Université Sorbonne Paris Nord

LEEC | Laboratoire d'Ethologie Expérimentale et Comparée

PhD position: Sexual signals in hermaphroditic worms and their evolution during the transition between hermaphroditism and separate sexes

Communication between the two sexes is crucial at reproduction and a huge amount of research has focused on sexual signals, such as pheromones, visual displays and bodily parades, that males and females use in the context of mating. This topic has been investigated mainly on animals with separate sexes. However, hermaphroditism is almost ubiquitous among animal taxa and more than 65000 hermaphroditic species exist. Hermaphroditic organisms have the two sexual functions tied together in the same body; they are able to produce both female and male gametes, and do it either at the same time (simultaneous hermaphrodites), or at different times during their life (sequential hermaphrodites).

How do sexual signals work in hermaphroditic species? Indeed, many species do not self-fertilize: individuals need to attract a partner, mate and exchange gametes to get their eggs fertilized. What implications does the hermaphroditic lifestyle have on signals and cues used to attract mates? Given their two sexual functions, what information are hermaphrodites signaling to attract mates, and what sex are they advertising the most? What quality are hermaphrodites advertising to their partners? At what extent do sexual signals in hermaphrodites convey honest information, as opposed to manipulative substances to force partners into overexpressing the less preferred sex?

These questions have been rarely addressed in sexual selection research. This timely PhD project plans to meet these goals performing **behavioral tests, transcriptomic and chemical analyses** using the polychaete worms of the genus *Ophryotrocha* as biological models. As this genus includes simultaneous, sequentially-hermaphroditic and separate sex species (all strictly unable to self-fertilize their eggs), the comparative analyses will allow to investigate the evolution of sexual signals as sexual systems diversify.

Picchi L., Lorenzi M.C. 2019. Gender-related behaviors: evidence for a trade-off between sexual functions in a hermaphrodite. Behavioral Ecology 30: 770-784.

Santi M., Picchi L. Lorenzi M.C. 2018. Dynamic modulation of reproductive strategies in a simultaneous hermaphrodite and the preference for the male role. Animal Behaviour 146: 87-96.

Picchi L., Cabanes G., Ricci-Bonot C., Lorenzi M.C. 2018. Quantitative matching of clutch size in reciprocating hermaphroditic worms. Current Biology 28: 3254-3259.e3.

Lorenzi M.C., Sella G. 2013. In between breeding systems: Neither dioecy nor androdioecy explains sexual polymorphism in functionally dioecious worms. Integrative and Comparative Biology 53: 689-700.

Supervisor: Prof. Maria Cristina Lorenzi

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Requirements: A completed University Master's degree in biology. We welcome applications from enthusiastic and highly motivated students with a background/strong interest in behavioral ecology; good basic knowledge of statistics and experimental design; proficiency in spoken and written English; good team-working and communication skills; ability to work independently. Completed projects/internships on topics relevant to the research area are advantageous.

How to apply: Applications should be sent to Maria-Cristina Lorenzi (lorenzi@univ-paris13.fr and in cc mariacristinalorenzi@gmail.com). including: letter of interest, CV, a short research plan proposal and recommendation letters from previous supervisors.

Applicants are strongly encouraged to make an informal enquiry beforehand by contacting Maria-Cristina Lorenzi via email ASAP.

First-step deadline: 31st May 2020.