

# Journal of Biological Research

Bollettino della Società Italiana di Biologia Sperimentale



**Primo simposio di Biologia Sperimentale  
applicata al mare e all'ambiente**

*First symposium on experimental biology:  
sea and environment*

Trapani, Italy, 24-25 May 2019

ABSTRACT BOOK

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enforced MPAs can increase density, size and reproductive potential (gonad weight) of *P. lividus*, often important for the local economy. We examined the effects of *P. lividus* recreational harvesting on the species itself on rocky substrates of Ustica Island MPA. We compared the average density, size structure and gonad weight of *P. lividus* recorded at protected (no take zone) and fished sites (take zone C) in summer 2017 and 2018. *P. lividus* was always larger and more abundant at the protected sites than the fished ones. Results suggest that stronger management measures should be adopted by managers of MPAs to accomplish conservation of wild *P. lividus* populations also in the take zones.

### HOW MANY NON INDIGENOUS SPECIES HAVE SPREAD ALONG ITALIAN COAST? THE ROLE OF SICILY AS CROSSROAD FOR MARINE BIOINVASIONS

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A recent paper by Servello *et al.* (2019; doi: <http://dx.doi.org/10.12681/mms.18711>), which involved the Taxonomy Lab of the University of Palermo, examined the state of art of the marine alien species in Italy. The research aimed to contribute to the effectiveness of descriptor of the marine strategy framework directive which contemplate the marine alien species presence in the Mediterranean Sea. More than two hundred non indigenous species have been counted, highlighting the threats towards the Mediterranean habitats. One hundred and eighty non indigenous species have established stable populations in Italian Seas; forty-four new alien species were recorded. Approximately half of the NIS recorded in Italy have most likely arrived through the transport-stowaway pathway related to shipping traffic. The actual non indigenous species distribution hotspots is located in the Adriatic Sea, Venice, which accounts for the highest number of alien taxa. In the Ionian Sea and Central Mediterranean Sea, Taranto and Catania can be considered hotspots as well. In the Western Mediterranean Sea, bioinvasion hotspots are the Gulfs of Naples, Genoa and Livorno. Regarding the Strait of Sicily it has been outlined its role as crossroad between alien taxa from the Atlantic Ocean and the Indo-Pacific area. Species as the kyphosids, or the mussel *Brachidontes sp.*, or some caprellids inhabit different habitats; however they have been recorded for the first times in the Sicilian coasts. The role of Sicily Island as sentinel for Mediterranean bioinvasions is discussed.

### A NEW SUSTAINABLE FEED BASED ON AGRICULTURAL WASTES AND FISHING INDUSTRY DISCARDS FOR THE SEA URCHIN *PARACENTROTUS LIVIDUS*

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Main goal of the echinoculture is the production of sea urchin gonads able to satisfy the market demands both qualitatively and quantitatively, and to reduce the impact of the harvesting pressure on natural populations. Moreover, the ingredi-

ents more frequently used for feed production, such as algae, vegetable meal, and oils and fishmeal, lead to further exploitation of natural resources, that are already stressed by human activities. To move towards a higher sustainability of echinoculture, this study proposes a new feed with a low environmental impact through the reuse of wastes and discards from the food industry. Two experimental formulations were obtained using endive (*Cichorium endivia*) market waste and anchovy (*Engraulis encrasicolus*) industry discards in different proportions, plus agar as a binder. After a preliminary evaluation of the feed stability, palatability and nutritional value, the two formulations were administered for 3 months to *Paracentrotus lividus* reared indoor. Gonads were analysed and compared between reared and wild sea urchins across time in terms of gonad somatic index, colour and fatty acids. At the end of experiment, all reared sea urchins showed a better gonad colour and a higher gonad somatic index and nutritional quality (PUFA,  $\omega$ -3/ $\omega$ -6) than wild specimens. Moreover, the formulation with a higher proportion of animal ingredient (60/40) showed the best performances in terms of gonad somatic index and colour, key factors in the assessment of the gonad commercial value. Therefore, the new feed, and especially the 60/40 formulation, represents a commercially valuable product.

### A NEW COELOMIC CELL POPULATION IN THE REGULAR SEA URCHIN *ARBACIA LIXULA*: IMPLICATIONS FOR SEA URCHIN PHYSIOLOGY

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Phagocytes, vibratile cells and red and colorless spherulocytes are accepted as the only circulating coelomocytes in echinoids. Here, based on live and stained preparations, we characterize the cells of the echinoid *Arbacia lixula* and a new spherulocyte is described. Living cells were analyzed immediately after collection. Cytological preparations were made using a cytocentrifuge (10<sup>5</sup> cells per spot, 80 × g/5 min), fixed in formalin vapor and stained with Mallory's trichrome (MT) or toluidine blue (TB). Phagocytes are large cells with filiform or bladder-like expansions with no special affinity to stains, while vibratile cells are round coelomocytes with a remarkable flagellum and stain purple (weak metachromasia) with TB. Red spherulocytes are round cells filled with uniform-sized red vacuoles, which do not stain with MT, but show a brownish color. Colorless spherulocytes are elongated cells, filled with heterogeneous-sized colorless vacuoles, which stain light blue with MT. The new coelomocyte, named as granular spherulocytes, is a small rounded cell, with homogeneous-sized colorless spherules, which stain bright pink with MT. Phagocytes, red and colorless spherulocytes perform the most important immune functions in echinoids (*i.e.* phagocytosis, antibacterial activity and cytotoxicity, respectively), while vibratile cell's function remain is under debate. A cell similar to *A. lixula*'s granular spherulocyte was described in *Eucidaris tribuloides*, however its function remains unknown. The new cell observed here shows the need for more accurate studies on sea urchin coelomocytes. Additionally, two important questions are raised: Are granular spherulocytes common in other sea urchins? What is the physiological function of this cell?