MOHAMMADJAVAD HAGHIGHATNIA

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Website

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LANGUAGES

Persian

English

CREATIVITY

Digital photography
Verse writing
Real-life sketching
Instrumental practice (guitar)
Action videography (360°)

ADVENTURE

Mountaineering
Mountain biking
Downhill skiing Snowboarding

ABOUT ME

Evolutionary biologist completing a PhD in Botany (expected October 2025), focused on how sexual selection, mating systems, polyploidy, and ecological context contribute to trait evolution and diversification in angiosperms. My doctoral work investigates the macroevolutionary consequences of variation in reproductive strategies and their role in shaping patterns of speciation.

Looking ahead, my broader scientific goal is to understand how biodiversity originates and persists, and why some clades or geographic regions are exceptionally species-rich while others are not. I am particularly interested in the evolutionary and ecological processes that drive large-scale patterns of diversity across the Tree of Life. Alongside first-author publications and international conference experience, I have contributed to collaborative research initiatives and helped organize international scientific meetings. I bring a concept-driven, interdisciplinary approach to evolutionary biology.

EDUCATION

- **PhD in Botany**, Charles University, Czech Republic (2020–2025)
  Focus: Macroevolution, reproductive strategies, sexual selection
  Thesis: Sexual selection and plant speciation: from micro- to macroevolutionary scales
  Supervisors: Clément Lafon Placette, Roswitha E. Schmickl, Antonin Macháč
- **MSc in Cellular and Molecular Biology**, University of Mazandaran, Iran (2014–2017)
  Focus: Molecular markers, population genetics
  Thesis: Genetic diversity of *Rhombomys opimus* based on SSR and ITS markers in Iran
- **BSc in Cellular and Molecular Biology**, Shahid Bahonar University of Kerman, Iran (2009–2013)

GRANTS AND FELLOWSHIP

- **GROW 2024** – Talented doctoral students support program, Institute of Botany, Czech Academy of Sciences, Czech Republic (2024–2025)
- **GROW 2022** – Talented doctoral students support program, Institute of Botany, Czech Academy of Sciences, Czech Republic (2022–2023)
- **START project (START/SCI/098)** – Team member: *Birth of polyploids amidst the majority diploid cytotype: which mechanisms make it possible?*, Charles University, Czech Republic (2021–2023)

- **PhD Botany Scholarship** – Department of Botany, Charles University, Czech Republic (2020–2024)

REFERENCES

Lafon Placette, Clément
Department of Botany, Faculty of Science, Charles University
Prague, Czech Republic
lafonplc@natur.cuni.cz

Schmickl, Roswitha Elisabeth
Institute of Botany, The Czech Academy of Sciences & Department of Botany, Faculty of Science, Charles University
Průhonice & Prague, Czech Republic.
roswitha.schmickl@ibot.cas.cz

Macháč, Antonin
Laboratory of Environmental Microbiology, Institute of Microbiology of the Czech Academy of Sciences
Prague, Czech Republic
A.Machac@email.cz

PUBLICATIONS

Published

- [Dataset] **Haghighatnia MJ**, Svitok M, Koch MA, Schmickl R, Lafon Placette C. (2025). *Aligned sequences and reconstructed phylogenetic tree of 1004 Brassicaceae species. OSF*. *Link*
- Schmickl R, Vallejo Marín M, Hojka J, Gorospe JM, **Haghighatnia MJ**, İltaş Ö, Kantor A, Slovák M, Lafon Placette C. (2024). *Polyploidy-induced floral changes lead to unexpected pollinator behavior in Arabidopsis arenosa. Oikos, 2024*(5), p.e10267.
- **Haghighatnia M**, Machac A, Schmickl R, and Lafon Placette C. (2023). *Darwin's 'mystery of mysteries': the role of sexual selection in plant speciation. Biological Reviews, 98*(6), pp.1928-1944.
- Hossienzadeh-Colagar A, **Haghighatnia MJ**, Amiri Z, Mohadjerani M, Tafrihi M. (2016). *Microsatellite (SSR) amplification by PCR usually led to polymorphic bands: Evidence which shows replication slippage occurs in extend or nascent DNA strands. Molecular biology research communications, 5*(3), pp.167-174.
- Karimian M, Nikzad H, Azami TA, Taherian A, Darvishi FZ, **Haghighatnia MJ.** (2015). *SPO11-C631T gene polymorphism: association with male infertility and an in silico-analysis. Journal of Family and Reproductive Health, 9*(4):155–163.

Under review and preparation

- **Haghighatnia MJ**, Svitok M, Schmickl R, Koch M, Lafon Placette C. (2025). *Divergent evolutionary trajectories of male and female investment in the Brassicaceae.* Submitted to *Annals of Botany.*
- Kantor A, Svitok M, Gorospe JM, **Haghighatnia MJ**, Hojka J, İltaş Ö, Slovák M, Schmickl R, Lafon Placette C (2025). *How do newly arisen polyploids beat their initial disadvantage? A meta-analysis of the consequences of whole genome duplication on reproductive traits.* Submitted to *The Plant Journal*.
- **Haghighatnia MJ**, Macháč A, Schmickl R, Lafon Placette C. (2025) *From Microevolution to macroevolution: sexual selection in plants shapes speciation in a 1000-species phylogeny of Brassicaceae.* To be submitted to *Nature Ecology & Evolution* (planned submission: May 2025]

CONFERENCES

- **Student Conference of Plant Biology (SCPB)** – Poster: *Sexual selection leads to speciation in the Brassicaceae: a myth or a reality* (Vienna, Feb 2024)
- **European Plant Science Retreat (EPSR)** – Oral talk: *Plant speciation; does sexual selection play a role?* (Wageningen, Sept 2023)
- **Conference of Young Botanists (CYBO)** – Oral talk: *Reproductive success through pollinator attraction; a road to neopolyploid establishment?* (Bolzano, Feb 2023)
- **European Society for Evolutionary Biology (ESEB)** – Oral talk: *Maternal investment as an adaptive trait in response to harsh environments in the Brassicaceae* (Prague, Aug 2022)
- **ESEB Satellite Symposia** – Poster & 3-min oral talk: *Plant speciation; can sexual selection drive reproductive barriers?* (Online, Sept 2021)
- **Evolution (ASN–SSE–SSB Joint Meeting)** – Oral talk: *Plant speciation puzzle: is sexual selection involved?* (Online, June 2021)

SCIENTIFIC RESPONSIBILITIES

- **Organizer (supporting)** – Student Conference of Plant Biology (SCPB 2024, Vienna) (22–23 February 2024, *Website*)
- **Founder & Scientific Committee Member** – Student Conference of Plant Biology (SCPB 2022, Prague) (20–22 September 2022, *Website*)
- **Member** – European Society for Evolutionary Biology (ESEB), since 2022
- **Member** – The American Society of Naturalists (ASN), 2021–2022

TECHNICAL SKILLS

- **Phylogenetic analyses**
  Sequence alignment and model selection: *MAFFT*, *MUSCLE*, *trimAl, ModelFinder*, *jModelTest2*
  Tree inference and dating (ML & BI): *IQ-TREE*, *RAxML-NG*, *MrBayes, BEAST2*, *treePL*
  Tree summarization and diagnostics: *TreeAnnotator, Tracer, coda*
  Tree visualization and annotation: *FigTree*, *iTOL*, *ggtree*, *DensiTree*
- **Macroevolutionary analyses**
  Character evolution and model-based trait analysis: *geiger*, *ape*, *phytools*, *OUwie*, *nlme*, *RRphylo*
  Ancestral state reconstruction: *ape*, *phytools*, *corHMM*
  Diversification analyses: *HiSSE*, *MuSSE*, *QuaSSE*, *BAMM*, *RPANDA*, *DR*, *ClaDS*, *ES-sim*, *RRphylo*, *BAMMtools*, *macroCAIC*
- **R programming**
  Statistical analyses and modeling: Regression modeling, hypothesis testing, multivariate analysis, generalized additive models, Bayesian models
  Data handling and visualization: *dplyr*, *tidyr*, *ggplot2*, *ggpubr*, *patchwork*
  Multivariate and dimensionality reduction analyses: PCA, phylogenetic PCA
  Machine learning and model evaluation: Supervised learning, ensemble methods, tree-based models, cross-validation, resampling, performance metrics
- **Laboratory and experimental work**
  Microscopy: Morphological measurements, fluorescence imaging
  Plant reproduction experiments: Controlled pollination and crossing assays
- Molecular biology techniques: DNA (plants, animals) and RNA (high-throughput purification) extraction, PCR implementation and optimization
- **High-performance computing**
  Parallelized and batch execution of phylogenetic and macroevolutionary analyses on *e-INFRA CZ* and *CIPRES Science Gateway*
- **Field studies**
  Experimental design:Setup and implementation of field protocols
  Sampling: Collection of plant material and ecological data
  Pollinator observations: Behavioral monitoring

TEACHING

- **Co-teacher** – MB120P147E “R for Life”, Department of Botany, Charles University (since 2023)