CAROLINA LOBATO

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Düsseldorf, North Rhine-Westphalia, Germany

Education

- **PhD. Molecular Biosciences and Biotechnology, defended with distinction** — *Apr 2021 - Mar 2025*
  Supervision: Univ.-Prof. Dipl.-Biol. Dr.rer.nat. Gabriele Berg — Graz, Austria
  Thesis: "The Microbiome of *Cannabis* Seeds: Insights into Microbiome-Driven Sustainability"
  Institute of Environmental Biotechnology – Graz University of Technology

- **MSc. Molecular Biomedicine** — *2014 - 2016*
  Supervision: Prof. Dr. Gabriela Moura — Aveiro, Portugal
  Thesis: "A Study of Alternative Initiation Codons in *Candida cylindracea*"
  Institute of Biomedicine – University of Aveiro

- **Internship LLLP-Erasmus** — *May - Sep 2013*
  Supervision: Prof. MVDr. Vladimír Celer, Ph.D. — Brno, Czechia
  Infectious Diseases and Microbiology – University of Veterinary Sciences Brno

- **BSc. Biotechnology** — *2009 - 2013*
  Supervision: Prof. Dr. Paula Amador — Coimbra, Portugal
  Higher School of Agriculture – Polytechnic University of Coimbra

Professional Experience

- **Postdoctoral Researcher** — *Jun 2025 - ongoing*
  Supervision: Prof. Dr. Björn Usadel — Düsseldorf, Germany
  Institute for Biological Data Science – Heinrich Heine University Düsseldorf

- **Graduate University Assistant** — *Jan 2021 - Dec 2024*
  Supervision: Univ.-Prof. Dipl.-Biol. Dr.rer.nat. Gabriele Berg — Graz, Austria
  Institute of Environmental Biotechnology – Graz University of Technology

- **Research Assistant** — *Apr - Dec 2020*
  Supervision: Univ.-Prof. Dipl.-Biol. Dr.rer.nat. Gabriele Berg & Dr. Tomislav Cernava — Graz, Austria
  Institute of Environmental Biotechnology – Graz University of Technology

- **Research Fellow** — *Apr 2018 - Nov 2019*
  Supervision: Prof. Dr. Leonor Morais-Cecílio — Lisbon, Portugal
  Plant Science and Crop Production – ISA, University of Lisbon

- **Research Fellow** — *May 2017 - Mar 2018*
  Supervision: Prof. Dr. José Carlos Rodrigues & Dr. Ana Alves — Lisbon, Portugal
  Forest Ecology – ISA, University of Lisbon

- **Graduate Research Intern** — *Sep 2013 - Jun 2014*
  Supervision: Dr. Sandra Gamboa — Coimbra, Portugal
  CERNAS – Polytechnic University of Coimbra

Mentorship

4 Master's & 4 Bachelor's students — 2020-2025

- *Provided training in microbiological techniques, molecular methods and data analysis.*
- *Guided experimental design, troubleshooting, and thesis development, fostering technical proficiency and scientific independence.*

Teaching

- **Guest Lecturer "*The Seed Microbiome*"** — Institute of Environmental Biotechnology
  Environmental Microbiology Seminar (MOL.963UF) — 2023 & 2024
- **Teaching Assistant** — Institute of Environmental Biotechnology
  Laboratory Course Microbiome Analysis (MOL.972UF) — 2023 & 2024
  Laboratory Course Environmental Biotechnology (MOL.935UF) — 2023 & 2024
  Biodiversity and Applied Microbiology Lecture (MOL.731UF) — 2021 - 2024
  Biodiversity and Applied Microbiology Lecture (PLA.221UF) — 2021 - 2024
  Laboratory Course Biotechnology (CHE.177UF) — 2021 - 2024
  Environmental Microbiology Seminar (MOL.963UF) — 2021 & 2022
  Laboratory Course Microbiology (MOL.209UF) — 2022
  Laboratory Course Bioinformatics (MOL.923UF) — 2021
- **Undergraduate Preceptor** — Higher School of Agriculture
  Laboratory Course Genetic Engineering — 2013

Professional Development & Service

Workshops & Training

- **CEPLAS workshop: Genome reconstruction from metagenomic data** — Sep 2025
- **Reproducible Research with R and quarto: Workflows for data, projects, and publications** — Sep 2024
- **Teaching Academy:** University Didactics 1 & 2 (Basic Module) — Jul - Sep 2022
- **Bacterial Metagenomics: from experimental design to data analysis** — May 2021
- **Code Academy:** Learn the Command Line Course — Feb 2021
- **Metagenomics applied to surveillance of pathogens and antimicrobial resistance** — Feb 2020
- **Programming Initiation Course for Biologists** — Jan 2019
- **Theoretical-practical course in Cytogenetics and Genomics in Diagnosis and Research** — Sep 2018

Co-founder and Coordinator

Seed Microbiome Working Group (SMWG) — 2022-ongoing

The group enables early-career researchers to present their work, receive feedback, and build a collaborative academic network to advance seed microbiome science.

Peer Review

- Environmental Microbiome — 2024 - ongoing
- Scientific Reports — 2025 - ongoing

Session Chair

- 10th Theodor Escherich Symposium on Microbiome Research (Graz) — Jan 2024
- 9th Theodor Escherich Symposium on Microbiome Research (Graz) — Nov 2022

Science Outreach

- **Speaker**
  TU Graz Science Day 2023: New Worlds in Production — Sep 2023
  Science communication seminar "Healthy seed microbiome, healthy Cannabis plants".
- **Organizer**
  TU Graz Long Night of Research 2024 — May 2024
  Planned and coordinated public engagement activities showcasing microbiome research carried out at the Institute of Environmental Biotechnology.
  PEC 282 - Growth, Cellular Renovation, and Reproduction: From Theory to Practice — 2014
  Engaging high school students through lectures and practical activities on recombinant DNA in bacteria, and in animal fertilization.
- **Blog**
  Research Highlights — 2024 - ongoing
  Personal website
  Story Behind the Publication — 18 Feb 2025
  Institute of Environmental Biotechnology (TU Graz) website

Research Output

Peer-reviewed Publications

Olimi E., Wuggenig R., **Lobato C.**, Bickel S., Kusstatscher P., Wicaksono W. A., Battisti A., Coyne D., Adriko J., Cernava T. & Berg G., "Insights into the *Mondia whitei* Microbiome Across Geographic Regions in Eastern Africa" Environmental Microbiology Reports, 2025

This paper characterizes the root microbiome and metabolome of the medicinal plant Mondia whitei, revealing strong location-specific microbial and chemical fingerprints. Key metabolites correlated with root-associated microbes highlight their bioprospecting potential and conservation value.

Lobato C., Abdelfattah A., Berg G. & Cernava T., "Defining the Cultured and Uncultured Bacterial Fractions in *Cannabis* Seeds" Environmental Microbiome, 2025

This study emphasizes the role of microbial abundance and interspecies interactions in seed microbiome culturing and the need for tailored strategies to retrieve seed microorganisms under laboratory conditions.

Lobato C., Freitas J.M., Habich D., Kögl B., Berg G. & Cernava T., "Wild Again: Recovery of a Beneficial *Cannabis* Seed Endophyte from Low Domestication Genotypes" Microbiome, 2024

This study examines the bacterial seed microbiomes of 46 Cannabis genotypes spanning a spectrum of domestication levels and reveals that less domesticated genotypes harbor greater microbial diversity. The study also presents a concrete case of restoration of beneficial microbial alliances lost during domestication.

Abdelfattah A., Tack A., **Lobato C.**, Wassermann B. & Berg G., "From Seed to Seed: The Role of Microbial Inheritance in the Assembly of the Plant Microbiome" Trends in Microbiology, 2023

This paper proposes a three-stage framework of microbial inheritance, from plant to seed, through seed dormancy, to seedling, and highlights its key role in shaping plant evolutionary potential and host microbiome co-evolution while outlining critical factors influencing assembly at each stage.

Inácio V., **Lobato C.**, Graça J. & Morais-Cecílio L., "Cork Cells in Cork Oak Periderms Undergo Programmed Cell Death and Proanthocyanidin Deposition" Tree Physiology, 2021

This paper elucidates the cellular and molecular processes underlying first and wound-induced periderm formation in cork oak, revealing shared and distinct pathways of suberization, polyphenolic accumulation and programmed cell death that shape cork's unique protective and industrially valuable tissue.

Submitted Manuscripts

Chen X., Olimi E., **Lobato C.**, Berg G. & Cernava T., "The Tomato Seed Microbiome is Mainly Shaped by Host Genotype and Production Site" mSystems, 2025

This research paper demonstrated that plant genotype is the primary driver of the tomato seed microbiome, identifying a small core microbiome and predictive links between host traits, environment, and microbial composition.

Oral Presentations

Lobato C., Freitas J.M., Habich D., Kögl B., Berg G. & Cernava T., "Symbiotic Futures: Leveraging Seed Microbiomes for Sustainable *Cannabis* Cultivation", LANDSCAPE, Berlin 2024

Lobato C., Freitas J.M., Habich D., Berg G. & Cernava T., "Healthy *Cannabis* Seeds Harness a Geno- and Chemotype Specific Microbial Signature" Slovenian Microbiome Network Symposium (SMNS), Maribor 2023

Lobato C., Freitas J.M., Habich D., Berg G. & Cernava T., "Exploring the microbiome of *Cannabis* Seeds Through Domestication and Breeding Stages" 2nd Young AMICI Symposium, 2023 (online)

Lobato C., Cuadros-Patiño K., Cernava T. & Berg G., "Characterization of the *Cannabis* Seed Microbiome for the Development of Improved Cultivation Strategies" Virtual Cannabis Research Conference, 2021 (online)

Poster Presentations

Lobato C., Freitas J.M., Habich D., Kögl B., Berg G. & Cernava T., "Symbiotic Futures: Leveraging Seed Microbiomes for Sustainable *Cannabis* Cultivation", 5th Plant Microbiome Symposium (PMS), Amsterdam 2024

Lobato C., Freitas J.M., Habich D., Berg G. & Cernava T., "Uncovering *Cannabis* Seed Endophytic Diversity and Composition Across Varieties" 16th Symposium on Bacterial Genetics and Ecology (BAGECO), Copenhagen 2023

Lobato C., Cernava T. & Berg G., "Exploring the *Cannabis* Seed Microbiome" 10th ISS Congress & 3rd International Conference on Holobionts, Lyon 2022

Lobato C., Cernava T. & Berg G., "Exploring the *Cannabis* Seed Microbiome" miCROPe International Symposium, Vienna 2022

Lobato C., Cuadros-Patiño K., Cernava T. & Berg G., "Characterization of the *Cannabis* Seed Microbiome for the Development of Improved Cultivation Strategies" 8th Theodor Escherich Symposium on Medical Microbiome Research (TES) & 4th AMICI Symposium, Graz 2021

Inácio V., **Lobato C.**, Graça J. & Morais-Cecílio L., "How cork cells differentiate: The Role of Programmed Cell Death and Proanthocyanidin Deposition in Cork Oak Periderm" PADiBa, Bonn 2019

Gamboa S., **Lobato C.**, Oliveira H., Oom M.M. & Bahcevandziev K., "Flow Cytometry for the Assessment of Equine Sperm Chromatin" GTIE, Golegã 2015

Additional Information

Languages: Portuguese (Native), English (Proficient), Spanish (Intermediate), German (A2)
Programming Languages: R (Experienced), Bash - Unix Shell (Experienced), Python (Beginner)
Driver's license: B1