

DEVILLE-CAVELLIN Marion Sarah

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Email: Marion.deville-cavellin@hotmail.com

Age: 26 years old

Nationality: French

Postdoctoral Researcher, University of Uppsala, Plant Ecology and Evolution

Education:

2022-2025: **PhD student at the Laboratory of Alpine Ecology** (LECA, Grenoble, France): Phenotypic plasticity and local adaptation at small scales to heavy metal pollution of *Cardamine resedifolia*. Supervisors: M. RAVETON & F. BOUCHER.

Thesis defended on November 14, 2025.

No official grades in France, but received jury commendation ("félicitations du jury"; French highest distinction).

Summer 2023: **University Diploma in Alpine Botany and Plant Ecology in the Briançon area**. (Col du Lautaret, France): Supervisor: R. DOUZET.

2020-2022: **Master of Biodiversity Ecology Evolution**, Biodiversity dynamics and modelling speciality, Grenoble Alpes University, promotion major.

2020 (one week): **University diploma in applied botany**. Supervisor: R. DOUZET.

2017-2020: **Bachelor's degree in biology**, Grenoble Alpes University, third in promotion.

Research experience:

2024 (one month): **Scientific exchange at the University of Toulouse** (LRSV, Toulouse, France): understanding the physiological mechanisms of tolerance to mining pollution in *Cardamine resedifolia*, an alpine plant, using omics data (metabolomics and transcriptomics). Collaborator: G. MARTI.

2024 (two weeks): **Scientific exchange at the University of Innsbruck** (Innsbruck, Austria): Understanding the origin of mining-tolerant populations of *Cardamine resedifolia*: demographic inference using rad data and dadi software. Collaborators: P. CARNICERO & P. KIRSCHNER.

2022 (six months): **Internship at the Laboratory of Alpine Ecology** (LECA, Grenoble, France): Micro-adaptation of *Cardamine resedifolia* to soil polluted by mining waste. Supervisors: F. BOUCHER.

2021 (two months): **Internship at the Laboratory of Alpine Ecology**, (LECA, Grenoble, France): Impacts of a mining pollution gradient on the development of *Arabidopsis thaliana* and *Cardamine resedifolia*. Supervisor: M. RAVETON.

2021 (two months): **Internship at the Institut national de recherche pour l'agriculture, l'alimentation et l'environnement**, (INRAE, Grenoble, France): Impacts of global warming on alpine plant communities. Supervisors: T. MUNKEMULLER & B. REINEKING.

2019 (two months): **Internship at the Col du Lautaret botanical garden** (Col du Lautaret, France): Guided tours on the popularisation of science: the challenges of Alpine flora and the importance of research. Supervisors: M. ROME & R. DOUZET.

Teaching:

2022 & 2023 (20h): **Directed work in ecology**, 2nd year course bachelor of biology, University Grenoble Alpes.

2022 & 2023 (2h): **Lecture on pollutants and environmental consequences**, 1st year of a master's degree in health engineering, University Grenoble Alpes.

2022 & 2023 (2h): **Lecture on plant adaptation and phenotypic plasticity to pollution in the Alpes: example of *Cardamine resedifolia***, 3rd year course bachelor of biology, University Savoie Mont-Blanc.

2022 (20h): **Practical work in plant biology**, 2nd year course bachelor of biology, University Grenoble Alpes.

Supervising:

2024 (1.5 month): **Supervised L. REGIMBAL**, 2nd undergraduate student (Col du Lautaret, France): Growth monitoring of the second year of reciprocal transplantation of *Cardamine resedifolia* in alpine conditions at the botanical garden of the Col du Lautaret.

2024 (2 months): **Supervised V. SIVAPRAGASSAM**, 1st year of master (LECA, Grenoble, France): monitoring the development and functional traits of coal mine populations of *Cardamine resedifolia*.

2024 (3 weeks): **Supervised M. CHEVALLIER & M. BERGONZOLI**, 3rd undergraduate student, (LECA, Grenoble, France): comparison of the functional leaf traits of *Cardamine resedifolia* in response to mining pollution: study of the results of reciprocal transplants between mining and non-mining ecotypes.

2023 (3 weeks): **Supervised N. ESSER**, 2nd undergraduate student, (LECA, Grenoble, France): Growth monitoring of the first year of reciprocal transplantation of *Cardamine resedifolia* in alpine conditions at the botanical garden of the Col du Lautaret.

2022 (3 weeks): **Supervised F. LATASSA**, 2nd undergraduate student, (LECA, Grenoble, France): study of soil enzymatic activities on a mining pollution gradient.

2021 (1 month): **Supervised C. DESCOMBES**, 3rd undergraduate student, (LECA, Grenoble, France): Study of the physiological response of *Cardamine resedifolia* to soil contamination by TMEs and PAHs caused by mining operations.

Bioinformatic, code languages and software

Data management:

- Genomic data (ddrad Seq), management with STACKS, VCFtools, bbdutk
- Transcriptomic data (pooled rnaseq)
- Metabolomic data (C18 U-HPLC-HR MS and MS/MS)

Genomic bio-informatic:

- Statistical modelling: expert in easySFS, dadi
- Phylogenetic tree: advance in IQTREE software
- Gene alignment: expert in Blastn

Transcriptomic bio-informatic:

- Expert: DESeq (research of statistical differentiated transcripts), David annotation (identifying gene ontology terms and functional annotation using TAIR database), KEGG and Pathview package

Metabolomic bio-informatic:

- Advance: MSCleanR, MS-DIAL, MS-FINDER, MetaboAnalist, Cytoscape, to identify, analyze and visualize statistical differentiated metabolites.

Code languages:

- Expert in R language
- Advance in bash language
- Basic knowledge of Python language

Advance in Qgis and ArcGis (mapping software: GIS).

Experimental

2021-2024: reciprocal transplant of *Cardamine resedifolia*: development monitoring from seed to flower, functional trait monitoring (SLA, Nitrogen Balance Index, photosynthesis, **fitness**).

2023: ICP-MS and ICP-AES : determination of metallic elements in plant tissue and soil.

2023: determination of metallothioneins (MT) content of *Cardamine resedifolia* by elisa kit, RT-qPCR to quantifying MT RNA.

2023: pigments extraction of *Cardamine resedifolia*: chlorophyll a & b, carotenoids, phenol and flavonoids, by spectrophotometry.

2023: phenotypic measurement in field condition on three species : *Poa pratensis*, *Taraxacum officinalis*, and *Geranium sylvaticum* to identify relevant traits to measure under heavy metal pollution and developed an integrated biomarker response.

2021: RNA extraction, DNA extraction and ddRAD seq.

2021-2024: field work:

- Sampling plant, and seed for metal analysis and reciprocal transplant experiment
- Sampling soil for metal analysis and common garden experiment

Article

Deville-Cavellin M., Guillevic F., Gonindard-Melodelima C., Campillo-Cressot S., Laporte F., Arnoldi C., Rossi M., Foulquier A., Raveton M. *Using integrated biomarkers to assess ecological risk from multi-metal and metalloid soil contamination*. Published. Chemosphere

Deville-Cavellin M., Rome M., Arnoldi C., Rioux D., Renaud J., Campillo-Cressot S., Sentenac S., Regimbal L., Carnicero P., Guédron S., Rossi M., Gateuille D., Raveton M., & Boucher F.C. *Rapid and exceptionally small-scale adaptation of the alpine plant Cardamine resedifolia to mining-contaminated soils*. In prep. Environmental pollution

Delerue F., Pauwels M., Frérot H., Díaz S., Randé H., Mauro V., Selvi F., Colzi I., Grossman E., **Deville-Cavellin, M.**, Kadowaki K., Coynel A., Dewez T., Gresse J., Sappin-Didier V., Nguyen C., Michalet R. *Revisiting the functional strategy of herbaceous metallophytes helps understanding leaf metal accumulation*. Submitted. Ecological Monographs

Others

November 2023: Organisation (inviting researchers, preparing meeting rooms, registration) of an international workshop of 1 week about past, present and future biodiversity.

October 2023: research lecture to “Climate change and ecotoxicology”: alpine plant local adaptation to heavy metal: the case of *Cardamine resedifolia*, (INRAE, la Rochelle, France).

May 2025 : Pint of science (<https://pintofscience.fr/>), Grenoble : Perspectives on the Origin of Alpine Biodiversity : How Does Homo sapiens Alter and Shape Today's Biodiversity? Where Does the Biodiversity of Our Mountains Come From?

Hobbies: bird-watching blind, botany, running, biking, knitting and crocheting, hiking, drawing, music, drinking wine and beer !