



One year postdoctoral fellowship - Tour du Valat,
France

TdV-PostDoc-2021

Demographic costs and benefits of contrasted migratory strategies in an iconic waterbirds species

The **Tour du Valat** is a private foundation working for the research and conservation of **Mediterranean wetlands**. Founded in 1954 by Dr Luc Hoffmann and based in the Camargue, it is at the cutting edge of multidisciplinary fields of research, building bridges between science, management and public policies. The main objective for the Tour du Valat is to change the behavior and decisions made by governments and the wider society in the Mediterranean basin to achieve that wetlands are conserved and sustainably managed towards the future.

The Tour du Valat has internationally recognized scientific expertise, and provides practical responses to problems regarding the conservation and sustainable management of natural resources. The Tour du Valat's projects are carried out in the Camargue and around the Mediterranean basin.

The **Tour du Valat** employs 80 people, including 10 researchers and about 8 Ph.D. or other students.

The "Mediterranean Wetlands Observatory" department at the Tour du Valat develops knowledge to monitor the state and trends of Mediterranean wetlands to provide an evidence base for governance and management decisions. Using a series of themes and indicators, the Observatory produces syntheses on the status and trends of Mediterranean wetlands, analyzes the causes and consequences of changes in a number of parameters including biodiversity and the services provided by wetlands. The Tour du Valat, and the Mediterranean Wetland Observatory in particular, are seeking for ways to improve our strategy for impact in international policy conventions (i.e. Ramsar convention, Barcelona Convention, Convention on Biological Diversity, CMS/AEWA, etc.) and are working in close link with the MedWet initiative (www.medwet.org).



For further information on the **Tour du Valat** visit:
<http://www.tourduvalat.org/en>

The **Tour du Valat** offers a one year postdoctoral fellowship on Demographic costs and benefits of contrasted migratory strategies in an iconic waterbirds species

Objectives of the project

This project aims at assessing the balance of costs and benefits of individual migration strategies in a long lived migratory waterbird species.

Background information

Migration is a fascinating phenomenon that allows birds to exploit peaks in resource abundance throughout their annual cycle. This requires birds to make choices about their migration departure dates and return dates from/to breeding grounds, as well as their wintering destinations. Changes in land use that affect wintering or stopover sites during the annual migratory bird cycle interfere with the optimality of bird decisions. While migratory animals are the fastest declining animals in the world, the loss of wetlands in particular poses a major threat to waterbirds (Bellisario 2018).

Migration is a dynamic and flexible adaptation of birds for optimal use of resources (Newton 2010). There often exists a wide variability of migratory strategies within a species (Grist et al. 2017). For example, while some individuals undertake long migrations, others within the same species migrate at short distances or even remain sedentary. Long migration distance can carry effects on reproductive success such as later arrival at the breeding ground (Lok et al. 2017; Gow et al. 2019). It is well documented that migratory birds arriving first on site have better reproductive success in general (Morrison et al. 2019), although this is not true for all species (e.g. bittern or storks in Poland where first arrivals face extreme events and poor early season reproductive success (Janiszewski et al. 2013; Polak 2016). Hence, an optimal breeding date generally derives from opposite constraints associated to early breeding (Bêty et al. 2003).

In this project we propose to study how the heterogeneity of migratory strategies is maintained within populations by considering the costs and benefits of each strategy in a long-lived iconic waterbirds species: the Greater Flamingo *Phoenicopterus roseus*. This study should allow predicting the relative benefits of these strategies depending on different scenarios of land use and climate change.

Study models

The Greater Flamingo presents high rates of juvenile and adult dispersal among his different breeding colonies in the Mediterranean basin and West Africa (Balkiz et al. 2010). Consequently, birds in the Mediterranean basin (from Turkey to Algeria and Spain) form a single interbreeding population (Geraci et al. 2012). In France, flamingos are partial migratory, part of the population remains wintering in the South and Occitania regions while others winter at intermediate distances in Spain and Italy or cross the Mediterranean to reach North Africa or West Africa. It has been shown that while the survival of flamingos in France was better at young age in North Africa, this trend was reversed after the age of three (Sanz-Aguilar et al. 2012). This species nests late and synchronously, which would leave the long-distance migrants the time to find a partner and participate in the reproduction. Nevertheless, exploratory analyses suggest that long distant migratory flamingos have a lower probability of nesting and reproductive success in the Camargue than sedentary ones.

Methods

Several thousand individual flamingos have been marked with PVC rings. These ringing operations of juveniles with remotely readable rings have made it possible to collect thousands of observations of these individuals along each phase of their annual cycle, including on the breeding ground and wintering grounds.

Based on these long-term data sets, we will carry out a comparative study according to the strategies undertaken. Multi-event models using the E-SURGE software developed at CEFE-CNRS in Montpellier will be used to analyze resighting data (Pradel 2005). These models make it possible to take into account the heterogeneity (in terms of age, sex, strategy) within the population.

More than 30,000 juveniles were ringed in France since 1977 and re-observed across the Mediterranean until 2020 (~500,000 re-observations). We will take into account individual information (sex, body condition at fledging) and assess the probability of recruitment and breeding success of flamingos in France and elsewhere in the Mediterranean according to their wintering site.

Expected candidate profile

We are looking for a highly motivated post-doc with interest in population dynamics and demography models. Applicants should have good background in ecology as well as solid mathematical and computational skills. Previous experience using E-SURGE would be a plus. Excellent written, verbal, and interpersonal skills are desirable. Speaking French is not mandatory but the candidate should be comfortable with working in the Camargue and in a French environment.

The position is for one year. Starting date is 1st March 2021, but some flexibility can be arranged.

Due to health situations, the post-doctoral position could start remotely and the situation could change over the year with the presence of the post-doctoral fellow on the Tour du Valat site when the situation allows it. Discussions will take place on the organization, in particular on the frequency of videoconferencing and face-to-face exchanges.

Gross monthly salary is 2500 €/month.

To apply please submit i) a cover letter summarizing research interests and expertise; ii) a CV including a list of publications; names and contact information of two references, all in a single pdf document sent to both:

Florence.Daubigney@tourduvalat.org

Application deadline is 14th February 2021 but application review will continue until the position is filled. The pre-selected candidates will be invited for an interview by videoconference.

Expected Productions

- Two articles in international peer-reviewed ecology journals are expected.
- Participation in an international symposium.

Supervision of the postdoc

Arnaud Béchet: Research Director at the Tour du Valat, French qualification to supervise research (HDR).

Jocelyn Champagnon: Researcher at Tour du Valat.

Références

- Balkiz Ö, Béchet A, Rouan L, et al (2010) Experience-dependent natal philopatry of breeding greater flamingos: Natal philopatry in adult flamingos. *Journal of Animal Ecology* 79:1045–1056. <https://doi.org/10.1111/j.1365-2656.2010.01721.x>
- Bellisario B (2018) Conserving migration in a changing climate, a case study: The Eurasian spoonbill, *Platalea leucorodia leucorodia*. *Biological Conservation* 217:222–231. <https://doi.org/10.1016/j.biocon.2017.11.013>
- Bêty J., Gauthier G., Giroux J. 2003. Body Condition, Migration, and Timing of Reproduction in Snow Geese: A Test of the Condition-Dependent Model of Optimal Clutch Size. *The American Naturalist* 162:110–121. doi: 10.1086/375680
- Gow EA, Knight SM, Bradley DW, et al (2019) Effects of Spring Migration Distance on Tree Swallow Reproductive Success Within and Among Flyways. *Front Ecol Evol* 7:380. <https://doi.org/10.3389/fevo.2019.00380>
- Grist H, Daunt F, Wanless S, et al (2017) Reproductive performance of resident and migrant males, females and pairs in a partially migratory bird. *Journal of Animal Ecology* 86:1010–1021. <https://doi.org/10.1111/1365-2656.12691>
- Janiszewski T, Minias P, Wojciechowski Z (2013) Reproductive consequences of early arrival at breeding grounds in the White Stork *Ciconia ciconia*. *Ornis* 60:280–284. <https://doi.org/10.1080/00063657.2013.778227>
- Lok T, Veldhoen L, Overdijk O, et al (2017) An age-dependent fitness cost of migration? Old trans-Saharan migrating spoonbills breed later than those staying in Europe, and late breeders have lower recruitment. *Journal of Animal Ecology* 86:998–1009. <https://doi.org/10.1111/1365-2656.12706>
- Morrison CA, Alves JA, Gunnarsson TG, et al (2019) Why do earlier-arriving migratory birds have better breeding success? *Ecology and Evolution* 9:8856–8864. <https://doi.org/10.1002/ece3.5441>
- Polak M (2016) Nest survival patterns in Eurasian Bittern: effect of nest age, time and habitat variables. *PeerJ* 4:e2047. <https://doi.org/10.7717/peerj.2047>
- Pradel R (2005) Multievent: an extension of multistate Capture-Recapture models to uncertain states. *Biometrics* 61:442–447. <https://doi.org/10.1111/j.1541-0420.2005.00318.x>
- Sanz-Aguilar A, Béchet A, Germain C, et al (2012) To leave or not to leave: survival tradeoffs between different migratory strategies in the Greater Flamingo. *Journal of Animal Ecology* Early view: <https://doi.org/10.1111/j.1365-2656.2012.01997.x>