed significantly to this development. This is leading to a 'big data' revolution in biogeography, which holds an enormous but still poorly explored potential for understanding large scale patterns and drivers of biodiversity.

Objectives

1. Exemplify the various uses of biodiversity data for exploratory and question-driven research in ecology, evolution and biogeography
2. Familiarize participants with new bioinformatic tools for handling and processing 'big data', including dealing with data errors and biases
3. Provide the participants with a workflow to use large scale species occurrence data for biodiversity analyses (including point localities and range maps)
4. Provide an overview of how to use R for analyzing large datasets of species occurrences (including data mining, visualization, exploration, cleaning and applications)

Target group and admission

Students and researchers working with biodiversity, including ecology, evolution, biogeography, and related disciplines. Maximum number of participants: 20. If the number of applicants exceeds this limit, applicants will be chosen based on expected need and fit into her/his research, with additional consideration to achieve a balance in home university, gender, career level, and taxon studied. The course will be taught in English but questions are welcome in Portuguese.

Applications: send your CV and a cover letter explaining your interest in the course and your current research theme to Alice Calvente: acalvente@cb.ufrn.br until August 31st.

Literature

Two weeks before the start, participants will be provided with about 5 articles as pdfs, to be read prior to the workshop.

Examination

Grades are pass/fail. Successful participants should participate in all course days and present a project on the last day. A certification will be issued for all participants.

Schedule (minor changes may occur)

Day 1:

- Morning:
 - o Introduction and individual presentations and expectations with the workshop
 - o Lecture by Alexandre Antonelli. Setting the scene: where do we stand now in terms of biodiversity data, especially regarding Neotropical biodiversity, evolution, and biogeography? What are some of the hottest questions in ecology, evolution and biogeography ('evolutionary biogeography') that such data can be used to address? What are the main challenges, prospects and limitations?
- Afternoon:
 - o Lecture by Alexander Zizka. Main databases of biodiversity data. Hands-on exercises using major databases (GBIF, eBird, BIEN, iDigBio, TROPICOS).
 - o Definition of projects for the rest of the week (in pairs).
 - o Account creation in smartphone app (iNaturalist, iSpot or BioNote). Quick exercise outdoors to get acquainted with the system.
- Evening: Joint dinner

Day 2:

- Day: Fieldwork in the Atlantic Rain Forest: Photo documentation of the highest possible number of species in the taxonomic group chosen using smartphones (in pairs). Voucher collection of interesting and difficult specimens for those holding collecting permits (all specimens to be deposited at UFRN).
- Evening: Photo /specimen identifications

Day 3:

- Day: Fieldwork in the Caatinga: Photo documentation of the highest possible number of species in the taxonomic group chosen using smartphones (in pairs). Voucher collection of interesting and difficult specimens for those holding collecting permits (all specimens to be deposited at UFRN).
- Evening: Photo /specimen identifications

Day 4:

- Morning: Software introduction and demonstration: speciesgeocodeR, CoordinateCleaner, and Infomap Bioregions
- Late morning/afternoon: Own exercises following the tutorials:
 - o Downloading geographic occurrence data from GBIF (R)
 - o Integration of own observations from the two previous days (R)
 - o Geographic cleaning of occurrence data from errors common to biological databases (R & Graphical User Interface)
 - o Species richness maps and range size estimation from point occurrences (R)
 - o Using point occurrences for taxon-specific bioregionalization (GUI)
 - o Classifying species into discrete areas for historical biogeography (R)
 - o Quantifying collection bias related to accessibility (R & GUI)
 - o Automated preliminary conservation assessment based on occurrence records (R & GUI)
- Evening: Joint dinner

Day 5:

- Morning:
 - o Own projects (in pairs)
- Afternoon:
 - o Presentation and discussion of projects (in pairs)
 - o Conclusions and course evaluation