> JEUDI 16 SEPTEMBRE 2021, 13h45 \ 14h30

Study of the reproductive biology and chemical communication in the sea cucumber *Holothuria arguinensis*

New sea cucumber fisheries are emerging in the Mediterranean Sea and Atlantic Ocean in response to a strong Chinese market demand. However, little is known about the biology of the new target species, hindering decisions on their management. The main objective of my thesis was to study the reproductive biology and the role played by chemical communication and chemosensory systems in *Holothuria arguinensis* and *Holothuria mammata*. The different populations sampled in a narrow range along the Iberian Peninsula varied in size/weight, gonadal production, and maturity profile within each species, suggesting the influence of singular features of each location. However, they had all the same general reproductive pattern with a summer-autumn spawning. These results, essential to manage populations, were also useful to determine when to develop bioassays to test whether and how these species communicate during reproduction. Male sea cucumbers, but not females, release chemicals that attract and induce spawning in both sexes. A preliminary analysis of the male spawning water suggests a pheromone with multiple components, among them possibly phosphatidylcholine derivatives. Histology, histochemistry and immunohistochemistry of the potential chemosensory structures involved in the detection of these cues – tentacles, papillae and tube feet – show no obvious differences between them. However, the disc was the most specialized area, with a specific nerve arrangement, rich in nitric oxide synthase and containing numerous cells some of which are likely sensory neurons. The analysis of tissue transcriptomes revealed the presence of at least 246 G-protein-coupled receptors among them at least 57 putative odorant receptors distributed mainly in the tentacles, oral cavity, calcareous ring and, papillae and tegument. Overall, this thesis gives valuable insights for sea cucumber fisheries management in the region and a better understanding of how sea cucumbers communicate during reproduction.

par **Nathalie MARQUET** *Post-doctorante au CCMAR (Faro, Portugal), et future post-doc MARBEC en janvier 2022*

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@ contacts

myriam.callier@ifremer.fr
sylvie.lapegue@ifremer.fr
laura.megevand@umontpellier.fr
celine.reisser@ifremer.fr