MAXIME DAHIREL

Behavioural and evolutionary ecologist
Dispersal ecology and evolution, urban ecology

My researches on the causes and consequences of **individual-level variation** are especially focused on **dispersal**, as a key trait bridging ecological and evolutionary dynamics, and on the role of behaviour in explaining species' ability (or inability) to persist in increasingly anthropogenic environments (**especially cities**).

I view these two axes of my researches as tightly linked, given the role of dispersal in responses to environmental changes in space and time. As (dispersal) behaviours are one part of complex integrated phenotypes, I am also always interested in the dynamics of morphological and physiological traits, among others.

I develop these research themes using a combination of lab and outdoor experiments, monitoring in naturalistic contexts and individual-based models.

To go directly to the list of publications click here

UPCOMING POSITION

2023 | 2021

Postdoctoral researcher (Marie Sklodowska-Curie Fellow)
Ghent University, Terrestrial Ecology unit — Ghent, Belgium
- Evolutionary ecology in cities (HELICITY project)

PREVIOUS RESEARCH POSITIONS

2021 | 2019

Postdoctoral researcher
INRAE (formerly INRA), Institut Sophia Agrobiotech — Sophia-Antipolis, France
- Range expansions, individual-based modelling
- **PI:** Dr Elodie Vercken

2018 | 2016

ATER (fixed-term research and teaching associate)
University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution) — Rennes, France
- Evolutionary ecology in cities, dispersal ecology and evolution

2016 | 2015

Postdoctoral researcher
Ghent University, Terrestrial Ecology unit — Ghent, Belgium
- Behavioural changes in response to urbanisation
- **Mentor:** Prof. Dries Bonte
- funded by a personal Fyssen Foundation fellowship

2014 | 2011

Research assistant (PhD student/candidate in Biology)
University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution) — Rennes, France
- **PhD thesis (defended Oct. 2014):** Individual and environmental drivers of dispersal in a hermaphrodite species, the land snail *Cornu aspersum*.
- **Supervisors:** Dr Armelle Ansart, Prof. Luc Madec (Univ. Rennes 1)

INFO

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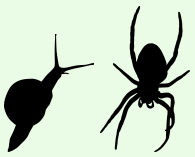
KEY SKILLS

Main study taxa



Rearing
Trait measurements
Behavioural observations (direct and video tracking)
Field sampling
Species ID (Western Europe)

Languages

- French: first language
- English: fluent
- German: 'false beginner'

Data analysis

- R (incl. tidyverse)
- Stan
- Julia

Bayesian & frequentist statistics
Linear models and extensions (Any and all combinations of generalized, mixed, non-linear, or multivariate)
Multivariate ordination and classification
...

Other software

- Netlogo
- ImageJ
- QGIS
- Clip Studio, Krita, Inkscape

TEACHING EXPERIENCE

2018 | 2016

- **ATER (fixed-term research and teaching associate)**
  University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution)
  Rennes, France

2012 | 2011

- **'Moniteur' (teaching assistant)**
  University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution)
  Rennes, France

- **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, methodologies, 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

present | 2020

- **co-supervision of 1 PhD student**
  Experimental evolution Data synthesis and individual-based modelling

2020 | 2012

- **Supervision of 12 MSc students and 4 BSc students (1 to 6 months projects)**
  Field and lab studies of dispersal and behaviour
  Data synthesis and individual-based modelling

More information on each project here

€ RESEARCH FUNDING

2023 | 2021

- **Marie Sklodowska-Curie Individual Fellowship (MSCA-IF)**
  €166 320
  - Project: HELICITY (Evolution of correlated traits in response to city life: helicid snails as windows on the consequences of urban history)

2018

- **Research grant from the Observatoire des Sciences de l'Univers de Rennes**
  €1 500
  - Project: Dispersal syndrome evolution and habitat fragmentation
  - Collaborators: Julien Pétillon (Univ. Rennes 1), Solène Croci (CNRS)

2016 | 2015

Fyssen Foundation postdoctoral grant

€24 600

• **Project:** Behavioural changes in response to urbanisation

SELECTED SCIENCE COMMUNICATION

since 2018

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

Discussions of current topics and articles in urban ecology and evolution

2018

Participation to the rotation curation outreach account La Bio au Labo

Archives (in French) here

2017

La vie au pied de l'immeuble: adaptation et évolution biologique en ville (Life among buildings : adaptation and biological evolution in cities).

Public talk and discussion, Pint of Science — Rennes, France

with Balbi, M.

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, Ethology...

Member of the Grant Review College of the British Ecological Society

Reviewing Research and Outreach Grant applications (6 to 8 / year)

2014 | 2012

PhD students representative to the Advisory Board of the research unit

University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution)

full Publons record here

LIST OF PUBLICATIONS AND COMMUNICATIONS

PREPRINTS (2)

2021

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

bioRxiv preprint

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

2020

Individual heterogeneity and its importance for metapopulation dynamics

bioRxiv preprint

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

PEER-REVIEWED PUBLICATIONS (21)

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.

2021

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

Oikos, in press

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

• preprint version peer-reviewed and recommended by *Peer Community In Evolutionary Biology*

2021

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., Poupelin 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.

2020

***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.**

2020

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)

2019 **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.**

2019 **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.

2018 **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.

2018 **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.

2017 **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.

2017 **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)

2016 **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.

2016 **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.

2015 **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.

• featured in the *Movement Ecology* Virtual Issue

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.

TALKS IN CONFERENCES (6)

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

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.

• "Eco-evolutionary dynamics in an urbanised world" symposium, invited symposium talk

2017 **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.
• remotely presented

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.

2013

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

2011 | 2009

MSc in Evolutionary, Behavioural and Functional Ecology

University of Rennes 1 — Rennes, France

2009 | 2006

BSc in Organismal Biology

University of Rennes 1 — Rennes, France

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**
  Ghent University, Terrestrial Ecology unit
  • dries.bonte [at] ugent.be
  • mentor during 2015-2016 and 2021-2023 positions

- **Dr. Elodie Vercken**
  INRAE, Institut Sophia Agrobiotech
  • elodie.vercken [at] inrae.fr
  • PI of 2019-2021 research project; current collaborator

- **Prof. David Renault**
  University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution)
  • david.renault [at] univ-rennes1.fr
  • research team leader during 2016-2018 position; current collaborator

- **Dr. Armelle Ansart**
  University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution)
  • armelle.ansart [at] univ-rennes1.fr
  • PhD co-supervisor; current collaborator

Made in R with pagedown
Code on GitHub
Animal silhouettes from Phylopic:
snail by Gareth Monger
spider by Birgit Lang
CV last updated on 2021-04-18.