

MATHIEU LAPARIE

French citizenship

✉ Forest Zoology Research Unit, INRA Orléans
2163, Av. de la pomme de pin, CS 40001 Ardon
45075 Orléans Cedex 2, France
☎ +33 (0) 2 38 41 78 98
✉ mathieu.laparie@orleans.inra.fr
🌐 Website: www.mlaparie.fr

Current position

Research associate (CR2)

Since 2013

INRA, Forest Zoology Research Unit, France

Keywords: Biological invasions, biodiversity, climate change, dispersal, ecophysiology, evolution, forests, insects, islands, metabolomics, morphometrics, phenotypic plasticity, pine processionary moth.

Research topics

My research interests lie in the relationship between durable success of invasive species and their ability to fit novel selection regimes dynamically through plastic or evolutionary changes. I have conducted experimental and field work to focus on three main questions, using tools in ecophysiology, metabolomics and morphometrics:

- what is the role of plasticity (physiological, trophic, *etc.*) in the colonization of new environments?
- how does range expansion, by itself, drive to evolutionary changes and syndromes?
- do invaders have scope to persist over the long term despite ecological perturbations their residence induces?

I have been working several years on insects invading sub-Antarctic islands, and now focus on the range expansion of the pine processionary moth in Europe under climate change.

Professional experience

2012-2013

University of Rennes 1 – UMR CNRS 6553 ÉCOBIO, France

Temporary lecturer (full-time ATER)

2012

University of Rennes 1 – UMR CNRS 6553 ÉCOBIO, France

Post-doctoral fellow for David Renault at the Centre National de la Recherche Scientifique (CNRS)

Education

PhD in Biology

2008-2011

University of Rennes 1 – UMR CNRS 6553 ÉCOBIO, France

"Invasive success of two alien insects at the Kerguelen Islands: role of morphological and ecophysiological adjustments to the novel environmental conditions" – Dissertation available at <http://goo.gl/IDr3r>

Directors: Dr. D. Renault (Univ. Rennes 1), Prof. Y. Frenot (Univ. Rennes 1, Institut Polaire français IPEV)

Rapporteurs: Prof. D. Simberloff (Univ. Tennessee), Dr. K. A. Hughes (British Antarctic Survey)

Examiners: Prof. B. J. Sinclair (Univ. Western Ontario, President of the committee), Dr. V. Debat (MNHN)

Previous degrees

2007-2008

University of Rennes 1

With great honor, rank 1/21

2nd year of Master's degree in Ecology, Evolution, Ethology

Main courses: Evolutionary biology, Landscape ecology, Behavioural ecology

2006-2007

University of Rennes 1

With great honor, rank 12/122

1st year of Master's degree in Biology of organisms, populations and ecosystems

Main courses: Functional responses of organisms to environmental conditions, Restoration ecology, Community ecology, Population biology

2005-2006

University of Poitiers

With great honor, rank 2/45

Bachelor's degree in Evolution of organisms and communities

Languages

French – Mother tongue

English – Good oral and written skills

Spanish – Elementary knowledge

Computer skills

Operating systems – *Windows, Linux* (bases)

Softwares and tools – *R, ArcGIS, LibreOffice,*

Microsoft Office, Adobe suite, Moodle

Articles in peer-reviewed journals

Published

Laparie M., Renault D., Lebouvier M. & Delattre T. 2013. Is dispersal promoted during range expansion of invasive species? Morphological analysis of a ground beetle invading the Kerguelen Islands, *Merizodus soledadinus* (Coleoptera, Carabidae). *Biological Invasions* 15, 1641–1648

- Hidalgo K., Laparie M., Bical R., Larvor V., Bouchereau A., Siaussat D. & Renault D. 2012. Metabolic fingerprinting of the responses to salinity in the invasive ground beetle *Merizodus soledadinus* at the Kerguelen Islands. *Journal of Insect Physiology* 59, 91–100
- Siaussat D., Laparie M., Maria A. & Renault D. 2012. Heat shock protein responses to salinity, food deprivation, and temperature in the invasive ground beetle *Merizodus soledadinus* at the Kerguelen Islands. *Polar Biology* 36, 201–209
- Laparie M., Bical R., Larvor V., Vernon P., Frenot Y. & Renault D. 2012. Habitat phenotyping of two sub-Antarctic flies by metabolic fingerprinting: evidence for a species outside its home? *Comparative Biochemistry and Physiology part A* 162, 406–412
- Colinet H., Larvor V., Laparie M. & Renault D. 2012. Exploring the plastic response to cold acclimation in *Drosophila melanogaster* through metabolomics. *Functional Ecology* 26, 711–722
- Laparie M., Larvor V., Frenot Y. & Renault D. 2012. Starvation resistance and energetic consequences of prey choice in a predatory insect invading the Kerguelen Islands, the ground beetle *Merizodus soledadinus*. *Comparative Biochemistry and Physiology part A* 161, 122–129
- Lebouvier M., Laparie M., Hullé M., Marais A., Cozic Y., Lalouette L., Vernon P., Candresse T., Frenot Y. & Renault D. 2011 The significance of the sub-Antarctic Kerguelen Islands for the assessment of the vulnerability of native communities to climate change, alien insect invasions and plant viruses. *Biological Invasions* 13, 1195–1208
- Laparie M., Lebouvier M., Lalouette L. & Renault D. 2010. Variation of morphometric traits in populations of an invasive carabid predator (*Merizodus soledadinus*) within a sub-Antarctic island. *Biological Invasions* 12, 3405–3417

In revision or submitted

- Laparie M., Vernon P., Cozic Y., Frenot Y., Renault D & Debat V. An active flyer invades a world of flightlessness: no apparent sub-Antarctic wing reduction syndrome in *Calliphora vicina* (Diptera, Calliphoridae). *Submitted to PLOS One*
- Laparie M. & Renault D. Climate warming, friend or foe? Physiological responses to temperature in a subpolar carabid beetle currently invading sub-Antarctic islands. *Submitted to Polar Biology*
- Renault D., Lombard M., Vingere J. & Laparie M. Comparative physiological plasticity to saline conditions in native flies from the subantarctic Kerguelen Islands. *Submitted to Polar Biology*

Communications

Oral presentations – International (* for presenting author)

- Laparie M.* The success of two invasive insects at the Kerguelen Islands: responses to novel environmental conditions. *University of Padova, Laboratory of Entomology, Legnaro, Italy, February 2014* (invited conference)
- Hullé M.*, De La Huerta M., Buchard C., Laparie M. & Vernon P. The ups and downs of an invasive species: the case study of an insect introduced on a sub-antarctic island. *Colloque d'ÉcoPhysiologie Animale (CEPA), Lyon, France, November 2013*
- Renault D.*, Hidalgo K., Lombard M., Vingere J. & Laparie M. Comparative physiological plasticity among native and alien insects distributed along salinity gradients. *XI SCAR Biology Symposium, Barcelona, Spain, July 2013*
- Hidalgo K., Laparie M., Siaussat D. & Renault D.* Metabolic fingerprinting and heat shock protein responses to salinity in the invasive ground beetle *Merizodus soledadinus* at the Kerguelen Islands. *Scientific workshop on Genericity of responses and adaptation strategies to multiple stresses in organisms of aquatic and terrestrial ecosystems, Paimpont, France, November 2012.*
- Laparie M.*, Larvor V. & Renault D. Physiological plasticity in insects: metabolic differences in salinity tolerance between two sub-Antarctic flies that live sympatrically. *4th International Symposium on the Environmental Physiology of Ectotherms & Plants, Rennes, France, July 2011*
- Hidalgo K.*, Laparie M., Bical R., Larvor V. & Renault D. Metabolic responses to saline conditions in the carabid beetle *Merizodus soledadinus* introduced at the Kerguelen Islands: does habitat distribution match with their physiological plasticity? *4th International Symposium on the Environmental Physiology of Ectotherms & Plants, Rennes, France, July 2011*
- Laparie M.*, Debat V., Vernon P., Cozic Y., Frenot Y. & Renault D. The blowfly *Calliphora vicina* at the Kerguelen Islands: evolution of the wing of an active flyer invading a world of flightlessness. *7th Symposium on Ecology and Behaviour, Rennes, France, May 2011*

Oral presentations – National (* for presenting author)

- Hullé M.*, Buchard C., De La Huerta M., Till M., Laparie M. & Vernon P. Les hauts et les bas d'une invasion biologique : le cas d'un puceron introduit dans les îles subantarctiques. *2^{nde} Édition des Rencontres Rennaises « Invasions biologiques », Rennes, France, November 2013*

- Laparie M., Larvor V. & Renault D.* Exploring the plastic response to salinity in native an alien subantarctic insects through metabolic fingerprinting. *6^{èmes} journées du réseau français de métabolomique et de fluxomique*, Nantes, France, May 2012
- Laparie M.*, Larvor V. & Renault D. Tolérance et réponses physiologiques aux variations de température chez un carabique d'origine australe envahissant les Îles Kerguelen. *8^{èmes} Journées Scientifiques du Comité National Français des Recherches Arctiques et Antarctiques (CNFRA)*, Brest, France, May 2012
- Renault D.*, Colinet H., Laparie M. & Larvor V. 2011. Caractérisation des profils métaboliques (GC-MS) des insectes en fonction de leur habitat et de leur régime alimentaire. *Workshop of the Corsaire platform*, Nantes, France, October 2011 (invited conference)
- Hullé M.*, Lebouvier M., Laparie M., Marais A., Cozic Y., Lalouette L., Vernon P., Candresse T., Frenot Y. & Renault D. Vulnérabilité des communautés natives face aux insectes invasifs et au changement climatique dans les îles sub-antarctiques. *7^{èmes} Journées Scientifiques du Comité National Français des Recherches Arctiques et Antarctiques (CNFRA)*, Paris, France, May 2011
- Laparie M.*, Lebouvier M., Lalouette L. & Renault D. Variabilité morphométrique chez un carabe prédateur introduit dans les îles Kerguelen, *Merizodus soledadinus* : étude de populations géographiquement et chronologiquement distinctes. *6^{ème} Symposium de Morphométrie et Évolution des Formes*, Montpellier, France, May 2009
- Lalouette L.*, Laparie M., Renault D., Vernon P. & Lebouvier M. Le carabe introduit *Oofterus soledadinus* dans les îles Kerguelen, les raisons d'un succès. *11^{èmes} rencontres francophones : Invasions biologiques et traits d'histoire de vie, variabilité, plasticité, adaptation*. Rennes, France, November 2007

Posters – International

- Laparie M., Larvor V. & Renault D. Climate warming, friend or foe? Thermal physiology of an invasive ground beetle. *XI SCAR Biology Symposium*, Barcelona, Spain, July 2013
- Laparie M., Debat V., Vernon P., Cozic Y., Frenot Y. & Renault D. An invasive fully-winged fly in a world ruled by flightless insects: phenotypic plasticity and evolution of the wing of *Calliphora vicina* (Diptera) within a sub-Antarctic archipelago. *XXXI SCAR Open Science Conference*, Buenos Aires, Argentina, August 2010
- Laparie M., Cottin M., Vernon P. & Renault D. Diet restriction and senescence: evolution of energy in adults of a long-lived wingless Diptera from subantarctic islands. *Evolutionary Biology: phylogeny, speciation, co-evolution, development, genomes, life histories, plasticity... What is new?* Rennes, France, June 2009

Popular science

- October 2012 *Exhibitor at the Fête de la Science, Paimpont, France*
Poster on insect' adaptations to sub-Antarctic conditions; animation of one session of seminars
- September 2011 *Exhibitor at the first Festival Art et Nature "Forêt", Paimpont, France*
Poster and video on sub-Antarctic research, demonstration of an ant colony; animation of one session of seminars
- June 2011 *Writing of a synthesis about my PhD topic (CIES)*
"Conséquences écologiques et évolutives des invasions biologiques : le cas d'invertébrés terrestres introduits dans les îles Kerguelen"
- April 2010 *Poster for schools within the Rennes city, France (CIES)*
"Les insectes des îles subantarctiques : des curiosités de la nature aujourd'hui menacées"
- October 2009 *Exhibitor at the Festival des Petits Explorateurs, Vannes, France*
"Les îles subantarctiques : un milieu unique pour le vivant"

Teaching experience and supervision of trainees

Supervision of trainees

- April-June 2012 *Manon De La Huerta, 1st year Master's degree*
"Loss of flight ability in an insect recently introduced in sub-Antarctic islands"
- June 2011 *Alice Bijou, 3rd year Bachelor's degree*
Videotracking techniques to monitor locomotor activity and dispersal in an invasive insect regarding trophic conditions and photoperiod
- January-July 2011 *Raphaël Bical, 2nd year of Master's degree*
"Relationship between plasticity and spatial range in insects: salinity tolerance in two wingless Dipterans native from the Kerguelen Islands"
- January-July 2011 *Kévin Hidalgo, 2nd year of Master's degree*
"Metabolic responses regarding soil salinity in the invasive ground beetle *Merizodus soledadinus* at the Kerguelen Islands: is physiological plasticity involved in its geographical range?"
- January-April 2010 *Élodie Fayel, engineer student from the Purpan school*
Laboratory (olfactometry) and field work at the Kerguelen Islands

Teaching

2008-2011, 2012-2013 *Monitor CIES (64 hours/year), Temporary lecturer (full-time ATER, 192 hours/year)*

Theoretical, practical, field courses to students from BSc to MSc (> 380H, or 570H prac. scale)

- Statistical and methodological tools in biology (creation of four practical lessons; 1st year of Masters EFCE, ERPUR, MFA, PNB, ED)
- Animal Biology (2nd year of Bachelor BO)
- Initiation to GIS (1st year of Masters EFCE, ERPUR, GHBV, MFA, PNB, ED)
- Scientific communication (1st year of Master CAH)
- Scientific English (2nd year of Masters ED, ERPUR)
- Bases of ecology (1st year of Bachelor BO)
- Bases of taxonomics and organization of life (1st year of Bachelor BO)
- Nutrition – Reproduction (1st year of Bachelor BO)
- Nutrition, development and growth (3rd year of Bachelor BO)
- Introduction to ecology (online courses *via* Moodle)
- Issues in ecology (2nd year of Bachelor BO)
- Landscape ecology (creation of one directed lesson, 1st year of Masters EFCE, ERPUR)
- Population biology (1st year of Master EFCE)
- Evolutionary biology: evolution of species (3rd year of Bachelor BO)
- Examiner for Master theses and oral defenses (1st year of Master CAH)

Other experience

Congress organization and other administrative responsibilities

- July 2011 Member of the organizing committee of the 4th International Symposium on the Environmental Physiology of Ectotherms & Plants (ISEPEP 4, Rennes, France)
- 2009-2010 Member of the four-people team in charge of communication and image of the laboratory

Grants

- August 2010 Travel grant for the SCAR Open Science Conference (\$ 750)
- August 2010 Grant from the Brittany region for communications in international congresses (800 €)

Field experience

Total of 9 months of field work (split in 2 summer missions) spent on sub-Antarctic islands during PhD: experiments on insects (sampling, trapping, invasion range, life histories, behavior, biotic interactions, *etc.*)

Workshops or summer schools

June 2010 *French-Swedish Summer School, Abisko, Sweden*
Conferences, debates and field courses on climate change within sub-polar regions

Internships

January-June 2008 *UMR CNRS 6553 ÉCOBIO, Paimpont, France* (supervised by D. Renault & P. Vernon)
"Food stress and senescence: variations of metabolic stores during starvation and regarding age in a wingless, saprophagous and long-lived Dipteran from sub-Antarctic islands"

April-June 2007 *UMR CNRS 6553 ÉCOBIO, Paimpont, France* (supervised by M. Lebouvier & D. Renault)
"Morphological variability among populations of a predaceous ground beetle invading the Kerguelen Islands"

June-August 2006 *UMR CNRS 7178 IPHC, Strasbourg, France* (supervised by O. Petit)
"Influence of individual parameters on collective move in a social group of brown lemurs *Eulemur fulvus*"

Experience of scholar applications

- Lecturer Ranked 2nd after interview, Tours, IRBI (Prof. Casas' group), 2012
- Post-docs Ranked after interview with Prof. Zuk, U. Minnesota (2nd); Dr. Brodin, U. Umeå (invited, 2nd); Prof. Ritchie & Prof. Goodwin, U. St Andrews (invited, ranked); Prof. Shine, U. Sydney (3rd)

References

Dr Alain Roques Head of current laboratory
Forest Zoology Research Unit, INRA Orléans, France; alain.roques@orleans.inra.fr, +33 (0) 2 38 41 78 58

Dr David Renault PhD director, supervisor during Master
UMR 6553 ÉCOBIO, CNRS – Univ. Rennes 1, France; david.renault@univ-rennes1.fr, +33 (0) 2 23 23 66 27

Dr Yves Frenot PhD co-director, Director of the French Polar Institute (IPEV)
Institut Polaire Français Paul-Émile Victor (IPEV), France; yves.frenot@ipev.fr, +33 2 98 05 65 00

Prof Daniel Simberloff PhD rapporteur
Ecology and Evolutionary Biology, University of Tennessee, USA; dsimberloff@utk.edu, (865) 974 0849