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Research Interests

I'm interested in fungal and bacterial biodiversity using state-of-the-art high-throughput sequencing technologies. In particular, I'm doing research on the evolution of trophic status within the Ceratobasidiaceae fungal family. It is a family of important plant pathogens, saprotrophs, and orchid mycorrhizal species. I have sequenced genomes of different anastomosis groups in collaboration with the DOE Joint Genome Institute for constructing a robust phylogeny of the family based on genome sequences and utilizing bioinformatic tools to decipher the evolution of different trophic statuses within the family. In addition, I'm studying nitrogen fixation and nodulation occurrence in certain plant species that are outliers to the currently known nitrogen-fixing clade. My research involves sampling and generating metagenomic data from root nodules of Zygophyllaceae and Areaceae plant families. The aim of the project is to explain the origin of nodulation occurrence in angiosperms using multi-omics techniques and modern microscopy.

Education

- Ph.D. (2017-2022): Microbial Ecology. University of Tartu, Estonia.
Thesis: Investigation of symbiotic nitrogen-fixing bacteria association with plants.
Supervisor: Prof. Leho Tedersoo, University of Tartu, Estonia
Co-supervisor: Dr. Mohammad Bahram, Swedish University of Agricultural Sciences, Uppsala, Sweden.
- M.Sc. (2012-2015): Plant Pathology with specialization in mycology. Sari Agricultural Sciences and Natural Resources University, Iran.
- B.Sc. (2009-2012): Plant Pathology. Urmia University, Iran.

Journal Publications:

- Myers, J., Schulz, F., Rahimlou, S., Amses, K., Simmons, D. R., Stajich, J. E., & James, T. (2024). Large DNA viruses in early diverging fungal genomes are relics of past and present infections. *bioRxiv*, 2024-01.
- Rahimlou, S., Quandt, C. A., & James, T. Y. (2024). Metabolic Constraints and Dependencies Between "Uncultivable" Fungi and Their Hosts. In *Fungal Associations* (pp. 33-57). Cham: Springer International Publishing.

- Tedersoo, L., Drenkhan, R., Abarenkov, K., Anslan, S., Bahram, M., Biteniaks, K., ... & Mikryukov, V. (2024). The influence of tree genus, phylogeny, and richness on the specificity, rarity, and diversity of ectomycorrhizal fungi. *Environmental Microbiology Reports*, 16(2), e13253.
- Kariman, K., Rengel, Z., Rodica, P.E.N.A., Rahimlou, S., & Tibbett, M. (2024). The necessity to expand mycorrhizal boundaries: Including the fungal endophytes that possess key mycorrhizal criteria. *Pedosphere*, 34(2), 520-523.
- Rahimlou, S., Moghadam, M.H., Gazis, R., Karlsen-Ayala, E., Bahram, M., James, T.Y., Tedersoo, L. (2024). Unveiling Root Nodulation in *Tribulus terrestris* and *Roystonea regia* via Metagenomics. *Molecular Genetics and Genomics* (under review).
- Mikryukov, V., Dulya, O., Zizka, A., Bahram, M., Hagh-Doust, N., Anslan, S., ... & Tedersoo, L. (2023). Connecting the multiple dimensions of global soil fungal diversity, *Science Advances* (In press)
- Azadnia, A., Mikryukov, V., Anslan, S., Hagh Doust, N., Rahimlou, S., Tamm, H., Tedersoo, L. (2023). Structure of plant-associated microeukaryotes in roots and leaves of aquatic and terrestrial plants revealed by blocking peptide-nucleic acid (PNA) amplification. *FEMS Microbiology Ecology*, (Accepted for publication).
- Rahimlou, S., Moghaddam, M.H., Nezhad, A.M.H., Heidari, B., Bahram, M. (2023). A checklist and worldwide distribution patterns of macrofungi in Iran. *Mycological Progress*, 22(33), 33.
- Kariman, K., Rengel, Z., Pena, R., Rahimlou, S., Tibbett, M. (2023). Response to “feremycorrhizal fungi: A confusing and erroneous term”: feremycorrhiza means ‘nearly mycorrhiza’; hence, it is a clear and correct term because the fungal partner has mycorrhizal traits and lineage. *Soil Biology and Biochemistry*, 108934.
- Tedersoo, L., Loit, K., Agan, A., Rahimlou, S., Vask, A., Ariyan, M., & Drenkhan, R. (2023). MycoPhylo experiment: Towards understanding how mycorrhiza types and phylogenetic relationships affect soil biodiversity and functioning. *Sustainable Forestry*, 6(1).
- Tedersoo, L., Mikryukov, V., Zizka, A., Bahram, M., Hagh-Doust, N., Anslan, S., ... & Abarenkov, K. (2022). Global patterns in endemism and vulnerability of soil fungi. *Global Change Biology*, 28(22), 6696-6710.
- Soudzilovskaia N.A., He J., Rahimlou S., Abarenkov K., Brundrett M., & Tedersoo L. (2022). FungalRoot v.2.0 – an empirical database of plant mycorrhizal traits. *New Phytologist*, 235, 1689-1691.
- Kariman, K., Moreira-Grez, B., Scanlan, C., Rahimlou, S., Boitt, G., & Rengel, Z. (2022). Synergism between feremycorrhizal symbiosis and free-living diazotrophs leads to improved growth and nutrition of wheat under nitrogen deficiency conditions. *Biology and Fertility of Soils*, 1-13.
- Hosseyni Moghadam, M. S., Safaie, N., Rahimlou, S., & Hagh-Doust, N. Inducing tolerance to abiotic stresses in *Hordeum vulgare* L. by halotolerant endophytic fungi associated with Salt Lake plants. *Frontiers in Microbiology*, 1827.
- Tedersoo, L., Mikryukov, V., Zizka, A., Bahram, M., Hagh-Doust, N., Anslan, S., ... & Abarenkov, K. (2022). Towards understanding diversity, endemism and global change vulnerability of soil fungi. *bioRxiv*.
- Tedersoo, L., Mikryukov, V., Anslan, S., Bahram, M., Khalid, A. N., Corrales, A., ... & Abarenkov, K. (2021). The Global Soil Mycobiome consortium dataset for boosting fungal diversity research. *Fungal Diversity*, 1-16.

- Rahimlou, S., Bahram, M., & Tedersoo, L. (2021). Phylogenomics reveals the evolution of root nodulating alpha-and beta-Proteobacteria (rhizobia). *Microbiological Research*, 250, 126788.
- Sayari, M., van der Nest, M. A., Steenkamp, E. T., Rahimlou, S., Hammerbacher, A., & Wingfield, B. D. (2021). Characterization of the Ergosterol Biosynthesis Pathway in Ceratocystidaceae. *Journal of Fungi*, 7(3), 237.
- Pölme, S., Abarenkov, K., Nilsson, R. H., Lindahl, B. D., Clemmensen, K. E., Kauserud, H., ... & Tedersoo, L. (2020). FungalTraits: a user-friendly traits database of fungi and fungus-like stramenopiles. *Fungal diversity*, 105(1), 1-16.
- Soudzilovskaia, N. A., Vaessen, S., Barcelo, M., He, J., Rahimlou, S., Abarenkov, K., ... & Tedersoo, L. (2020). FungalRoot: global online database of plant mycorrhizal associations. *New Phytologist*, 227(3), 955-966.
- Tedersoo, L., Rahimlou, S., & Brundrett, M. (2019). Misallocation of mycorrhizal traits leads to misleading results. *Proceedings of the National Academy of Sciences*, 116(25), 12139-12140.
- Tedersoo, L., Laanisto, L., Rahimlou, S., Toussaint, A., Hallikma, T., & Pärtel, M. (2018). Global database of plants with root-symbiotic nitrogen fixation: Nod DB. *Journal of Vegetation Science*, 29(3), 560-568.
- Rahimlou, S., Babaeizad, V., Bose, T., & Sayari, M. (2016). Determination of lignin-modifying enzymes (LMEs) in *Hyphodermella* species using biochemical and molecular techniques. *Mycologia Iranica*, 3(1), 57-63.
- Rahimlou, S., Bose, T., Babaeizad, V., Sayari, M., & Tajick, M. A. (2015). Molecular data confirm the mitosporic state of *Hyphodermella rosae* (Phanerochaetaceae) as the pathogen of rosaceous fruits in northern Iran.
- Mirhosseini, H. A., Babaeizad, V., & Rahimlou, S. (2014). *Neofusicoccum parvum*, agent of leaf spot on the new host *Ginkgo biloba* in Iran. *New Disease Reports*, 30.
- Rahimlou, S., Babaeizad, V., & Sayari, M. (2014). First report of fruit spot of pomegranate caused by *Colletotrichum gloeosporioides* in Iran. *Journal of Plant Pathology*, 96(3).

Participation in international workshops

PNGOO9S Introduction to Meta-analysis in ecology (Royal Holloway University of London, UK)

PK.1680 Applied Biostatistics in Biological Sciences Using R (Estonian University of Life Sciences)

LT2017/2018-O308 Community Assembly Rules in Fungal and Microbial Ecology: State of the Art and Up-to-date Tools (University of Copenhagen, Denmark)

LT2017/2018-O308 Sample Preparation for High-throughput Sequencing of Fungal Communities (Swedish University of Agricultural Sciences, Sweden).

Grants and scholarships

2023 Funding resources for my post-doctoral fellowship:

- Gordon and Betty Moore Foundation, Developing Marine *Malassezia* as a model fungal symbiont, Grant No. 9343. Anthony Amend (PI).
- National Science Foundation, DEB-SBS, PurSUiT: Discovery and phylogenetic analysis of chytrid fungi using cultures and single cells. DEB-1929738. Timothy Y. James (PI).

2022 T1.1 Dora Plus short-term mobility grant

2021 T1.1 Dora Plus short-term mobility grant

2020 Proposal (WIP) ID: 506772. Bahram M. (PI), Cubeta M. (Co-PI), Rahimlou S., Tedersoo L., Ryberg M., Põldmaa K., Yagame T. Evolution of nutritional modes of Ceratobasidiaceae (Basidiomycota, Fungi). Joint Genome Institute (JGI). <https://jgi.doe.gov/csp-2021-evolution-nutritional-modes-ceratobasidiaceae>

2019-2020 Dora Plus Action 1 – Study Mobility of Doctoral Degree Students (6 months) – Laboratoire de Recherche en Sciences Végétales (LRSV-CNRS) – Toulouse, France. “Identification of the bacterial symbionts associated with root nodules of *Tribulus terrestris* and *Roystonea regia* using molecular methods”

2017 Dora Plus doctoral studies scholarship, Faculty of Science and Technology (2017-2021), Botany and Ecology. University of Tartu, Estonia.

Student supervision

Mrs. Yasodhini Liyanage

Project: Exploring the host plant range and functional mechanisms in feremycorrhizal symbiosis

Institute: University of Western Australia, School of Agriculture and Environment

Commencement date: 01 Jun 2022

Advisory panel:

Internal advisory panel members

- Prof. Zed Rengel
- Dr. Khalil Kariman
- Dr. Mingpei You

External advisory panel member

- Dr. Saleh Rahimlou
-

Peer review

Journal: Nature communications (1)

Review date: 2023 Type: review Role: reviewer

SOURCE-WORK-ID: f6880c3b390dc2fcdc2dc3a192c42da8

Convening organization:

Springer Nature (London, GB)

Journal: Plant and soil (1)

Review date: 2022 Type: review Role: reviewer

SOURCE-WORK-ID: f9e9f140-e1e5-488f-a3ce-1e006bab2056

Convening organization:

Springer Nature (New York, US)

Journal: Soil Biology and Biochemistry

Review date: 2023 Type: review Role: reviewer

SOURCE-WORK-ID: e674bd7d-afde-4b34-b7bb-a844ccd542b7

Convening organization:

Elsevier, Inc. (New York, US)

Journal: Mycorrhiza

Review date: 2023 Type: review Role: reviewer

SOURCE-WORK-ID: e54ff0e7-dd69-4bb1-90b3-315cb8dd3761

Convening organization:

Springer Nature (New York, US)

Journal: Ecology and Evolution

Review date: 2024 Type: review Role: reviewer

Manuscript ID: ECE-2024-07-01534

References

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