

NORIT PROJECT

Incidence of Norway lobster (*Nephrops norvegicus* L.) emergence activity rhythms on its population assessment.

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The Norway lobster, *Nephrops norvegicus* (L.) is a decapod crustacean inhabiting complex burrow systems in muddy continental shelves and slopes on the European waters of the Atlantic Ocean and Mediterranean Sea. This species is object of an important multispecific fishery in the Mediterranean, showing signs of overexploitation. Animals of this species show marked behavioural rhythms of emergence in the field. Emergence is performed under an optimum light intensity whose timing varies at different depths depending upon light penetration into the water column and hence upon the sun position. Present data indicate that not all the individuals emerge from their burrows at a circadian basis. Thus, part of the population remains inside their burrows even at the timing when the optimum light intensity occurs. It is hypothesized that other factors such as animals' size and the sexual stage, as well as the presence of food, other conspecifics, the level of anoxia in the substratum, jointly with the photoperiod length, may co-modulate the emergence in a nowadays unknown manner. The final objective of this proposal is to measure, and to quantify, the emergence rhythms of the Norway lobster (*Nephrops norvegicus* L.) for the different parts of its population, in response to different environmental variables, and thus obtaining a database for a more precise evaluation of this resource.

This proposal is based on a multidisciplinary and integrative approach since it relates physiological aspects underlying emergence at the level of the individual (melatonin as the photoperiod hormone, anoxia, food deprivation, etc.), with aspects of population dynamics at level of fishery (evaluation of the population). The proposal relies on the technology required for behavioural measures. Telemetric systems will be developed for the remote and continuous data collection on individual movements for applications in the laboratory and also in field areas. The team is multidisciplinary: the

biological expertise will be provided by researchers specialised on behaviour and physiology of this species (ICM-CSIC) while the engineering know-how will be provided by experts in telecommunications (SARTI-UPC). These members are considered experts in a series of techniques that can be proficiently applied to the present case of study: remote sensing, automated data acquisition (including filtering and elaboration), telemetry and video image analysis. Both teams are integrated in the Unidad Asociada Tecnoterra. This proposal will be developed as follow: a first year of preparation and technological setup, a second year of biological experimentation and a third year of analysis and presentation of results. This is a realistic temporal schedule in order to accomplish the proposed objectives. In the present planning, a strong warranty of success is given by the accomplishment of the technological objectives since those are integrated but at the same time, independent from the scientific ones. This last point assures the achievement of specific results at the end of this project. It should be considered also that an earlier good starting up of the technological setup will make easier the automation of data acquisition from the experiments with the consequent increase in results performance and reliability of data treatment. Also, some of the proposed new measuring techniques are important since they will be developed with the ultimate goal of their application in field studies. The development of new systems of remote data acquisition and their integration and adaptation into the already existing ones, will allow us to obtain smaller, better manageable and less aggressive devices for behavioural monitoring. With these new systems of probes and receiving hardware a reduced level of stress to animals will be achieved, a fundamental factor to measure all different aspects of behavioural repertoire of this species connected with their emergence. All these technological innovations will increase the possibilities of observation in future studies.