

# MAXIME DAHIREL

(he/him)

**Evolutionary ecologist**

**Urban ecology and evolution, dispersal ecology**

My researches on the causes and consequences of **individual-level variation** are split along two linked axes:

- the role of trait variation in explaining species' ability (or inability) to persist in increasingly anthropogenic environments (**especially cities**)
- the ecology of **dispersal**, as a key trait bridging 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.

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

## CURRENT POSITION


2023  
|  
2021

- **Postdoctoral researcher (Marie Skłodowska-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)

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

present  
|  
2012

- **Supervision of 13 MSc students (1st or 2nd year) and 5 BSc students (1 to 6 months projects)**  
Field and lab studies of dispersal and behaviour  
Data synthesis and individual-based modelling

See list of current students [here](#)

## € RESEARCH FUNDING

2023  
|  
2021

- **Marie Skłodowska-Curie Individual Fellowship (MSCA-IF)**  
€166 320  
• **Project:** HELICITY (Evolution of correlated traits in response to city life: helioid 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 Pétilion (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)
- **PhD students representative to the Advisory Board of the research unit**  
University of Rennes 1, ECOBIO (Ecosystems, Biodiversity, Evolution)

2014  
|  
2012

## LIST OF PUBLICATIONS AND COMMUNICATIONS

### PREPRINTS (2)

2022

- **Individual variation in dispersal, and its sources, shape the fate of pushed vs. pulled range expansions**  
*bioRxiv preprint*  
• Dahirel M., Guicharnaud C., Vercken E.

2020

- **Individual heterogeneity and its importance for metapopulation dynamics**  
*bioRxiv preprint*  
• Masier S., Dahirel M., Mortier F., Bonte D.



## PEER-REVIEWED PUBLICATIONS (26)

- 2022 ● **Dispersal syndromes in challenging environments: a cross-species experiment**  
*Ecology Letters*, in press  
• Cote J., Dahirel M., Schtickzelle N., Altermatt F., Ansart A., Blanchet S., Chaine 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.
- 2022 ● **Morph-dependent nematode infection and its association with host movement in the land snail *Cepaea nemoralis* (Mollusca, Gastropoda)**  
*Journal of Zoology*, in press  
• Dahirel M., Proux M., Gérard C., Ansart A.
- 2022 ● **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)
- 2022 ● **Dispersal syndrome and landscape fragmentation in the salt-marsh specialist spider *Erigone longipalpis***  
*Current Zoology*, in press  
• Dahirel M., Wulschleger M., Berry T., Croci S., Pétilion J.
- 2021 ● **Landscape connectivity alters the evolution of density-dependent dispersal during pushed range expansions**  
*bioRxiv preprint, peer-reviewed and recommended by Peer Community In Evolutionary Biology*  
• Dahirel M., Bertin A., Calcagno V., Duraj C., Fellous S., Groussier G., Lombaert E., Mailleret L., Marchand A., Vercken E.
- 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*, 130(5): 708-725  
• 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., Menuet 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., Pétilion 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., Chaîne 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)


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

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

- 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

- **Dr. Armelle Ansart**

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

- armelle.ansart [at] univ-rennes1.fr
- PhD co-supervisor; current collaborator