

# Mélanie Duc

## CONTACT INFORMATION

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Address Akademijos Str. 2, Vilnius LT-08412, Lithuania  
Tel. no.: +370 69524559  
E-mail: [melanie.duc@gamtc.lt](mailto:melanie.duc@gamtc.lt)  
<https://orcid.org/0000-0001-5468-2594>  
<https://www.researchgate.net/profile/Melanie-Duc>  
[https://www.linkedin.com/in/m%C3%A9lanie-duc-291885119/?locale=en\\_US](https://www.linkedin.com/in/m%C3%A9lanie-duc-291885119/?locale=en_US)

## EDUCATION AND ACADEMIC DEGREE

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2019-present PhD student: Zoology. Nature Research Centre – Vilnius University, Vilnius, Lithuania.  
2017-2019 Master degree: Biology, option Animal Ecology. Lund University, Lund, Sweden  
2016-2017 Bachelor degree: Ecology, Biology of Organisms (Licence EBO, Ecologie, Biologie des Organismes). Montpellier University, Montpellier, France  
2015-2016 Higher National Diploma: Environmental engineering (DUT Génie Biologique, option Génie de l'Environnement). Institut of Bretagne Occidentale University, Brest, France  
2013-2015 Higher School Preparatory Class, BCPST: Biology, Chemistry, Physics, Earth' Sciences. Chateaubriand High school, Rennes, France.

## PROFESSIONAL EXPERIENCE

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2022.01-present Senior specialist at the P. B. Šivickis Laboratory of Parasitology. Nature Research Centre, Vilnius, Lithuania  
2019.11 – 2021.12 Biologist0, at the P. B. Šivickis Laboratory of Parasitology. Nature Research Centre, Vilnius, Lithuania  
2019.07 – 2019.10 Employed in various projects: 1) Daily check-up of captive zebra finches (*Taeniopygia guttata*), 2) DNA extraction from blood samples using ammonium acetate method, nested PCR to determine the presence of avian malaria parasites, 3) Sequence capture on *Plasmodium* and *Haemoproteus* using respectively Agilent and Swift with MyBait protocols. Department of Biology, Lund University, Lund, Sweden

## RESEARCH INTERESTS

I have been working with haemosporidian parasites since my MSc studies at Lund University, Lund, Sweden using molecular, phylogenetic and statistical analyses.

Since the start of my PhD, I have gained knowledge about the life cycle of avian haemosporidians. I participated in fieldwork and collection of material that I have been analysing. My project centre on the determination and description of the exo-erythrocytic stages of the *Haemoproteus* parasites in their naturally infected avian hosts. The obtained data as well as the museum collections (see internships) and available literature information will be used to unravel possible phylogenetic patterns in regard of the evolution of the parasites and the pathologies they cause in internal organs of their avian host.

Aside my PhD project, I have been involved as a junior researcher in two projects on *Haemoproteus* vectors, *Culicoides* biting midges in the P. B. Šivickis Laboratory of Parasitology (P-MIP-21-76 and P-MIP-20-217). The first project centred on the identification of the vectors transmitting haemoproteids in diurnal vectors; the second project on investigating the mechanisms of transmission of avian haemoproteids – like the feeding preferences of these vectors. This work

remarkably broadens my experience in Parasitology and is helpful for my PhD research to better understand haemosporidian parasite life cycles.

My PhD project is multidisciplinary, and the research methodology combines the following approaches:

- microscopic examination of blood and histological preparations,
- DNA extraction, polymerase chain reaction (PCR), electrophoresis and sequence analysis,
- phylogenetic analysis,
- histology and cytology,
- chromogenic in situ hybridization (CISH),
- dissection of birds and of *Haemoproteus* vectors (Ceratopogonidae).

## PUBLICATIONS

*Scientific articles published in journals (books), indexed in „Clarivate Analytics Web of Science“ database (with citation index):*

1. Chagas, C. R. F., Hernández-Lara, C., **Duc, M.**, Valavičiūtė-Pocienė, K., & Bernotienė, R. (2022). What can Haemosporidian lineages found in *Culicoides* biting midges tell us about their feeding preferences?. *Diversity*, *14*(11), 957. doi:10.3390/d14110957
2. Ellis, V. A., Kalbskopf, V., Ciloglu, A., **Duc, M.**, Huang, X., Inci, A., Bensch, S., Hellgren, O., & Palinauskas, V. (2022). Genomic sequence capture of *Plasmodium relictum* in experimentally infected birds. *Parasites & vectors*, *15*(1), 1-12. doi:10.1186/s13071-022-05373-w
3. Valkiūnas, G., **Duc, M.**, & Iezhova, T. A. (2022). Increase of avian *Plasmodium circumflexum* prevalence, but not of other malaria parasites and related haemosporidians in northern Europe during the past 40 years. *Malaria journal*, *21*(1), 1-11. doi:10.1186/s12936-022-04116-7
4. Hernandez Lara, C., **Duc, M.**, Ilgūnas, M., & Valkiūnas, G. (2021). Massive infection of lungs with exo-erythrocytic meronts in European robin *Erithacus rubecula* during natural *Haemoproteus attenuatus* haemoproteosis. *Animals*, *11*(11), 1-15. doi:10.3390/ani11113273
5. **Duc, M.**, Ilgūnas, M., Kubiliūnaitė, M., & Valkiūnas, G. (2021). First report of *Haemoproteus* (Haemosporida, haemoproteidae) megalomeronts in the brain of an avian host, with description of megalomerogony of *Haemoproteus pastoris*, the blood parasite of the common starling. *Animals*, *11*(10), 1-17. doi:10.3390/ani11102824
6. Valkiūnas, G., Ilgūnas, M., Bukauskaitė, D., **Duc, M.**, & Iezhova, T. A. (2021). Description of *Haemoproteus asymmetricus* n. sp. (Haemoproteidae), with remarks on predictability of the DNA haplotype networks in haemosporidian parasite taxonomy research. *Acta tropica*, *218*, 1-16. doi:10.1016/j.actatropica.2021.105905
7. Hellgren, O., Kelbskopf, V., Ellis, V. A., Ciloglu, A., **Duc, M.**, Huang, X., Lopes, R. J., Mata, V. A., Aghayan, S. A., Inci, A., & Drovetski, S. V. (2021). Low MSP-1 haplotype diversity in the West Palearctic population of the avian malaria parasite *Plasmodium relictum*. *Malaria journal*, *20*(1), 1-9. doi:10.1186/s12936-021-03799-8
8. **Duc, M.**, Ilgūnas, M., & Valkiūnas, G. (2020). Patterns of *Haemoproteus majoris* (Haemosporida, Haemoproteidae) megalomeront development. *Acta tropica*, *212*, 1-7. doi:10.1016/j.actatropica.2020.105706
9. Ciloglu, A., Ellis, V. A., **Duc, M.**, Downing, P. A., Inci, A., & Bensch, S. (2020). Evolution of vector transmitted parasites by host switching revealed through sequencing of *Haemoproteus* parasite mitochondrial genomes. *Molecular phylogenetics and evolution*, vol. *153*, 400-410. doi:10.1016/j.ympev.2020.106947

## **PARTICIPATION IN INTERNATIONAL AND NATIONAL SCIENTIFIC PROGRAMMES AND PROJECTS**

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- 2021-2024 Junior Researcher in the primary project implementer of the group project: „Mechanisms of transmission of avian haemoproteosis“. (Principal investigator Dr. Carolina R.F Chagas. Lithuanian Research Council, grant no. P-MIP-21-76)
- 2020-2022 Junior Researcher in the group project „Determination of vectors transmitting haemoproteid parasites of diurnal raptors“. (Project principal investigator Dr. Bukauskaitė Dovilė. Lithuanian Research Council, grant no. P-MIP-20-217)
- 2019-2022 European Research Council, Advanced Grant (HORIZON). Grant no. [742646](#). Immunity in ecology and evolution: *Hidden' costs of disease, immune function and their consequences for Darwinian fitness*. (Project principal investigator Prof. Dennis Lennart Hasselquist. Subcontract implementor in Lithuania.)

## **INTERNSHIP AND TRAINING**

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- 2023.01.08 – 2023.01.28 Musée national d'Histoire naturelle (MNHN), Paris, France: under SYNTHESYS+ program (FR-TAF\_Call4\_062), access to the haemosporidians collection (Protists) with the application “Comparative research on exo-erythrocytic development of wildlife haemosporidian parasites”.
- 2022.11.20 – 2022.12.10 Natural History Museum (NHM), London, United Kingdom: under SYNTHESYS+ program (GB-TAF-TA4-005), access to the haemosporidians collection (Protists) with the application “Comparative research on exo-erythrocytic development of wildlife haemosporidian parasites”.
- 2021.10.11 – 2021.12.10 University of Veterinary Medicine, Vienna, Austria: to train and learn the technic of chromogenic in situ hybridisation (CISH) for the study of haemosporidian parasites and to improve my skills in histological methods.

## **PARTICIPATION IN SCIENTIFIC CONFERENCES**

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### ***International scientific conferences:***

1. **Duc M.**, Valkiūnas V. Oral presentation: Exo-erythrocytic stages of avian *Parahaemoproteus* (Haemosporida, Apicomplexa) protists: how we study their diversity. – Protistology-UK autumn meeting 2022. December 1<sup>st</sup>-2<sup>nd</sup>, 2022, Natural history Museum, London, United Kingdom.
2. **Duc M.**, Himmel T., Hernández-Lara C., Ilgūnas M., Weissenböck H., Valkiūnas G. Oral presentation: Data on neglected avian haemoproteosis: exo-erythrocytic development of *Haemoproteus* species in naturally infected birds. – 4<sup>th</sup> International Congress on Parasites of Wildlife (ICPOW), September 11-15, 2022, Kruger Park, South Africa.
3. **Duc M.**, Ilgūnas M., Weissenböck H., Valkiūnas G. Poster presentation: Meronts and megalomeronts in avian *Parahaemoproteus* species, which is which and where do they develop? – 5<sup>th</sup> International Conference on Malaria and Related Haemosporidian Parasites of Wildlife, September 05-09, 2022, Bielefeld, Germany.
4. **Duc M.**, Himmel T., Weissenböck H., Valkiūnas G. Oral presentation: New data on exo-erythrocytic development of neglected avian *Haemoproteus* blood parasites (Haemoproteidae, Apicomplexa) – 15<sup>th</sup> International Congress of Parasitology (ICOPA), August 21-26, 2022, Copenhagen, Denmark.
5. **Duc M.**, Treinys R., Bernotienė R., Kazak M., Chagas C. R. F., Bukauskaitė D. Poster presentation: Identified vectors transmitting haemoproteid parasites of diurnal raptors –

15<sup>th</sup> International Congress of Parasitology (ICOPA), August 21-26, 2022, Copenhagen, Denmark.

6. **Duc M.**, Ilgūnas M., Valkiūnas G. Formerly neglected avian haemoproteosis: megalomeronts of *Haemoproteus majoris* develop in different bird species over different seasons. – 9<sup>th</sup> Conference of the Scandinavian – Baltic Society for Parasitology, April 21-23, 2021, online.
7. **Duc M.**, Ilgūnas M., Valkiūnas G. Patterns of *Haemoproteus majoris* (Haemosporida, Haemoproteidae) megalomeront development. – International Online Conference on Blood Parasites of Wildlife, September 14-15, 2020, online.

## **PARTICIPATION IN THE STUDY PROCESS**

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### ***Supervision of bachelor students:***

Monika Kubilinaite Bachelor student, project: „Diversity of exo-erythrocytic 2020 – 2021 megalomeronts of different *Haemoproteus* species in naturally infected wild birds“ (VU, Biologijos studijų programa)

## **OTHERS**

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