

Maxime DAHIREL

Behavioural & Evolutionary Ecologist
French citizenship

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I am a behavioural and evolutionary ecologist, mainly interested in the causes and consequences of individual-, population- and species-level variation in behaviour, morphology and life-history, how it varies across space and time and how it is shaped by environmental conditions. 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 lab-based experiments and monitoring in naturalistic contexts.

Previously held positions

ATER (fixed-term research and teaching associate)

	<i>University of Rennes 1, UMR 6553 Ecobio, France</i>
2016-2018	Research themes: Dispersal ecology and evolution, phenotypic syndromes, evolutionary ecology in cities Teaching: Statistics for biologists, ecology, zoology

Postdoctoral researcher

	<i>Ghent University, Department of Biology, Terrestrial Ecology unit, Gent, Belgium</i>
2015-2016	"Determinants of urbanisation-driven divergence in behaviours" (12 months, funded by a personal Fyssen Foundation fellowship) Mentor: Prof. Dries Bonte (Ghent Univ.).

Research assistant (PhD student / candidate in Biology)

	<i>University of Rennes 1, UMR 6553 Ecobio, France</i>
2011 - 2014	"Individual and environmental drivers of dispersal in a hermaphrodite species, the land snail <i>Cornu aspersum</i> " (with great honours). Available online at: http://www.theses.fr/en/2014REN1S068 Supervisors: Dr Armelle Ansart, Prof. Luc Madec (Univ. Rennes 1). Reviewers: Prof. Michel Baguette (MNHN), Prof. Dries Bonte (Ghent Univ.). Examiners: Dr Jean-François Le Galliard (CNRS), Dr Benoît Facon (INRA)

Published (or in press) in peer-reviewed journals

- 2018**
- [13](*accepted, in press*) **Dahirel M.**, De Cock M., Vantieghem P., Bonte D. Urbanization-driven changes in web-building and body size in an orb-web spider. *Journal of Animal Ecology* (bioRxiv preprint at: <https://doi.org/10.1101/214924>)
- [12](*accepted, in press*) 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. Bottom-up and top-down control of dispersal across major organismal groups: a coordinated distributed experiment. *Nature Ecology and Evolution* (bioRxiv preprint at: <https://doi.org/10.1101/213256>)
- [11] 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. Body size shifts in aquatic and terrestrial urban communities. *Nature*, 558, 113–116
- [10] Van Petegem K., Moerman F., **Dahirel M.**, Fronhofer E.A., Vandegehuchte M.L., Van Leeuwen T., Wybouw N., Stoks R., Bonte D. (2018). Kin competition accelerates experimental range expansion in an arthropod herbivore. *Ecology Letters* 21(2): 225-234
- 2017**
- [9] **Dahirel M.**, Vong A., Ansart A., Madec L. (2017) Individual boldness is life stage-dependent and linked to dispersal in a hermaphrodite land snail. *Ecological Research* 32(5): 751-755
- [8] **Dahirel M.**, Dierick J., De Cock M., Bonte D. (2017) Intraspecific variation shapes community-level behavioral responses to urbanization in spiders. *Ecology* 98(9): 2379-2390
- [7] Bonte D., **Dahirel M.** (2017) Dispersal: a central and independent trait in life-history. *Oikos*, 126(4): 472-479
- 2016**
- [6] **Dahirel M.***, Séguret A.*, Ansart A., Madec L. (2016) Dispersal-related traits of the snail *Cornu aspersum* along an urbanisation gradient: maintenance of mobility across life stages despite high costs. (*: joint first authors). *Urban Ecosystems*. 19 (4): 1847-1859
- [5] **Dahirel M.**, Vardakis M., Ansart A., Madec L. (2016). Density-dependence across dispersal stages in a hermaphrodite land snail: insights from discrete choice models. *Oecologia*, 181 (4): 1117-1128
- [4] **Dahirel 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

- 2015 [3] **Dahirel M.**, Cholé H., Séguret A., Madec L., Ansart A. (2015). Context-dependence of the olfactory perceptual range in the generalist land snail *Cornu aspersum*. *Canadian Journal of Zoology*, 93 (8): 665-669
- [2] **Dahirel M.**, Olivier E., Guiller A., Martin M.-C., 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
- 2014 [1] **Dahirel M.**, Ansart A., Madec L. (2014). Stage- and weather-dependent dispersal in the brown garden snail *Cornu aspersum*. *Population Ecology* 56 (1): 227-237

Submitted or in preparation with available preprints

Vong A., Ansart A., **Dahirel M.** Dispersers are more likely to follow mucus trails in the land snail *Cornu aspersum*. *bioRxiv preprint at: <https://doi.org/10.1101/373001>*

Communications in international conferences

Talks

- 2017 (invited symposium talk) **Dahirel M.**, De Cock M., Bonte D. (2017). Body size constraints and behavioural adaptations to city life: a case study in the spider *Araneus diadematus*. "Eco-evolutionary dynamics in an urbanised world" symposium, *Ecology Across Borders*, joint conference of the BES, GfÖ and NeCoV, Ghent, Belgium, December 2017
- Dahirel M.**, Masier S., Renault D., Bonte D. (2017). Metabolic dispersal syndromes and response to stress in spider mites. "Dispersal – Connecting networks", *EVENET Movement and Dispersal conference*, Ghent, Belgium, December 2017
- 2016 **Dahirel M.**, Dierick J., 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, July-August 2016
- 2013 **Dahirel M.**, Olivier E., Madec L., Ansart A. (2013). Habitat specialization and movement characteristics in European helicoid land snails: implications for dispersal and foraging strategies. 9th "Ecology & Behaviour" *SERL meeting*, Strasbourg, France, April 2013
- 2012 **Dahirel M.**, Ansart A., Madec L. (2012). Dispersal strategies in the land snail *Cornu aspersum*: sex-biased dispersal in a hermaphroditic species? 8th "Ecology & Behaviour" *SERL meeting*, Chizé, France, April 2012

Workshops

- 2017 Hertzog L., **Dahirel M.** (2017). An introduction to Bayesian data analysis using Stan. *Ecology Across Borders*, joint conference of the BES, GfÖ and NeCoV, Ghent, Belgium, December 2017

Posters

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| 2014 | Dahirel M. , Ansart A., Madec L. (2014). Studying the interplay between dispersal behavior and reproduction in hermaphrodites, using land snails as models. <i>15th conference of the International Society for Behavioral Ecology, New York, USA, July-August 2014</i> |
| 2013 | Dahirel M. , Olivier E., Guiller A., Martin M.-C., Madec L., Ansart A. (2013). How does habitat specialization influence dispersal? A comparative approach in European land snails. <i>Movement and Dispersal International Conference, Aberdeen, UK, November 2013</i> |
| | Dahirel M. , Ansart A., Madec L. (2013). Slow but sure: stage-dependent dispersal in the brown garden snail <i>Cornu aspersum</i> . <i>Causes and Consequences of Organism Dispersal, Lund, Sweden, January-February 2013</i> |

Teaching and supervision of trainees

Teaching

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| 2016-2018 | Fixed-term teaching and research associate (“ATER”), University of Rennes 1, France
Lectures and practical courses in Statistics and Ecology to BSc and MSc students (>192 hours/year). |
| 2011-2012 | Teaching assistant (“moniteur”), University of Rennes 1, France
Theoretical and practical courses in Ecology, Evolution and Statistics to BSc and MSc students (64 hours) |

Classes taught in these positions include:

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| Statistics | Advanced R for data analysis (first year of MSc) ~ 20 h
Statistical tools, methodologies, and experimental design (several levels, second year of BSc studies to first year of Master studies) ~230h |
| Ecology | General ecology (first year of BSc studies) ~80h
Community ecology (third year of BSc studies and first year of MSc) ~ 42h
Spatial ecology (movement ecology; first year of MSc) ~4h
Ecological bases of vegetal production (third year of BSc studies) ~ 12h
Initiation to GIS (second year of BSc studies) ~ 4h |
| Zoology | Introduction to diversity of life (first year of BSc studies) ~30h
Advanced animal diversity (insects; third year of BSc studies) ~ 40h
Physiology of nutrition, development, growth (third year of BSc studies); ~6h |

Supervision of trainees

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| 2012-2018 | Supervision of 11 MSc students and 4 BSc students (1 to 6 months training periods): field and lab studies of dispersal and behaviour in gastropods, spiders and fruit flies. |
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Outreach and science communication

Talks

- 05-2017** | **Dahirel M.**, (with Balbi M.) 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

Notable social media outreach

- 02-2018** | Interview for the "Circles of Life" project by illustrator Franz Anthony <https://the-circles-of-life.tumblr.com/post/170867786495/cornu-aspersum-garden-snail-ft-maxime-dahirel-in> (Twitter, Instagram, Tumblr)
- 06-2018** | Participation to the rotation curation science outreach account La Bio au Labo (<http://labioaulabo.tumblr.com/> ; <https://twitter.com/laBioauLabo>). Twitter-based outreach in dispersal ecology, urban ecology and animal behaviour. Archives (in French): <https://wakelet.com/wake/94072ba5-c1b3-4d25-acd0-5e0a2b64ace3>

Featured in media

Research I have participated in has been featured by various general and specialist outlets including the RTBF, Le Temps, Scientific American, Der Tagesspiegel, as well as local journals and television channels...

Skills

Scientific fields

Behavioural ecology, evolutionary ecology, dispersal ecology and evolution, urban ecology, population ecology, landscape ecology, spatial ecology

Animal ecology (molluscs and arthropods)

Life-history traits measurements, behavioural observations, animal trajectory analysis, field sampling, mark-recapture methods, species identification (birds, insects, land snails), rearing, dissection, basic molecular biology and biochemical analyses (DNA extraction, PCR, EIA assays)

Languages

French: Mother tongue
English: Very good oral and written skills
German: Elementary knowledge ('false beginner' level)

Statistics

Linear, Generalized Linear and Generalized Additive (Mixed) Models, including quantitative genetics applications (animal model)
Nonlinear (mixed) models
Cox model and survival regression
Discrete choice models
Mark-recapture models (CJS and multi-state models)
Phylogenetic comparative analyses
Multivariate analyses (PCA/COA/RDA/LDA)
Bayesian Inference

Computer skills

(beginner+, intermediate level++, experienced+++)

Data analysis: R⁺⁺⁺, MARK⁺, WinBUGS/OpenBUGS⁺, Stan⁺

Scripting languages: R⁺⁺

Individual-based modelling: NetLogo⁺

Video tracking: ImageJ⁺⁺

Image analysis and manipulation: GIMP⁺⁺⁺, Adobe Photoshop⁺⁺, Inkscape⁺⁺, ImageJ⁺⁺

Geographic Information Systems: ArcGIS⁺⁺, QuantumGIS⁺⁺

Other experience

Research funding acquired

2018 | Research grant (€1500) from the Observatoire des Sciences de l'Univers de Rennes

2015 | Postdoctoral fellowship (€24600, 12 months) from the Fyssen Foundation

Travel grants

07-2016 | Travel grant (\$700) from the International Society for Behavioral Ecology

07-2016 | Travel grant (€300) from the Research Foundation - Flanders

07-2014 | Travel grant (\$1250) from the International Society for Behavioral Ecology

07-2014 | Travel grant (£130) from the British Ecological Society

Peer review

Referee for various journals and outlets including *Proceedings of the Royal Society B*, *Journal of Animal Ecology*, *Oikos*, *PCI Ecology*, *Ethology*... (full Publons record: <https://publons.com/author/1196421/maxime-dahirel>)

Member of the Grant Review College of the British Ecological Society

Administrative responsibilities

2012-2014 | *University of Rennes 1 – UMR CNRS 6553 Ecobio, France*

PhD students representative to the Advisory Board of the research unit

Qualifications

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)

Other education details

Previous degrees

2009 - 2011	<i>University of Rennes 1, France</i> Master's degree in Evolutionary, Behavioural and Functional Ecology (with honours, rank: 1 st year 1 st /46, 2 nd year 1 st /18)
2006 - 2009	<i>University of Rennes 1, France</i> Bachelor's degree in Organismal Biology (with honours, rank: 2 nd /130)

Internships

2011 (6 months)	<i>University of Rennes 1 – UMR CNRS 6553 Ecobio, France</i> “Phenotype- and condition-dependent dispersal in the land snail <i>Cornu aspersum</i> ”. Supervisors: Dr Armelle Ansart, Prof. Luc Madec (Univ. Rennes 1)
2010 (4 months)	<i>INRA – UMR 1349 Bio3P (now IGEPP), Le Rheu, France</i> “Performances of an introduced aphid on a native Brassicaceae of Kerguelen islands, in relation to a possible loss of chemical defences”. Supervisors: Dr Maurice Hullé (INRA), Dr Sébastien Dugravot (Univ. Rennes 1)
2009 (3 months)	<i>INRA – UR SAD Paysage, Rennes, France</i> “Spatial dynamics of carabid beetles in agricultural landscapes”. Supervisor: Dr Chloé Vasseur (at the time PhD Student, INRA)

References

Prof. Dries BONTE (postdoc advisor, member of PhD defence jury). Ghent University – Terrestrial Ecology unit – dries.bonte@ugent.be

Dr David RENAULT (research team leader in last research position). University of Rennes 1/ CNRS – Ecobio research unit – david.renault@univ-rennes1.fr

Dr Armelle ANSART (PhD co-supervisor). University of Rennes 1/CNRS – Ecobio research unit – armelle.ansart@univ-rennes1.fr

Prof. Luc MADEC (PhD co-supervisor). University of Rennes 1/CNRS – Ecobio research unit – luc.madec@univ-rennes1.fr