



## STAGE DE RECHERCHE M2 ECOLOGIE EVOLUTION GENOMIQUE

Rentrée 2020

---

### **Does male reproductive senescence trigger age-specific mating tactics in female roe deer?**

**Contacts** : Jean-François Lemaître ([jean-francois.lemaitre@univ-lyon1.fr](mailto:jean-francois.lemaitre@univ-lyon1.fr)) et Jean-Michel Gaillard ([jean-michel.gaillard@univ-lyon1.fr](mailto:jean-michel.gaillard@univ-lyon1.fr))

**Laboratoire** : Université Claude Bernard Lyon 1, Laboratoire de Biométrie et Biologie Evolutive (UMR CNRS 5558) Villeurbanne

**Summary**: Female's mating tactics display a wide range of variation in animals, both within and among populations. In polytocous species, females can maximize fitness not only by choosing the best males, but also by increasing the genetic diversity of their offspring. As a consequence, multiple paternities within a single litter or brood have been regularly documented, even if the rate of multiple paternity varies a lot among and within populations. So far, the ecological factors and selective pressures responsible for this intra-specific variation remain poorly understood. Under current theories on life-history evolution, females should seek multiply-sired litters or broods when the benefits of multiple paternity (either directly through fertilization insurance or indirectly through genetic incompatibility avoidance) outweigh their costs. However, the costs and benefits of multi-paternity for female should vary according to both their phenotypic attributes and the ecological context. In this project, we will investigate the influence of female's age (that strongly influence phenotypic performance in most mammals) on individual variation in the magnitude of multiple paternity in two populations of roe deer (*Capreolus capreolus*) subjected to markedly different environmental context. In both populations, roe deer have been monitored for more than 40 years, and multi-generational pedigrees are available.

In these roe deer populations, we previously reported that males suffer from reproductive senescence (e.g. smaller antlers in the old males) and that oldest females avoid to mate with the old males. This mating tactic might be adaptive because oldest females should avoid paying the cumulative cost of their own reproductive senescence and of that of their partner. Therefore, old males can only mate with young females. As female roe deer can play an active role in mate choice by making short rut excursions, we predict that young adult females should display more multiple mating than old ones.

Overall, the objectives of this project will be twofold: (i) performing a thorough assessment of male reproductive senescence in roe deer by analysing the age-specific variation in antler length) and (ii) analysing how age influences the propensity of females to initiate multiple mating.

#### **References:**

- Birkhead, T (2000). *Promiscuity. An evolutionary history of sperm competition*. Harvard university Press.
- Jennions, M.D. & Petrie, M. (2000). Why do females mate multiply? A review of the genetic benefits. *Biological Reviews*, 75, 21–64.

Lemaître, J.-F. & Gaillard, J.-M. (2017). Reproductive senescence: new perspectives in the wild: Reproductive senescence in the wild. *Biological Reviews*, 92, 2182–2199.

Lott, D. F. (1991). *Intraspecific variation in the social systems of wild vertebrates*. Cambridge University Press, Cambridge.

Vanpé C, Gaillard J-M, Kjellander P, Mysterud A, Magnien P, Delorme D, Van Laere G, Klein F, Liberg O, Hewison AJM. 2007. Antler size provides an honest signal of male phenotypic quality in roe deer. *The American Naturalist* 169: 481–493.

Vanpé, C., Gaillard, JM., Quéméré, E., Hewison, AJM, Kjellander, P., Pellerin M., Lemaître, J.-F. 2019. Old roe deer females rarely mate with old males in roe deer *Capreolus capreolus*. *Biological Journal of the Linnean Society* 128:515-525.