

Halil Mert Solak, PhD

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Research Interests

I am an evolutionary ecologist studying how diet and the gut microbiome shape adaptation and diversification in wild vertebrates. My work combines fieldwork across extreme environments, from 3000 m in the Taurus Mountains to the forests of New Guinea, with large-scale 16S and 18S rRNA metabarcoding, bioinformatics and statistical modelling.

Keywords: host-microbiome interactions · dietary ecology · metabarcoding · adaptive radiation · high-altitude adaptation · rodents · lizards

Academic Positions

2024 – present · Postdoctoral Researcher. Department of Zoology, Faculty of Science, Charles University, Prague, Czech Republic. PI: Jakub Kreisinger.

Education

2020 – 2024 · PhD in Biology. Graduate School of Natural and Applied Sciences, Zonguldak Bülent Ecevit University, Türkiye. Supervisors: Alexey Yanchukov and Jakub Kreisinger. Thesis: The effect of altitude on gut microbiome composition accounting for diet and host genetics: a study on Anatolian blind mole rats (*Nannospalax xanthodon*) in the Central Taurus Mountains. Defended 18 January 2024.

2017 – 2019 · MSc in Biology. Graduate School of Natural and Applied Sciences, Zonguldak Bülent Ecevit University, Türkiye. Supervisors: Alexey Yanchukov and Jamie Winternitz. Thesis: Altitudinal effects on innate immune response and local population genetic structure of *Nannospalax xanthodon* (Anatolian blind mole rat). December 2019.

2012 – 2017 · BSc in Biology (English-medium). Bolu Abant İzzet Baysal University, Türkiye.

Grants, Fellowships and Research Exchanges

2023 · WAME Research Exchange Grant. Wild Animal Microbiome Evolution (WAME), a Special Topic Network funded by the European Society for Evolutionary Biology (ESEB). Two-week visit to Charles University, Prague (24 April – 8 May 2023), analysing the 18S diet dataset of my PhD. Host: Jakub Kreisinger.

2022 · EMBO Scientific Exchange Grant (#9427). Three-month visit to the Laboratory of Evolutionary Interactions of Holobionts, Institute of Vertebrate Biology, Czech Academy of Sciences (7 June – 7 September 2022). Project: Variation in the composition of gut microbiota of Anatolian blind mole rat (*Nannospalax xanthodon*) across the altitude gradient. Host: Dagmar Čížková.

2018 · Erasmus+ Internship. Department of Animal Behaviour, Bielefeld University, Germany (4 September – 4 November 2018). Host: Jamie Winternitz.

Research team member on funded projects: TÜBİTAK 1002 (220Z032), 2021–2024; TÜBİTAK 1001 (119Z400), 2020–2024; TÜBİTAK 3001 (117Z596), 2017–2020.

Awards and Honours

2020 · Best Student Publication (International), EkoEvo Student Awards. Ecology and Evolutionary Biology Society of Türkiye, for Altitudinal effects on innate immune response of a subterranean rodent (Zoological Science, 2020).

Publications

Peer-reviewed articles

1. Yanchukov A, Çetintaş O, Çolak F, Nedyalkov N, Rusin M, **Solak HM**, Bilgin R, et al. (2026). Genome-wide SNP and mtDNA phylogeny of blind mole rats (Spalacinae Gray, 1821) reflects a complex history of relictualism, expansion, and speciation. *Zoological Journal of the Linnean Society* 206(1): zlaf186. [doi:10.1093/zoolinnea/zlaf186](https://doi.org/10.1093/zoolinnea/zlaf186)
2. **Solak HM**, Kreisinger J, Čížková D, Sezgin E, Schmiedová L, Murtskhvaladze M, Henning Y, Çolak F, Matur F, Yanchukov A (2024). Altitude shapes gut microbiome composition accounting for diet, thyroid hormone levels, and host genetics in a subterranean blind mole rat. *Frontiers in Microbiology* 15: 1476845. [doi:10.3389/fmicb.2024.1476845](https://doi.org/10.3389/fmicb.2024.1476845)
3. **Solak HM**, Sezgin E, Čížková D, Kreisinger J, Çolak F, Çetintaş O, Yanchukov A (2023). The microbiota of long-living and cancer-free blind mole rat (*Nannospalax xanthodon*) from the edge of its distribution in Northern Anatolia. *Communications Faculty of Sciences University of Ankara Series C Biology* 32(2): 105–118. [Article](#)

4. Uludüz N, Yanchukov A, **Solak HM**, Sözen M (2023). Cetacean stranding events at Zonguldak, southwestern Black Sea coast of Türkiye. *Acta Zoologica Bulgarica* 75(1): 123–131.
5. **Solak HM**, Yanchukov A, Çolak F, Matur F, Sözen M, Ayanoğlu C, Winternitz JC (2020). Altitudinal effects on innate immune response of a subterranean rodent. *Zoological Science* 37(1): 1–11. [doi:10.2108/zs190067](https://doi.org/10.2108/zs190067)

Submitted and in review

6. **Solak HM**, Vejmelka F, Okena DS, Bryjová A, Ribas A, Poonlaphdecha S, Moradpour N, Novotný V, Kreisinger J, Čížková D. Adaptive radiation, incumbency and local ecological context drive dietary niches in New Guinean rodents. *Molecular Ecology* (in review).

Conference Presentations

Oral presentations

1. **Solak HM**, Kreisinger J, Čížková D, Sezgin E, Schmiedová L, Murtskhvaladze M, Çolak F, Matur F, Yanchukov A. Altitude shapes gut microbiome composition accounting for diet and host genetics in a subterranean mole rat. *Zoologické dny*, Ostrava, Czech Republic, 8–9 February 2024.
2. **Solak HM**, Sezgin E, Čížková D, Kreisinger J, Çolak F, Matur F, Yanchukov A. Altitudinal effect on gut microbiome composition of long-living and cancer-free blind mole rat (*Nannospalax xanthodon*). *8th Ecology and Evolutionary Biology Symposium*, Ankara, Türkiye, 17–19 July 2023.
3. **Solak HM**, Winternitz JC, Yanchukov A, Ayanoğlu C, Çolak F, Matur F, Sözen M. Altitudinal effects on ecoimmunology of Turkish blind mole-rats. *Subterranean Rodent Workshop, VII EGSM*, Budapest, Hungary, 1 October 2018.

Poster presentations

4. **Solak HM**, Sezgin E, Čížková D, Kreisinger J, Çolak F, Matur F, Yanchukov A. Altitudinal effect on gut microbiome composition of Anatolian blind mole rat (*Nannospalax xanthodon*). *7th Ecology and Evolutionary Biology Symposium*, Ankara, Türkiye, 7–9 September 2022.
5. **Solak HM**, Sezgin E, Čížková D, Kreisinger J, Çolak F, Matur F, Yanchukov A. Altitudinal effect on gut microbiome composition of Anatolian blind mole rat (*Nannospalax xanthodon*). *ESEB Congress 2022*, Prague, Czechia, 14–19 August 2022.

6. **Solak HM**, Yanchukov A, Çolak F, Matur F, Sözen M, Ayanoğlu C, Winternitz JC. Altitudinal effects on innate immune response and local population genetic structure of Anatolian blind mole-rats (*Nannospalax xanthodon*). *Zoologické dny*, Olomouc, Czech Republic, 6–7 February 2020.
7. **Solak HM**, Yanchukov A, Çolak F, Matur F, Sözen M, Ayanoğlu C, Winternitz JC. Altitudinal effects on innate immune response of Turkish blind mole-rats (*Nannospalax xanthodon*). *6th Ecology and Evolutionary Biology Symposium*, İzmir, Türkiye, 10 July 2019.
8. **Solak HM**, Winternitz JC, Çolak F, Matur F, Yanchukov A. Altitudinal effects on evolution of globin gene clusters and host adaptation on *Nannospalax xanthodon* (Turkish blind mole rat). *5th Ecology and Evolutionary Biology Symposium*, İzmir, Türkiye, 21 July 2018.

Research Projects

2024 – present · Trophic and microbial niche dynamics of two murine radiations on New Guinea. Diet (18S) and gut microbiome (16S V3–V4) metabarcoding of Hydromyini and Rattini rodents sampled at six localities (Baitabag, Finisterre Range, Mount Michael, Mount Wilhelm, Nagada, Wanang) across altitudinal gradients. Charles University, with international partners.

2024 – present · Microbiota of sympatric *Darevskia* lizards. 16S rRNA metabarcoding comparing the parthenogenetic *D. dahli* with its paternal ancestor *D. portschinskii* in Georgia.

2021 – 2024 · Altitude and the gut microbiome of Anatolian blind mole rats (TÜBİTAK 1002, 220Z032). PhD project: microbiome, diet and host genetics across six locations in the Central Taurus Mountains.

2020 – 2024 · Genome-wide phylogeny of blind mole rats (*Spalax* and *Nannospalax*) (TÜBİTAK 1001, 119Z400; PI A. Yanchukov). ddRAD genotyping-by-sequencing and mtDNA across the full distribution range.

2017 – 2020 · High-altitude adaptation in *Nannospalax xanthodon* (TÜBİTAK 3001, 117Z596; PI A. Yanchukov). MSc project: globin gene clusters and innate immune response in high- and low-altitude populations, including fieldwork at 3000 m a.s.l. (Medetsiztepe, Niğde).

Workshops and Teaching

2022 · Workshop co-organiser. *RAD Sequencing: From library preparation to data analysis*, organised as part of the TÜBİTAK 1001 project (119Z400), partly supported by the Ecology and Evolutionary Biology Society of Türkiye (EkoEvo).

Peer review: BMC Microbiology, BMC Veterinary Research, Ecotoxicology, Frontiers in Microbiology, Frontiers in Marine Biology, Mammalian Biology.

Skills

Wetlab: 16S and 18S rRNA amplicon library preparation and sequencing, ddRAD genotyping-by-sequencing, microsatellite genotyping, innate immune assays.

Bioinformatics and statistics: processing of large-scale metabarcoding datasets and downstream statistical modelling of microbiome and diet data by using R and Linux Bash languages.

Field: small-mammal and reptile sampling.

Languages: [e.g. Turkish (native), English (fluent)]

References

Dr. Jakub Kreisinger · Department of Zoology, Faculty of Science, Charles University, Prague · [jakub.kreisinger@natur.cuni.cz]

Dr. Alexey Yanchukov · Department of Biology, Zonguldak Bülent Ecevit University · [yawa33@gmail.com]

Dr. Dagmar Čížková · Institute of Vertebrate Biology, Czech Academy of Sciences, Brno · [cizkova@ivb.cz]