

MAXIME DAHIREL

(they/he)

My researches are mostly split along two linked axes:

- **urban biodiversity, ecology and evolution**, with a focus on the role of trait variation in explaining species' ability (or inability) to persist in cities
- **dispersal** as a bridge between ecological and evolutionary dynamics.

I develop these research themes using a combination of lab and outdoor experiments, monitoring in naturalistic contexts and individual-based models. A key aspect of my work is the use of advanced statistical and data science methods that accurately reflect the complexity of the natural systems I study.

To go directly to the list of publications [click here](#)

Most recent position

Postdoctoral researcher / Project manager

📅 2024 - present 🌐 Ghent, Belgium

Ghent University, Terrestrial Ecology unit

Dune ecology and Nature-Based Solutions (DuneFront project)

Previous positions

Postdoctoral researcher (Marie Skłodowska-Curie Fellow)

📅 2021 - 2023 🌐 Ghent, Belgium

Ghent University, Terrestrial Ecology unit

Evolutionary ecology in cities (HELICITY project)

Postdoctoral researcher

📅 2019 - 2021 🌐 Sophia-Antipolis, France

INRAE (formerly INRA), Institut Sophia Agrobiotech

Evolutionary ecology of range expansions

ATER (fixed-term research and teaching associate)

📅 2016 - 2018 🌐 Rennes, France

University of Rennes 1, ECOBIO research unit

Evolutionary ecology in cities, dispersal ecology and evolution

Postdoctoral researcher

📅 2015 - 2016 🌐 Ghent, Belgium

Ghent University, Terrestrial Ecology unit

Behavioural changes in response to urbanisation

Research assistant (PhD student/candidate in Biology)

📅 2011 - 2014 🌐 Rennes, France

University of Rennes 1, ECOBIO research unit

PhD thesis on land snail dispersal, available [here](#).

Info

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@mdahirel.bsky.social
@mdahirel@mastodon.social
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Key skills

🌿 Invertebrate zoology

(primarily land snails and spiders)

Rearing

Trait measurements

Behavioural observations

Field sampling methods

Species ID (Western Europe)

🗨 Languages

French: first language

English: fluent

German: 'false beginner'

🔗 Programming languages

R (incl. tidyverse)

Julia

📊 Data science and statistics

Version control with Git & GitHub

Quarto/RMarkdown

Shiny apps (offline)

Bayesian & frequentist statistics

Linear models and extensions (Any and all combinations of generalized, mixed/hierarchical, additive, non-linear, or multi-response)

Ordination and classification methods

...

Advanced data visualisation

Spatial data science & GIS

Individual-based modelling

💻 Other software

QGIS

Clip Studio, Krita, Inkscape

ImageJ

Netlogo

Teaching experience

ATER (fixed-term research and teaching associate)

📅 2016 - 2018 🌐 Rennes, France

University of Rennes 1, ECOBIO research unit

'Moniteur' (teaching assistant)

📅 2011 - 2012 🌐 Rennes, France

University of Rennes 1, ECOBIO research unit

Courses taught or co-taught in these positions include:

Statistics and data science (lectures and practical)

Advanced R for data analysis (1st year of MSc) ~ 20h

Statistical tools and experimental design (2nd year of BSc to 1st year of MSc) ~ 230h

Ecology (lab and field)

General ecology (1st year of BSc) ~ 80h

Community ecology (3rd year of BSc and 1st year of MSc) ~ 42h

Spatial ecology (movement ecology; 1st year of MSc) ~ 4h

Ecological bases of vegetal production (3rd year of BSc) ~ 12h

Initiation to GIS (2nd year of BSc) ~ 4h

Zoology (lab and field)

Introduction to the diversity of life (1st year of BSc) ~ 30h

Entomology (3rd year of BSc) ~ 40h

Physiology of nutrition, development, growth (3rd year of BSc) ~ 6h

Mentoring experience

Co-supervision of 1 PhD student

📅 2020 - 2023

- Experimental evolution

- Data synthesis and individual-based modelling

Supervision of 13 MSc students (1st or 2nd year) and 5 BSc students (1 to 6 months projects)

📅 2012 - present

- Field and lab studies of dispersal and behaviour

- Data synthesis and individual-based modelling

See list of students for current year [here](#)

Research funding

Marie Skłodowska-Curie Individual Fellowship (MSCA-IF)

📅 2021 - 2023 | €166 320

Project: HELICITY (Evolution of correlated traits in response to city life: helioid snails as windows on the consequences of urban history)

Research grant from the Observatoire des Sciences de l'Univers de Rennes

📅 2018 | €1 500

Project: Dispersal syndrome evolution and habitat fragmentation

Fyssen Foundation postdoctoral grant

📅 2015 - 2016 | €24 600

Project: Behavioural changes in response to urbanisation

Selected science communication

Invited speaker, Ateliers À propos

📅 2022

Online science workshop (targeted to 6-12 year olds): invited for a session on snail biology, urban ecology (in French)

Contributor to the Life in the City : Evolution in an Urbanizing World blog

📅 since 2018

Discussions of current topics and articles in urban ecology and evolution

📺 Research I have participated in has also been featured by various press outlets including the RTBF, De Standaard, Scientific American, Le Temps, as well as local journals and television channels.

Service

Referee for various journals and outlets

including *Proceedings of the Royal Society B*, *Functional Ecology*, *Journal of Animal Ecology*, *Oikos*, *PCI Ecology*, *Animal Behaviour*...

Member of the Grant Review College of the British Ecological Society

Reviewing Research and Outreach Grant applications (typically 4 to 6 / year)

PhD students representative to the Advisory Board of the research unit

📅 2012-2014

University of Rennes 1, ECOBIO research unit

Publications

Preprints (4)

Drivers of plant-associated invertebrate community structure in West-European coastal dunes

bioRxiv preprint

Van De Walle R., **Dahirel M.**, Langerhaert W., Benoit D., Vantieghem P., Vandegehuchte M.L., Massol F., Bonte D.

Shifts in colour morph frequencies along an urbanisation gradient in the ground beetle *Pterostichus madidus*

bioRxiv preprint

Dahirel M., Audusseau H., Croci S.

Individual variation in dispersal, and its sources, shape the fate of pushed vs. pulled range expansions

bioRxiv preprint

Dahirel M., Guicharnaud C., Vercken E.

Individual heterogeneity and its importance for metapopulation dynamics

bioRxiv preprint

Masier S., **Dahirel M.**, Mortier F., Bonte D.

Peer-reviewed publications (31)

2024

Urban *Cepaea nemoralis* snails are less likely to have nematodes trapped within their shells

Peer Community Journal, 4: e83

Dahirel M., Reyné H., De Wolf K., Bonte D.

Species interactions affect dispersal: a meta-analysis

Philosophical Transactions of the Royal Society B, 379: 20230127

Bestion E., Legrand D., Baines C.B., Bonte D., Coulon A., **Dahirel M.**, Delgado M., Deshpande J.N., Duncan A.B., Fronhofer E.A., Gounand I., Jacob S., Kaltz O., Massol F., Matthysen E., Parmentier T., Saade C., Schtickzelle N., Zilio G., Cote J.

2023

Urbanization impacts short- but not long-distance natal dispersal in a common orb web spider

Oikos, 2023(12): e10278

Bonte D., Rose C., Bastiaensen T., Bechsgaard J., Bilde T., **Dahirel M.**, De Wolf K., Thylys H., Uytterchaut T., Vanthournout B.

Landscape connectivity alters the evolution of density-dependent dispersal during pushed range expansions

Peer Community Journal, 3: e114

Dahirel M., Bertin A., Calcagno V., Duraj C., Fellous S., Groussier G., Lombaert E., Mailleret L., Marchand A., Vercken E.

Life-history traits, pace of life and dispersal among and within five species of *Trichogramma* wasps: a comparative analysis

Peer Community Journal, 3: e57

Guicharnaud C., Groussier G., Beranger E., Lamy L., Vercken E., **Dahirel M.**

Land snails can trap trematode cercariae in their shell: encapsulation as a general response against parasites?

Parasite, 30:1

Gérard C., De Tombeur Y., **Dahirel M.**, Ansart A.

Dispersal syndrome and landscape fragmentation in the salt-marsh specialist spider *Erigone longipalpis*

Current Zoology, 69(1): 21-31

Dahirel M., Wulschleger M., Berry T., Croci S., Pétilion J.

2022

Dispersal syndromes in challenging environments: a cross-species experiment

Ecology Letters, 25(12): 2675-2687

Cote J., **Dahirel M.**, Schtickzelle N., Altermatt F., Ansart A., Blanchet S., Chaîne A., De Laender F., De Raedt J., Haegeman B., Jacob S., Kaltz O., Laurent E., Little C., Madec L., Manzi F., Masier S., Pellerin F., Pennekamp F., Therry L., Vong A., Winandy L., Bonte D., Fronhofer E., Legrand, D.

Morph-dependent nematode infection and its association with host movement in the land snail *Cepaea nemoralis* (Mollusca, Gastropoda)

Journal of Zoology, 318(3): 191-192

Dahirel M., Proux M., Gérard C., Ansart A.

Global urban environmental change drives adaptation in white clover

Science, 375(6586): 1275-1281

Santangelo J.S. **et al.** (the Global Urban Evolution project, 287 authors)

2021

Boldness and exploration are linked to shell morph but not environmental contexts in the snail *Cepaea nemoralis*

Ethology, 127(4):321-333

Dahirel M., Gaudu V., Ansart A.

Shifts from pulled to pushed range expansions caused by reduction of landscape connectivity

Oikos, 130(5): 708-725

Dahirel M., Bertin A., Haond M., Blin A., Lombaert E., Calcagno V., Fellous S., Mailleret L., Malausa T., Vercken E.

Increased population density depresses activity but does not influence emigration in the snail *Pomatias elegans*

Journal of Zoology, 313(3):172-181

Dahirel M., Menut L., Ansart A.

2020

Transdisciplinary Bioblitz: Rapid biotic and abiotic inventory allows studying environmental changes over 60 years at the Biological Field Station of Paimpont (Brittany, France) and opens new interdisciplinary research opportunities

Biodiversity Data Journal, 8: e50451

Nicolai A., Guernion M., Guillocheau S., Hoeffner K., Le Gouar P., Ménard N., Piscart C., Vallet D., Hervé M., Benezeth E., Chedanne H., Blémus J., Vernon P., Cylly D., Hotte H., Loïs G., Mai B., Perez G., Ouisse T., Monard C., Wiegand C., Caudal J.-P., Butet A., **Dahirel M.**, Barbe L., Balbi M., Briand V., Bormans M., Charrier M., Bouger G., Jung V., Le Lann C., Pannard A., Pétillon J., Rantier Y., Marguerie D., Tougeron K., Devogel P., Dugravot S., Dubos T., Garrin M., Carnet M., Gouraud C., Chambet A., Esnault J., Poupin M., Welk E., Bütof A., Dubois G., Humbert G., Marie-Réau O., Norvez O., Richard G., Froger B., Rochais C., Potthoff M., Ayati K., Bellido A., Rissel A., Santonja M., Farcy J.-O., Collias E., Sene L., Cluzeau D., Supper R.

***Brachylaima* spp. (Trematoda) parasitizing *Cornu aspersum* (Gastropoda) in France with potential risk for human consumption**

Parasite, 27: 15

Gérard C., Ansart A., Decanter N., Martin M.-C., **Dahirel M.**

Urbanization drives cross-taxon declines in abundance and diversity at multiple spatial scales

Global Change Biology, 26(3): 1196–1211

Piano E., Souffreau C., Merckx T., Baardsen L.F., Backeljau T., Bonte D., Brans K.I., Cours M., **Dahirel M.**, Debortoli N., Decaestecker E., De Wolf K., Engelen J.M.T., Fontaneto D., Gianuca A.T., Govaert L., Hanashiro F.T.T., Higuti J., Lens L., Martens K., Matheve H., Matthysen E., Pinseel E., Sablon R., Schön I., Stoks R., Van Doninck K., Van Dyck H., Vanormelingen P., Van Wichelen J., Vyverman W., De Meester L., Hendrickx F.

2019

The distinct phenotypic signatures of dispersal and stress in an arthropod model: from physiology to life history

Journal of Experimental Biology, 222(16): jeb203596

Dahirel M., Masier S., Renault D., Bonte D. (* contributed equally to the work)

Dispersers are more likely to follow mucus trails in the land snail *Cornu aspersum*

The Science of Nature, 106: 43

Vong A., Ansart A., **Dahirel M.**

Urbanization driven changes in web building and body size in an orb web spider

Journal of Animal Ecology, 88(1): 79–91

Dahirel M., De Cock M., Vantieghem P., Bonte D.

2018

Bottom-up and top-down control of dispersal across major organismal groups: a coordinated distributed experiment

Nature Ecology and Evolution, 2: 1859–1863

Fronhofer E.A., Legrand D., Altermatt F., Ansart A., Blanchet S., Bonte D., Chaine A., **Dahirel M.**, De Laender F., De Raedt J., di Gesu L., Jacob S., Kaltz O., Laurent E., Little C.J., Madec L., Manzi F., Masier S., Pellerin F., Pennekamp F., Schtickzelle N., Therry L., Vong A., Winandy L., Cote J.

Body size shifts in aquatic and terrestrial urban communities

Nature, 558: 113–116

Merckx T., Souffreau C., Kaiser A., Baardsen L.F., Backeljau T., Bonte D., Brans K. I., Cours M., **Dahirel M.**, Debortoli N., De Wolf K., Engelen J.M.T., Fontaneto D., Gianuca A., Govaert L., Hendrickx F., Higuti J., Lens L., Martens K., Matheve H., Matthysen E., Piano E., Sablon R., Schön I., Van Doninck K., De Meester L., Van Dyck H.

Kin competition accelerates experimental range expansion in an arthropod herbivore

Ecology Letters, 21(2): 225–234

Van Petegem K., Moerman F., **Dahirel M.**, Fronhofer E.A., Vandegehuchte M.L., Van Leeuwen T., Wybouw N., Stoks R., Bonte D.

2017

Individual boldness is life stage-dependent and linked to dispersal in a hermaphrodite land snail

Ecological Research, 32(5): 751–755

Dahirel M., Vong A., Ansart A., Madec L.

Intraspecific variation shapes community-level behavioral responses to urbanization in spiders

Ecology, 98(9): 2379–2390

Dahirel M., Dierick J., De Cock M., Bonte D.

Dispersal: a central and independent trait in life-history

Oikos, 126(4): 472–479

Bonte D., Dahirel M.

2016

Dispersal-related traits of the snail *Cornu aspersum* along an urbanisation gradient: maintenance of mobility across life stages despite high costs

Urban Ecosystems, 19(4): 1847–1859

Dahirel M., Séguret A., Ansart A., Madec L. (* contributed equally to the work)

Density-dependence across dispersal stages in a hermaphrodite land snail: insights from discrete choice models

Oecologia, 181(4): 1117–1128

Dahirel M., Vardakis M., Ansart A., Madec L.

Potential syndromes linking dispersal and reproduction in the hermaphrodite land snail *Cornu aspersum*

Journal of Zoology, 299(2): 98–105

Dahirel M., Ansart A., Madec L.

2015

Context-dependence of the olfactory perceptual range in the generalist land snail *Cornu aspersum*

Canadian Journal of Zoology, 93(8): 665–669

Dahirel M., Cholé H., Séguret A., Madec L., Ansart A.

Movement propensity and ability correlate with ecological specialization in European land snails: comparative analysis of a dispersal syndrome

Journal of Animal Ecology, 84(1): 228–238

Dahirel M., Olivier E., Guiller A., Martin M.-C., Madec L., Ansart A.

2014

Stage- and weather-dependent dispersal in the brown garden snail *Cornu aspersum*

Population Ecology, 56(1): 227–237

Dahirel M., Ansart A., Madec L.

Communications in conferences

Talks (9)

(Talks or posters as non-presenting author not included)

2024

Ecological boundary conditions for dunes as coastal protection solutions across Europe

2nd "Building Coastal Resilience" conference | 🌐 Porto, Portugal

Dahirel M., Castelle B., Bonte D.

2022

Urbanisation reshapes *Cornu aspersum* phenotypes along multiple (?) trait dimensions

Annual Meeting of the British Ecological Society | 🌐 Edinburgh, UK

Dahirel M., De Wolf K., Vanthournout B., Bonte D.

Multivariate effects of urbanisation on an anthropophilic land snail, *Cornu aspersum*

SFE² - GfÖ - EEF joint meeting | 🌐 Metz, France

Dahirel M., De Wolf K., De Tombeur Y., Ansart A., Gérard C., Bonte D.

2019

Pushed to the edge: dispersal restriction shapes eco-evolutionary dynamics of micro-wasp range expansions.

Annual Meeting of the British Ecological Society | 🌐 Belfast, UK

Dahirel M., Bertin A., Calcagno V., Fellous S., Lombaert E., Mailleret L., Vercken E.

2017

Body size constraints and behavioural adaptations to city life: a case study in the spider *Araneus diadematus*.

Ecology Across Borders, joint conference of the BES, GfÖ and NeCoV | 🌐 Ghent, Belgium

Dahirel M., De Cock M., Bonte D.

Metabolic dispersal syndromes and response to stress in spider mites

"Dispersal – Connecting networks", EVENET Movement and Dispersal conference | 🌐 Ghent, Belgium

Dahirel M., Masier S., Renault D., Bonte D.

2016

Behavioural responses of arachnids to urbanisation: the role of intra- and inter-specific variation

16th conference of the International Society for Behavioral Ecology | 🌐 Exeter, UK

Dahirel M., Dierick J., Bonte D.

2013

Habitat specialization and movement characteristics in European helicoid land snails: implications for dispersal and foraging strategies

9th "Ecology & Behaviour" SERL meeting | 🌐 Strasbourg, France

Dahirel M., Olivier E., Madec L., Ansart A.

2012

Dispersal strategies in the land snail *Cornu aspersum*: sex-biased dispersal in a hermaphroditic species?

8th "Ecology & Behaviour" SERL meeting | 🌐 Chizé, France

Dahirel M., Ansart A., Madec L.

Posters (4)

2019

Orb-web spider responses to city life: Species replacement, phenotypic changes and consequences for ecosystem functioning

67th meeting of the Entomological Society of America | 🌐 St Louis, USA

Dahirel M., Dierick J., De Cock M., Bonte D.

2014

Studying the interplay between dispersal behavior and reproduction in hermaphrodites, using land snails as models

15th conference of the International Society for Behavioral Ecology | 🌐 New York, USA

Dahirel M., Ansart A., Madec L.

2013

How does habitat specialization influence dispersal? A comparative approach in European land snails

Movement and Dispersal International Conference | 🌐 Aberdeen, UK

Dahirel M., Olivier E., Guiller A., Martin M.-C., Madec L., Ansart A.

Slow but sure: stage-dependent dispersal in the brown garden snail *Cornu aspersum*

Causes and Consequences of Organism Dispersal | 🌐 Lund, Sweden

Dahirel M., Ansart A., Madec L.

Workshops

2017

An introduction to Bayesian data analysis using Stan.

Ecology Across Borders, joint conference of the BES, GfÖ and NeCoV | 🌐 Ghent, Belgium

Hertzog L., Dahirel M.

Predoctoral education

MSc in Evolutionary, Behavioural and Functional Ecology

📅 2009 - 2011 🌐 Rennes, France

University of Rennes 1

BSc in Organismal Biology

📅 2006 - 2009 🌐 Rennes, France

University of Rennes 1

Other

Qualification from the French National Council of Universities

authorized to apply for Lecturer/Assistant Professor positions in France, section 67 (Population Biology and Ecology)

Member of the British Ecological Society

References

Prof. Dries Bonte

dries.bonte (at) ugent.be

Ghent University, Terrestrial Ecology unit

Group leader during 2015-2016, 2021-2023 and 2024-present positions

Dr. Armelle Ansart

armelle.ansart (at) univ-rennes.fr

University of Rennes, ECOBIO research unit

PhD co-supervisor; current collaborator

Dr. Elodie Vercken

elodie.vercken (at) inrae.fr

INRAE, Institut Sophia Agrobiotech

PI of 2019-2021 research project; current collaborator