

MARIANNE AZEVEDO SILVA

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EDUCATION

- University of Campinas Aug 2017 – Nov 2023
Ph.D. Ecology
Thesis: “Ants, biodiversity and latitudinal gradient: investigating interactions with plants, functional variation and genetic diversity in the cerrado savanna”
Advisor: Prof. Paulo S. Oliveira
- University of Campinas Mar 2014 – Feb 2017
M.Sc. Ecology
Dissertation: “Genetic diversity of ants (Hymenoptera: Formicidae) at colony and population scales: a comparative study of *Camponotus renggeri* and *C. rufipes* in Cerrado vegetation”
Advisor: Prof. Paulo S. Oliveira
- University of the Ryukyus Nov 2015 – Feb 2016
International Internship (Japan)
Advisor: Prof. Tadashi Kajita
- University of Campinas Oct 2011 – Feb 2014
Internship in Ecology
Undergraduate research project: “Development and characterization of microsatellite markers for delimitation of two ant species in Cerrado: *Camponotus renggeri* and *Camponotus rufipes* (Formicidae: Formicinae)”
Advisors: Prof. Paulo S. Oliveira, Prof. Anete P. Souza
- University of Campinas Jan 2011 – Jun 2011
Internship in Forensic Entomology (Taxonomy)
Advisor: Prof. Patrícia Thyssen
- University of Campinas Mar 2010 – Dec 2013
B.Sc. Biological Sciences

RESEARCH INTERESTS

Patterns and potential drivers of biodiversity at multiple biological scales. I am particularly interested in animal-plant interactions and sources of spatial variation.

RESEARCH EXPERIENCE

- Ph.D. student, University of Campinas, Brazil 2017 - 2023
Graduate Program in Ecology
Advisor: Prof. Paulo S. Oliveira

- Investigated the direct and indirect effects of environmental heterogeneity, resources, and community traits on ant-plant interactions across a latitudinal gradient in a neotropical savanna.
- Revealed resource availability as the main driver of intraspecific functional trait variation in a highly dominant Brazilian ant.
- Unveiled the contribution of environmental heterogeneity, resources, and community traits to ant intraspecific genetic diversity.

This work resulted in three manuscripts, all of which in preparation. This work was funded by the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) and the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).

M.Sc. student, University of Campinas, Brazil 2014 - 2017
Graduate Program in Ecology
Advisor: Prof. Paulo S. Oliveira

- Described the breeding system and genetic diversity in neotropical carpenter ant colonies.
- Performed landscape genetic analyses to investigate the impact of the physiognomic mosaic of cerrado savanna on ant dispersal.

This work resulted in two publications -- in the Zoological Journal of the Linnean Society and Conservation Genetics. This work was funded by the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

Undergraduate student, University of Campinas, Brazil 2011 - 2014
Department of Animal Biology
Advisors: Prof. Paulo S. Oliveira and Prof. Anete P. Souza

- Developed two microsatellites-enriched libraries for neotropical ants.
- Investigated ant genetic diversity and structure.
- Performed analyses to unveil the taxonomic validity of two closely related ants, *Camponotus renggeri* and *C. rufipes*.

This work resulted in two publications -- in the Zoological Journal of the Linnean Society and Conservation Genetics Resources. This work was funded by the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP), the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

RESEARCH GRANTS

Contributions to Ongoing Funded Research

Project: Ecology of Neotropical ants: tritrophic interactions, associated microbiota, and population genetics. Oct 2022 – Sep 2024

- Principal Investigator: Prof. Paulo S. Oliveira
- University of Campinas, Brazil
- FAPESP, R\$ 114,294.00
- Role: Co-author. My work in this project is to evaluate context-dependence in ant-plant interactions across a latitudinal gradient of Cerrado. For this purpose, I use Structural Equation Modelling. I am responsible for one of the three aims of the project, analyzing the data and writing the resulting manuscript. I wrote the grant with Dr. Paulo Oliveira.

Contributions to Prior Funded Research

Project: Molecular ecology of Neotropical ants Jan 2018 – Oct 2020

- Principal Investigator: Prof. Paulo S. Oliveira
- University of Campinas, Brazil
- FAPESP, R\$ 182,939.18
- Role: Co-author. My work in this project was to develop molecular markers (microsatellites and SNPs) and evaluate factors influencing ant genetic diversity at different spatial scales (locally and across a latitudinal gradient of Cerrado). I was responsible for two of the three aims of the project, analyzing the data, co-supervising two undergraduate students and writing the resulting manuscripts. I wrote the grant with Dr. Paulo Oliveira.

Project: Protection efficiency in coastal habitats: an integrated approach in the study of macrophyte and associated invertebrate diversity at areas under different conservation status Dec 2017 – Oct 2021

- Principal Investigator: Prof. Fosca P. P. Leite
- University of Campinas, Brazil

- FAPESP, R\$ 180.560,51
- Role: Co-author. My work in this project was to develop molecular markers (microsatellites and SNPs) for four marine species and help analyzing the molecular data (diversity and structure). I contributed to one of the two aims of this project.

Project: Ecology of interactions, behavioral ecology, and genetics of Neotropical ant populations Mar 2015 – Feb 2017

- Principal Investigator: Prof. Paulo S. Oliveira
- University of Campinas, Brazil
- FAPESP, R\$ 100,796.03
- Role: Co-author. My work in this project was to genotype workers from numerous colonies of carpenter ants from the Brazilian savanna and describe their breeding system. I also analyzed these data using landscape genetics approaches to evaluate ant dispersal in Cerrado. I was responsible for one of the four aims of the project, analyzing the data and writing the resulting manuscripts. I wrote the grant with Dr. Paulo Oliveira.

TEACHING AND MENTORING EXPERIENCE

Graduate Mentor 2017 - present

University of Campinas, Brazil

- Mentored nine undergraduate students in data collection and analyses of ant biodiversity at multiple biological scales.
- Guided students in project conception, data analyses, manuscript writings and preparation of presentations.

Teaching Assistant, *Organismal and population ecology* Mar 2019 – Jul 2019

University of Campinas, Brazil

- Prepared lectures and class activities focusing on organismal and population ecology.
- Elaborated and corrected exams.
- Made extra classes encounters for helping undergraduate students.

Teaching Assistant, *Basic ecology* Aug 2013 – Dec 2013

University of Campinas, Brazil

- Help professors in class activities.
- Made extra classes encounters for helping undergraduate students.

Teaching Assistant, *Zoology of invertebrates II* Mar 2013 – Jul 2013

University of Campinas, Brazil

- Help professors in class activities.
- Made extra classes encounters for helping undergraduate students.

Teaching Assistant, *Human anatomy* Aug 2011 – Dec 2011

University of Campinas, Brazil

- Help professors in class activities.
- Made extra classes encounters for helping undergraduate students.

HONORS AND AWARDS

FAPESP PhD Program fellowship Jan 2018 – Dec 2021

Fellowship - IUSSI Congress 2022 (San Diego, CA) Jul 2022

CNPq Master Program fellowship Apr 2014 – Apr 2016

Santander International Mobility - scholarship to an Internship Nov 2015 – Feb 2016

FAPESP Undergraduate Research fellowship Aug 2012 – Dec 2013

PUBLICATIONS

- M Azevedo-Silva**, GM Mori, AP Souza, PS Oliveira. 2015. Microsatellites for two Neotropical dominant ant species, *Camponotus renggeri* and *C. rufipes* (Hymenoptera: Formicidae). Conservation Genetics Resources 7: 459-462 doi: 10.1007/s12686-014-0395-1
- MUV Ronque, **M Azevedo-Silva**, GM Mori, AP Souza, PS Oliveira. 2016. Three ways to distinguish species: using behavioural, ecological and molecular data to tell apart two closely related ants, *Camponotus renggeri* and *Camponotus rufipes* (Hymenoptera: Formicidae). Zoological Journal of the Linnean Society 176: 170-181. doi: 10.1111/zoj.12303
- VLG Brito, GM Mori, BBZ Vigna, **M Azevedo-Silva**, AP Souza, M Sazima. 2016. Genetic structure and diversity of populations of polyploid *Tibouchina pulchra* Cogn. (Melastomataceae) under different environmental conditions in extremes of an elevational gradient. Tree Genetics & Genomes 12: 101 doi:10.1007/s11295-016-1059-y
- PA Peres, **M Azevedo-Silva**, FPP Leite. 2017. Development and characterization of novel microsatellite loci for the amphipod *Cymadusa filose*. Marine Biodiversity doi: 10.1007/s12526-017-0654-y
- CEP Nunes, PK Maruyama, **M Azevedo-Silva**, M Sazima. 2018. Parasitoids turn herbivores into mutualists in a nursery system involving active pollination. Current Biology 28: 1-7. doi: 10.1016/j.cub.2018.02.013
- PA Peres, **M Azevedo-Silva**, SCS Andrade, FPP Leite. 2019. Is there host-associated differentiation in marine herbivorous amphipods? Biological Journal of the Linnean Society 126: 885–898. doi: 10.1093/biolinnean/bly202
- M Azevedo-Silva**, GM Mori, CS Carvalho, MC Côrtes, AP Souza, PS Oliveira. 2020. Breeding systems and genetic diversity in tropical carpenter ant colonies: different strategies for similar outcomes in Brazilian Cerrado savanna. Zoological Journal of the Linnean Society 190: 1020-1035. doi: 10.1093/zoolinnean/zlaa035
- ASM Lemos, **M Azevedo-Silva**, S Gonçalves-Neto, AP Souza, PS Oliveira. 2021. Microsatellites for the Neotropical ant, *Odontomachus chelifer* (Hymenoptera: Formicidae). Journal of Insect Science 20: 1-6. doi: 10.1093/jisesa/ieaa117
- S Gonçalves-Neto, **M Azevedo-Silva**, ASM Lemos, AP Souza, PS Oliveira. 2021. Microsatellites for the Neotropical ant, *Camponotus leydigi* (Hymenoptera: Formicidae). Entomological Science 24: 79-84. doi: 10.1111/ens.12454
- PA Peres, AP Ferreira, GBO Machado, **M Azevedo-Silva**, SGL Siqueira, FPP Leite. 2021. Sex-biased dispersal depends on the spatial scale in a tube-building amphipod. Marine Ecology Progress Series 258:135-148. doi: 10.3354/meps13552
- MP Pereira-Romeiro, GT Vanin, **M Azevedo-Silva**, GM Mori. 2022. Natural history of *Camponotus renggeri* and *Camponotus rufipes* (Hymenoptera: Formicidae) in an Atlantic Forest reserve, Brazil. Insectes Sociaux 69: 369–374. doi: 10.1007/s00040-022-00880-6
- M Azevedo-Silva**, ASM Lemos, S Gonçalves-Neto, LFP Salles, M Pereyra, AV Christianini, AP Souza, PS Oliveira. 2023. Are there edge effects on the genetic diversity of the trap-jaw ant *Odontomachus chelifer* (Formicidae: Ponerinae) in a neotropical savanna fragment? a first assessment. Environmental Entomology 52: 279-285. doi: 10.1093/ee/nvad00
- M Azevedo-Silva**, MC Côrtes, CS Carvalho, GM Mori, AP Souza, PS Oliveira. 2023. Landscape genetics in a highly threatened environment: how relevant to ants is the physiognomic mosaic of the cerrado savanna? Conservation Genetics. doi: 10.1007/s10592-023-01537-y
- PAS Longo, **M Azevedo-Silva**, KFR Mansur, TA Marinho, AG Madeira, AP Souza, SK Hirota, Y Suyama, GM Mori, FPP Leite. Towards the understanding of genetic and

morphological variations of a highly abundant seaweed-associated marine invertebrate.
Submitted to Estuarine, Coastal and Shelf Science

PUBLICATIONS *in preparation*

- M Azevedo-Silva**, S Sendoya, M Côrtes, A Nogueira, PS Oliveira. Unveiling context-dependence in a tropical savanna: direct and indirect effects of environmental heterogeneity, resources, and community traits on ant-plant interactions.
- M Azevedo-Silva**, S Sendoya, M Côrtes, A Nogueira, G Mori, Y Suyama, AP Souza, PS Oliveira. Resource availability drives functional trait variation in a dominant ant of tropical Cerrado savanna.
- M Azevedo-Silva**, S Sendoya, M Côrtes, A Nogueira, G Mori, Y Suyama, AP Souza, PS Oliveira. Investigating the drivers of ant intraspecific genetic diversity in a latitudinal gradient of neotropical Cerrado savanna.
- MP Pereira-Romeiro, **M Azevedo-Silva**, HS Florindo, PS Oliveira, GM Mori. Investigating queen reproductive success in facultative polygynous colonies of carpenter ants from Neotropical Cerrado savanna.

CONFERENCE PRESENTATIONS

Oral presentations

- FP Rocha, **M. Azevedo-Silva**. 2023, October. Natural history beyond the field: can molecular data contribute to unveiling organism ecology and behavior? XXVI Simpósio de Mirmecologia: An International Ant Meeting. Manaus, Amazonas, Brazil.
- M Azevedo-Silva**, MC Côrtes, CS Carvalho, GM Mori, AP Souza, PS Oliveira. 2022, July. Landscape genetics in a threatened environment: How relevant to ants is the conservation of cerrado? IUSSI 2022. San Diego, California, USA.
- M Azevedo-Silva**, GM Mori, CS Carvalho, MC Côrtes, AP Souza, PS Oliveira. 2019, November. Ant breeding systems and colony genetic diversity: The case of Neotropical carpenter ants. Entomology 2019. Saint Louis, Missouri, USA.
- M Azevedo-Silva**, MC Côrtes, CS Carvalho, GM Mori, AP Souza, PS Oliveira. Landscape genetics of ants (Hymenoptera: Formicidae) in Cerrado savanna: The importance of preserving vegetation physiognomies. IUSSI 2018. Guarujá, São Paulo, Brazil.
- M Azevedo-Silva**, GM Mori, CS Carvalho, MC Côrtes, AP Souza, PS Oliveira. 2017, October. Different strategies for similar outcomes: a comparative study of the breeding systems of two carpenter ants from the Brazilian savanna. XXIII Simpósio de Mirmecologia: An International Ant Meeting. Curitiba, Paraná, Brazil.
- M Azevedo-Silva**, MUV Ronque, GM Mori, AP Souza, PS Oliveira. 2015, October. Using a multidisciplinary approach to tell apart two closely related species, *Camponotus renggeri* and *C. rufipes* (Hymenoptera: Formicidae). XXII Simpósio de Mirmecologia – An International Ant Meeting. Ilhéus, Bahia, Brazil.

Poster presentations

- M Azevedo-Silva**, MP Pereira-Romeiro, HS Florindo, AP Souza, PS Oliveira, GM Mori. 2022, July. Investigating the drivers of reproductive success in queens of Neotropical carpenter ants. IUSSI 2022. San Diego, California, USA.
- ASM Lemos, **M Azevedo-Silva**, LFP Salles, M Pereyra, S. Gonçalves-Neto, AP Souza, PS Oliveira. 2019, September/October. Using molecular tools to investigate edge effects on genetic diversity of *Odontomachus chelifer* (Formicidae: Ponerinae) in a cerrado reserve. XXIV Simpósio de Mirmecologia: An International Ant Meeting. Belo Horizonte, Minas Gerais, Brazil.
- S. Gonçalves-Neto, **M Azevedo-Silva**, ASM Lemos, H Soares Jr, AP Souza, PS Oliveira. 2019, September/October. The use of molecular markers in the investigation of polydomy in a cerrado savanna ant, *Camponotus leydigi* (Formicidae: Formicinae). XXIV Simpósio de Mirmecologia: An International Ant Meeting. Belo Horizonte, Minas Gerais, Brazil.

Round tables

RS Probst, **M Azevedo-Silva** (coordinators). 2023, October. Back to basics in the era of -omics: A reappraisal of ant natural history. XXVI Simpósio de Mirmecologia: An International Ant Meeting. Manaus, Amazonas, Brazil.

UNIVERSITY SERVICE

Representative of graduate students at the Committee of the Graduate Program in Ecology, University of Campinas, Brazil 2014 - 2016

Representative of undergraduate students at the deliberative body of Institute of Biology, University of Campinas, Brazil 2012 - 2013

TECHNICAL SKILLS

High ability in programming and analyses in R language.

Medium ability in Bioinformatic analyses in Ubuntu.

High ability in molecular approaches (E.g., DNA extraction, PCR, electrophoresis, and genotyping).

Field experience.

GIS/spatial mapping

LANGUAGES

Portuguese: Native

English: Fluent