

MAXIME DAHIREL

Behavioural and evolutionary ecologist
Dispersal ecology and evolution, urban ecology

I am interested in the causes and consequences of individual-level variation in behaviour, morphology and life-history, how it varies across space and time and how it is shaped by the interplay of environmental conditions and evolutionary constraints.

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

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

CURRENT POSITION

present
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2019

● Postdoctoral researcher

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

2018
|
2016

PREVIOUS RESEARCH POSITIONS

2016
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2015

● 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

2014
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2011

● 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

● 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)

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)

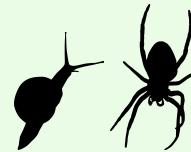
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KEY SKILLS

Main study taxa



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

Languages

French: first language
English: very good
German: 'false beginner'

Data analysis

R (base + tidyverse)
Stan
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
GIMP and Inkscape

- Courses taught or co-taught in these positions include:

Statistics (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

2020
|
2012

- **Supervision of 11 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 ACQUIRED

2018

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

€1500

• Project: Dispersal syndrome evolution and habitat fragmentation

• co-PIs: Julien Pétillon (Univ. Rennes 1), Solène Croci (CNRS)

2016
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2015

- **Fyssen Foundation postdoctoral grant**

€24600

• Project: Behavioural changes in response to urbanisation

● SELECTED SCIENCE COMMUNICATION (BY AND ABOUT)

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 science 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).**

Pint of Science

📍 Rennes, France

with Balbi, M.

2017

- **The Circles of Life: 52 stories of people and the things they really, really, really care about.**

An illustration series by Franz Anthony.

✉ 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.

2014
|
2012

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)

full Publons record [here](#)

LIST OF PUBLICATIONS AND COMMUNICATIONS

PREPRINTS

- 2019
- **Boldness and exploration are linked to shell morph but not environmental context in the snail *Cepaea nemoralis*.**
bioRxiv preprint doi: 10.1101/866947
 - Dahirel M., Gaudu V., Ansart A.

PEER-REVIEWED PUBLICATIONS

- 2019
- **Urbanization drives cross-taxon declines in abundance and diversity at multiple spatial scales.**
Global Change Biology doi:10.1111/gcb.14934
 - 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.
 - **The distinct phenotypic signatures of dispersal and stress in an arthropod model: from physiology to life history.**
Journal of Experimental Biology, 222, 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 are decoupled from body size in an orb-web spider.**
Journal of Animal Ecology 88, 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.

• (direct link to pdf [here](#))

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.* , Séguert 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., Séguert A., Madec L., Ansart A. (2015).

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 NATIONAL AND INTERNATIONAL CONFERENCES

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

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.
- **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
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2009

- **MSc in Evolutionary, Behavioural and Functional Ecology**
University of Rennes 1
📍 Rennes, France
 - with honours, rank: 1st year 1st/46, 2nd year 1st/18

2009
|
2006

- **BSc in Organismal Biology**
University of Rennes 1
📍 Rennes, France
 - with honours, rank: 2nd/130

OTHER

- **Qualifications from the French National Council of Universities**
authorized to apply for Lecturer/Assistant Professor positions in France,
section 67 (Population Biology and Ecology) and 68 (Biology of Organisms)
- **Member of the British Ecological Society**

REFERENCES

- **Prof. Dries Bonte**
Ghent University, Terrestrial Ecology unit
 - dries.bonte [at] ugent.be
 - mentor during 2015-2016 position; current collaborator

● **Dr. Elodie Vercken**

INRAE, Institut Sophia Agrobiotech
• elodie.vercken [at] inrae.fr
• PI of current research project

● **Dr. 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