

# ASSESSMENT OF CHEMICAL CONTAMINATION OF MALTA AND LAMPEDUSA COASTAL WATERS BY MEANS OF ACTIVE MUSSEL WATCH

A. Scarpato <sup>1\*</sup>, G. Romanelli <sup>1</sup>, E. Azzurro <sup>1</sup>, M. Amici <sup>1</sup>, V. Perini <sup>1</sup>, A. Cozzolino <sup>1</sup>, F. Novelli <sup>1</sup>, R. Di mento <sup>1</sup>, R. Parravano <sup>1</sup>, P. Giordano <sup>1</sup>, R. Piermarini <sup>1</sup>, A. Cento <sup>2</sup> and V. Axiak <sup>3</sup>

<sup>1</sup> ISPRA, Istituto Superiore per la Protezione e la Ricerca Ambientale, 00166, Rome, Italy - alfonso.scarpato@isprambiente.it

<sup>2</sup> PSTS S.c.p.a., Parco Scientifico e Tecnologico della Sicilia, 95030 Catania, Italy

<sup>3</sup> Department of Biology, University of Malta, 2080

## Abstract

In the frame of Italia-Malta community initiative program (the 'MonItaMal' project), the active mussel watch was used to evaluate the chemical contamination of Malta, Lampedusa and Linosa coastal waters. This study was carried out during 2006-2007 together with analysis of sediments. The concentration of heavy metals, TBT, PHs, DDTs, PCBs, and pesticides was assessed, providing a snapshot of the contamination levels in the Sicily channel.

*Keywords: Bivalves, Chemical Analysis, Monitoring*

## Introduction

The mussel watch methodology is a widely used technique to monitor the levels of a large array of contaminants and biochemical parameters in marine coastal waters [1]. It is based on the ability of the mussels to concentrate chemical contaminants in their tissues in relation to their presence in the environment. Monitoring the quality of the coastal marine environment is an action recommended by the European Union, together with the preservation of habitats and their biodiversity. Malta and Lampedusa belong to different countries, but these two islands are located in the same geographical sector, the Sicily channel, and the adoption of common methodologies for environmental control is strongly advised by the UE.

## Materials and methods

During 2006-2007, according with a standardized mussel watch protocol, a total of 43 mussel cages were deployed in 11 locations subjected to a different anthropogenic impact. In Malta, the mussel locations were in proximity of the marine protected area of Gnejna, close to sewage outfalls of Cumnija and Xghajra; in Lampedusa, locations were in proximity of the main harbor and within the protected area (A zone); in Linosa, an island characterized by a minimum anthropogenic pressure, 2 locations were considered (Fig.1).

Sediments and water samples were analyzed in order to fully characterize the study areas. Analyses of PAHs (16 EPA), PCBs (10 congeners), OC pesticides (pp'-DDT and its metabolites, HCHs, HCB, Aldrin, Dieldrin), heavy metals (Hg, Cd, Pb, Cu, Zn), TBT on mussel and sediment were realized by means of standardized laboratory methods.

## Results and Discussion

Mussel cages recovery was of 70%. Results of heavy metals analysis were generally comparable between the three island, with no significant differences between Lampedusa Malta and Linosa. However, high levels of contaminants were found in correspondence of Xghajra (Malta), were metals, especially Hg, Pb e CU, had higher concentrations (up to ten times higher) with respect to background levels [1].

Mean TBT levels resulted of 2.53ng Sn/g w.w. In Malta, 0.43ng Sn/g w.w. at Lampedusa whilst in Linosa these compounds were not detected. Their degradation products (DBT e MBT) resulted to be significantly higher in Malta than in Lampedusa and Linosa.

PCB and pesticide contamination appeared to be low in both islands with levels comparable to the ones of Linosa. The maximum concentration of PCBs was of 30 ng/g d.w..

As for DDTs, the metabolites DDD and DDE were the main components. On the whole, the mean DDTs levels of Malta and Lampedusa (the maximum value was of 13-14 ng/g d.w. on both islands) confirmed those obtained from other mussel watch projects that used the same methodology in the same study area [1]. Nevertheless in correspondence of Xghajra, concentrations of 8 ng/g d.w. were detected. Similar levels of DDTs are known for highly polluted areas such as Naples, Barcelona and Marseille (Scarpato, unpublished data). Sediment analyses confirmed the mussel watch results, with the area of Xghajra presenting the highest values for metals (especially Hg and Cu), TBT and related degradation products (DBT and MBT).

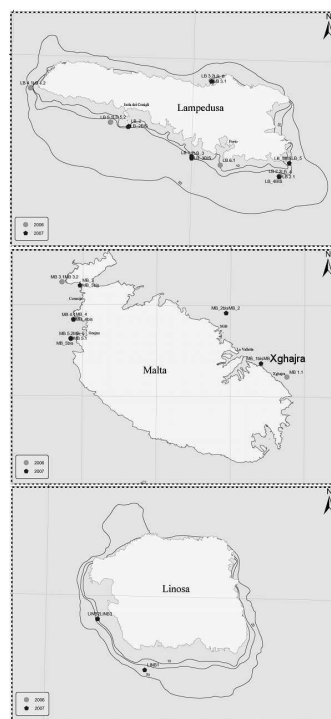


Fig. 1. Sampling stations

## References

- 1 - [1]. Andral B., Stanisiere J.Y., Sauzade D., Damier E., Thebault H., Galgani F. and Boissery P., 2004. Monitoring chemical contamination levels in the Mediterranean based on the use of mussel caging. *Mar Pol Bull*, 49: 704-712.