

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

Sexual selection is a central topic in behavioral ecology and is usually associated with male and female reproductive success. Communication between the two sexes is crucial at the moment of 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, mainly on animals with separate sexes. Although most animals have separate sexes, 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, and produce female and male gametes either at the same time (simultaneous hermaphrodites), or at different times during their life (sequential hermaphrodites).

How does communication between sexes work in hermaphroditic species where individuals need to mate with partners to fertilize their eggs? What implications the hermaphroditic lifestyle has on signals and cues used to attract mates? What quality are hermaphrodites advertising to their partners? Given their two sexual functions, what information are hermaphrodites signaling to attract mates, and what sex are they advertising the most? At what extent do sexual signals produced by 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 using the polychaete worms of the genus *Ophryotrocha* as biological models. This genus includes simultaneously and sequentially hermaphroditic species (all strictly unable to self), as well as species with separate sexes, making it possible to explore 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; proficient 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.