Helena Vallicrosa

Postdoc researcher | Swiss federal Institute of Technology (EPFL) and Swiss Federal Institute for Forest, Snow and Landscape research (WSL)

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Terrestrial ecologist researcher interested in plant elemental ecology and evolution; biogeochemical cycles between atmosphere, soil, and vegetation; and its response to global change scenarios. My approaches are from local scale to global scale through both field experiments and computational science. High interest and skills in teaching in high education.

Education

PhD in Terrestrial Ecology (Cum Laude) - Universitat Autònoma de Barcelona, Spain.
Nov. 2021 – Sept. 2017. Dissertation: *Global change and forest nutrient stoichiometry. The foliar elemental composition of woody plants and its drivers. (http://hdl.handle.net/10803/674539)*

Master's degree in Terrestrial Ecology and Biodiversity Management - Universitat Autònoma de Barcelona, Spain
Sept. 2017 - September 2016. *Major in Terrestrial Ecology. Dissertation: Niche modeling of Catalan endemic species.*

Degree in Environmental Biology. Universitat Autònoma de Barcelona, Spain
June 2016 – Sept. 2012. *Major in plant biology*

Research experience

Swiss federal Institute of Technology (EPFL) and Swiss Federal Institute for Forest, Snow and Landscape research (WSL). Lausanne, Switzerland.
Current. Postdoc associate. *Plant Ecology Research Laboratory. Advisor: Charlotte Grossiord*

Massachusetts Institute of Technology (MIT). Boston (MA), United States of America.
2021-2023. Postdoc associate. *Civil and Environmental Engineering department. Advisor: César Terrer.*

Center for Ecological Research and Forestry Applications (CREAF). Barcelona, Spain.
2017-2021. Predoctoral researcher. *Global Ecology Unit. Advisors: Josep Peñuelas and Jordi Sardans.*

National Institute of Agronomic Research (INRA), Kourou. French Guyana.
2019. Imbalance-P project field campaign. *N and P fertilization experiment in tropical plots. Leaves and soil samples collection, processing, and analysis.*

Animal Biology, Vegetal Biology and Ecology Department (BABVE). Universitat Autònoma de Barcelona, Spain.

2017. Master's thesis. *Advisors: Miquel Ninyerola and Llorenç Sáez. Niche modeling of endemic species.*

Sao Paulo Botanical Garden, Sao Paulo, Brasil

2016. Internship. *Advisors: Eduardo Pereira Cabral and Laís Petri. Providing field and lab support.*

Universidade Presbiteriana Mackenzie's Herbarium. Sao Paulo, Brasil

2015. Internship. *Advisors: Ricardo Rosario. Identification, classification, and maintenance of new samples.*

Universidade Presbiteriana Mackenzie. Sao Paulo, Brasil

2016-2015. Degree's exchange. *Santander's Iberoamerican Grant.*

Teaching

Introduction to R and Geographic Information Systems (GIS) – MIT OpenCourseWare

Fall 2023. Instructor and course designer. *Online open access course that* provide students with tools and concepts for working with R. It includes the R basics, linear and linear mixed models and how to use Geographic Information Systems (GIS) in R.

Carbon cycle and Ecosystem ecology – Massachusetts Institute of Technology

Spring 2023 and spring 2022. Teaching assistant in a graduate course. *Lecture about the role of nutrients in the carbon cycle, R programming, and using R to solve ecological problems (AI models, GIS, statistics, data curation…)*

Scientific publications

Figueiredo Lugli, L., Fuchslueger, L., **Vallicrosa, H**., Van Langenhove, et al. (2024). Contrasting responses of fine root biomass and traits to large-scale nitrogen and phosphorus addition in tropical forests in the Guiana shield. Oikos e10412. https://doi.org/10.1111/oik.10412

Vallicrosa, H., Fleischer, K., Delgado-Baquerizo, M. et al. (2023). Nitrogen deposition and climate drive plant nitrogen uptake in terrestrial ecosystems, 27 October 2023, PREPRINT (Version 1) available at Research Square

Sardans, J., Llusià, J., Ogaya, R., **Vallicrosa, H.,** Filella, I., et al. (2023), Foliar elementome and functional traits r elationships identify tree species niche in French Guiana rainforests. **Ecology**. Accepted Author Manuscript e4118.

Vallicrosa, H., Lugli, F.L., Fuchslueger, et al. (2023). Phosphorus scarcity contributes to nitrogen limitation in lowland tropical forests. **Ecology**. 104 (6): e4049.

Dechant, B., Kattge, J., Pavlick, R., Schneider, F., Sabatini, F., et al. (2023). Intercomparison of global foliar trait 470 maps reveals fundamental differences and limitations of upscaling approaches, EarthArXiv.

Vallicrosa, H. (2022) Beyond nitrogen and phosphorus. **Nature Ecology and Evolution**, 6, 1056-1057.

Vallicrosa, H., Sardans, J., Maspons, J., & Peñuelas, J. (2022) Global distribution and drivers of forest biome foliar nitrogen to phosphorus ratios (N:P). **Global Ecology and Biogeography,** 31, 861– 871.

Verryckt, L. T., Vicca, S., Van Langenhove, et al. (2022) Vertical profiles of leaf photosynthesis and leaf traits and soil nutrients in two tropical rainforests in French Guiana before and after a 3-year nitrogen and phosphorus addition experiment **Earth System Science Data**, 14, 5–18.

Vallicrosa, H., Sardans, J., Maspons, J., Zuccarini, P., Fernández-Martínez, M., Bauters, M et al. Global maps and factors driving forest foliar elemental composition: the importance of evolutionary history (2021). **New Phytologist**, 233 (1), 169-181 https://doi.org/10.1111/nph.17771

Van Langenhove, L., Depaepe, T., Verryckt, L. T., **Vallicrosa, H**., et al. (2021). Impact of nutrient additions on free-living nitrogen fixation in litter and soil of two French-Guianese lowland tropical forests. ***Journal of Geophysical Research: Biogeosciences***, 126, e2020JG006023. https://doi.org/10.1029/2020JG006023

Vallicrosa, H.; Sardans, J.; Ogaya, R.; Fernández, P.R.; Peñuelas, J.(2021). Short-Term N-Fertilization Differently Affects the Leaf and Leaf Litter Chemistry of the Dominant Species in a Mediterranean Forest under Drought Conditions. **Forests** 2021, *12*, 605. https://doi.org/10.3390/f12050605

Sardans, J., **Vallicrosa, H**., Zuccarini, P. *et al.*(2021*)* Empirical support for the biogeochemical niche hypothesis in forest trees. **Nature Ecology and Evolution** 5, 184–194 (2021). https://doi.org/10.1038/s41559-020-01348-1.

Li, X., Sardans, J., Gargallo-Garriga, A., Asensio, D., **Vallicrosa, H.**, Peñuelas, J. (2020). Nitrogen reduction processes in paddy soils across climatic gradients: Key controlling factors and environmental implications, **Geoderma**, 368, 2020, 114275, https://doi.org/10.1016/j.geoderma.2020.114275.

Penuelas, J., Fernández-Martínez, M., **Vallicrosa,** et al.(2020). Increasing atmospheric CO2 concentrations correlate with declining nutritional status of European forests. **Communications Biology** 3, 125. https://doi.org/10.1038/s42003-020-0839-y

Wang W, Sardans J, Wang C, et al. (2019) The response of stocks of C, N, and P to plant invasion in the coastal wetlands of China**. Global Change Biology**. 2019 Feb;25(2) 733-743. doi:10.1111/gcb.14491. PMID: 30346103.

Congresses and seminars

EGU general assembly 2024 - Vienna

April 2024. Presentation. ***Vallicrosa Pou, H****. and Grossiord, C.: Nitrogen deposition effect on tree growth depends on climate, tree size, and leaf habit, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-4053, https://doi.org/10.5194/egusphere-egu24-4053, 2024.*

ReClean seminar series - Bern

March 2024. Invited talk. *Plant elemental ecology: understanding plant nutrient flows in a global change context*

AGU general assembly 2022 - Chicago

December 2022. Presentation. Vallicrosa, H., Terrer, C. How much N are plants taking yearly from the soil? AGU General Assembly 2022, oral presentation, 12-16 Dec.

EGU general assembly 2020 – Vienna (Online)

May 2020. Presentation. **Vallicrosa, H**., Sardans, J., Zuccarini, P., Maspons, J., and Peñuelas, J.: Neural Networks to estimate world forest foliar elemental composition and stoichiometry, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-8994, https://doi.org/10.5194/egusphere-egu2020-8994, 2020

Mentoring

Master project - EPFL

Spring 2024. Understanding the plant distribution limitations of big genome plants

Master project - EPFL

Spring 2024. Understanding Swiss grasslands nitrogen cycle under heat and drought experiments.

Courses

Kaufman Teaching Certificate Program - MIT

50h. Spring 2023. Interactive workshop series intended for late-program graduate students and postdocs interested in academic careers or developing skills to support their teaching at MIT.

5th Training Course on New Advances in Land Carbon Cycle Modeling - Cornell

72h. Summer 2022. Lead by Yiqi Luo and Lifen Jiang. New theory on land carbon storage dynamics, matrix approach to land carbon, nitrogen, and phosphorus modeling. Data assimilation system with both flux- and pool-based observations. Deep learning and machine learning to enhance process-based research. Ecological forecasting.

Gender perspective in research – Universitat Autònoma de Barcelona

4h. November 2020.

Introduction to a meta-analysis in ecology - Universitat de Barcelona

4h. Workshop in the 1st meeting of the Iberial Ecological Society & XIV AEET Meeting. 2019

Other services and skills

Reviewer

Nature plants, Nature Ecology and Evolution, Global Change Biology, New Phytologist, Water Research, Plant and Soil, Plant diversity, Biogeosciences, Functional Ecology, Geoderma, Forests

Scientific outreach

Schools: Talks, workshops
General public: Radio collaboration, podcast collaboration, science and diversity activities.

Other skills and tools

- Programming language: Broad experience in R
- Languages:
    - Catalan: Native
    - Spanish: Native
    - English: Fluent
    - Portuguese: Fluent
    - French: Basic
- Fieldwork: design, sample collection, storage, processing, and analysis.
- Driving license
- Scuba diving open water license