

## PERSEUS Training Course: “Biochemical biomarker techniques for the assessment of pollution effects in marine organisms”

Host institute: HCMR

Responsible scientist: Catherine Tsangaris

Scientist: Evangelia Stroglyoudi

Technician: Despina Kaparou

Date: 13/5/2013-21/6/2013

The training on the topic “Biochemical biomarker techniques for the assessment of pollution effects in marine organisms” was implemented under the PERSEUS training visits scheme 2013/2014, in two subsequent training periods of three weeks duration in May-June 2013. A total of 8 trainees participated, 4 of which attended each training period.

The training is relevant to PERSEUS WP2 subtask 2.3.4 and MSFD descriptor: D8 Contaminants and pollutions effects. Training was provided on biochemical techniques i.e. metallothionein content, acetylcholinesterase, catalase and glutathione-S-transferase activities, as biomarkers of pollutant exposure and/or effects. The goal was to provide research training and technical assistance to individuals to promote collection of data on biomarkers of pollution from areas where relative information is poor. The trainees were invited to provide samples from their regions and apply common analytical protocols to assess biochemical biomarkers in different SES sub regions.

Prior to the training visits, guidelines on sampling and sample preparation were communicated to the participants in order to collect indicator organisms from their regional sampling sites including reference and contaminated sites (2-4 sites per participant). Sampling was performed by the participants during May 2013 and the samples were transferred to HCMR for analysis during the training visits. Samples of indicator organisms (mussels or fish) from seven areas were collected, and the participants brought them for analysis to HCMR.

| Area   | Indicator species  | Number of sites |
|--|--|-----------------|
| Slovenian coast, North Adriatic Sea          | <i>Mytilus galloprovincialis</i>                           | 4               |
| Saronikos Gulf, Aegean Sea                   | <i>Mytilus galloprovincialis</i>                           | 4               |
| Cyprus coast, Levantine Sea                  | <i>Brachidontes pharaonis</i> and <i>Mullus surmuletus</i> | 4               |
| Apulia coast, South Adriatic Sea, Ionian Sea | <i>Diplodus sargus sargus</i>                              | 3               |
| Venice lagoon, North Adriatic Sea            | <i>Mytilus galloprovincialis</i>                           | 2               |
| Constanta, Black Sea                         | <i>Mytilus galloprovincialis</i>                           | 2               |
| Gelendzhik and Strait of Kerch, Black Sea    | <i>Mytilus galloprovincialis</i> and <i>Rapana venosa</i>  | 2               |

The first week of the course included lectures and laboratory demonstrations of the biomarker techniques using samples provided by the course organizers (given and directed by C. Tsangaris and E. Stroglyoudi). A general introduction of the use of biomarkers in biomonitoring and the detailed procedures, for metallothionein, acetylcholinesterase, catalase and glutathione-S-transferase both in theory and practice were presented. The protocols on the biomarker analyses were distributed to the participants. After laboratory demonstrations the participants were actively involved in the analyses. During the second and third week of the course, the participants were split in working groups and analysed their samples under the supervision of the HCMR scientists. On completion of the analyses, data were compiled and processed. Two days were dedicated to the initial assessment of the results, guidance on the preparation of the course's reports and discussions on the preparation of a common publication. A draft outline on the common publication has been laid and specific tasks have been assigned to the participants for the preparation of the publication.

The course programme run for two training periods from 13/5-31/5 and from 3/6-21/6.

The first group of scientists who participated from 13-31 May was:

- Andreja Ramsak, National Institute of Biology, Marine Biology Station, Slovenia
- Alisa Kosyan, Southern branch of P.P. Shirshov Institute of Oceanology of RAS; A.N. Severtsov Institute of Ecology and Evolution of RAS
- Irina Catianis, National Research and Development Institute for Marine Geology and Geoecology-GeoEcoMar- Bucharest, Romania
- Serena Felling, Laboratory of Zoology and Marine Biology, Department of Biological and Environmental Science and Technology, University of Salento

The second group of scientists who participated from 3-21 June was:

- Valentina Coatu, National Institute for Marine Research and Development "Grigore Antipa" Constantza, Romania
- Yiota Lazarou, Oceanography Centre, University of Cyprus
- Vanessa Moschino, Institute of Marine Sciences - ISMAR - CNR
- Rana Abu Alhaija, Energy, Environment and Water Research Center (EEWRC) of The Cyprus Institute

In addition, 2 scientists participated with their own expenses in the course: Suzanna Karvalho from KAUST (King Abdulah, University of Science and Technology) supported herself and attended the core of this training (2 weeks) supported by KAUST and Leyla Bordbar, a PhD Student from University of Athens, Department of Chemistry, Laboratory of Environmental Chemistry.

## **Programme of the Visit**

### Week 1: Lectures and demonstrations

“General concepts on the use of biomarkers for pollution assessment”

“The use of Metallothioneins (MTs) as biomarker of heavy metal exposure for pollution assessment”

“Basic concepts of methodology for the determination of MT content”

“The use of acetylcholinesterase (AChE), catalase (CAT) and glutathione-S-transferase (GST) as biomarkers for pollution assessment”

“Basic concepts of methodologies for the determination of AChE, CAT and GST activities”

Week 2 and Week 3: Analyses of participant’s samples Data processing, statistical analysis and Preparation of draft reports and draft common publication outline.