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)

2016-2018

University of Rennes 1, UMR 6553 Ecobio, France
Research themes: Dispersal ecology and evolution, phenotypic syndromes, evolutionary ecology in cities
Teaching: Statistics for biologists, ecology, zoology

Postdoctoral researcher

2015-2016

Ghent University, Department of Biology, Terrestrial Ecology unit, Gent, Belgium
"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 candidate in Biology)

2011 - 2014

University of Rennes 1, UMR 6553 Ecobio, France
"Individual and environmental drivers of dispersal in a hermaphrodite species, the land snail *Cornu aspersum*" (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)

Articles

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

(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., 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*

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*

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*

Posters

Dahirel M., Ansart A., Madec L. (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, July-August 2014*

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. *Movement and Dispersal International Conference, Aberdeen, UK, November 2013*

Dahirel M., Ansart A., Madec L. (2013). Slow but sure: stage-dependent dispersal in the brown garden snail *Cornu aspersum*. *Causes and Consequences of Organism Dispersal, Lund, Sweden, January-February 2013*

Teaching and supervision of trainees

Teaching

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:

- **Bases of ecology** (1st year of Bachelor's degree in Biology)
- **Nutrition, development and growth** (3rd year of Bachelor's degree in Organismal Biology)
- **Animal diversity** (1st and 3rd year of Bachelor's degree)
- **Community ecology** (1st year of Master's degrees in Ecology and Environmental Sciences)
- **Initiation to GIS** (2nd year of Bachelor's degree in Biology)
- **Quantitative biology/Statistics for ecology and biology** (2nd and 3rd year of Bachelor's degrees in Biology, 1st year of Master's degrees in Ecology and Environmental Sciences)
- **Spatial ecology**: methods for the observation and analysis of animal movement (1st year of Master's degree in Ecology)

Supervision of trainees

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.

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…

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 Travel grant (€300) from the Research Foundation - Flanders
07-2014	Travel grant ($1250) from the International Society for Behavioral Ecology 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 — *University of Rennes 1, France*

Master's degree in Evolutionary, Behavioural and Functional Ecology (with honours, rank: 1st year 1st/46, 2nd year 1st/18)

2006 - 2009 — *University of Rennes 1, France*

Bachelor's degree in Organismal Biology (with honours, rank: 2nd/130)

Internships

2011 (6 months)	*University of Rennes 1 – UMR CNRS 6553 Ecobio, France* "Phenotype- and condition-dependent dispersal in the land snail *Cornu aspersum*". **Supervisors:** Dr Armelle Ansart, Prof. Luc Madec (Univ. Rennes 1)
2010 (4 months)	*INRA – UMR 1349 Bio3P (now IGEPP), Le Rheu, France* "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)	*INRA – UR SAD Paysage, Rennes, France* "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 (current research team leader). 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