

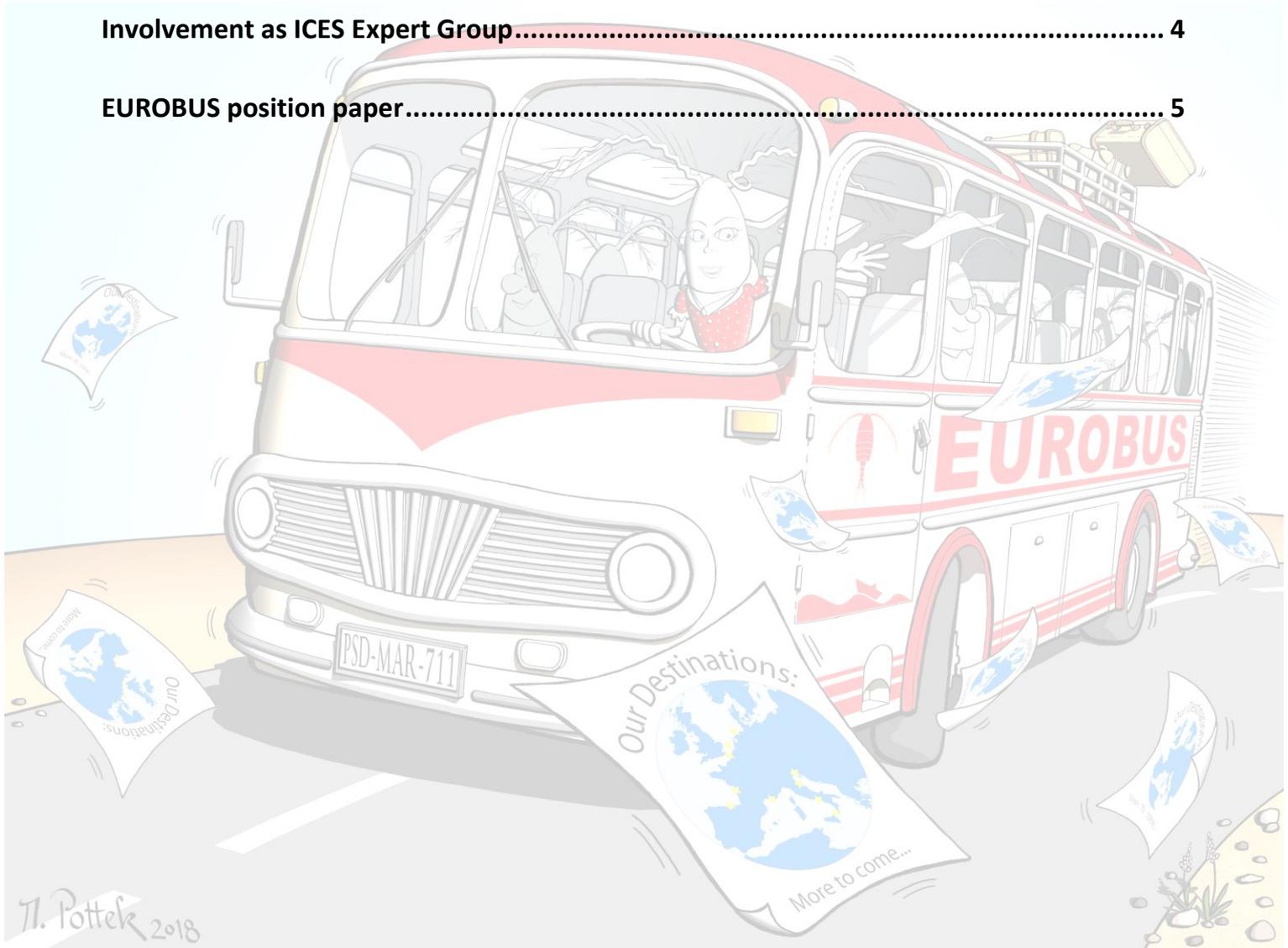
EUROBUS

Towards an EUROpean OBservatory of the invasive
calanoid copepod *Pseudodiaptomus marinUS*

Stazione Zoologica Anton Dohrn
Naples, Italy 29-30 January 2018

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Summary of the presentations

The first part of the meeting was dedicated to the presentations of the different rapporteurs. The majority of the presentations were centred on the occurrence of *Pseudodiaptomus marinus* in areas with different environmental conditions: coastal/neritic areas (Southern North Sea, Baltic Sea, Southern Tyrrhenian Sea, Adriatic Sea, Black Sea), estuaries (Bilbao estuary, Mondego estuary), lagoons (Berre lagoon, Lake Faro, Lake Fusaro, Venice lagoon). The diversity of site typologies and environmental conditions, together with multiple means of introduction (ballast waters, aquaculture), underline the great invasive potential of *P. marinus*, allowing this species to inhabit a wider gamut of environments compared to other *Pseudodiaptomus* species. The presentations have also focused on specific behavioural and physiological traits supporting the ability of this species to survive in different conditions. In addition, first evidences derived from molecular approaches on this species have been presented, mostly in terms of ITS2 sequencing.

Should the rapporteurs agree, it might be useful to share all presentations among EUROBUS participants. The slides might be hosted on ICES platform, made available upon endorsement of the initiative.

Open discussion & future perspectives

The open discussion session on the evening of the first day and on the second day of the workshop provided food for thought on several aspects related to the study of *P. marinus*. The first topic discussed was related to the sampling strategies employed. None of the participants is/was involved in a project dedicated to *P. marinus* and the data presented were obtained from zooplankton samples collected in several different projects. Depending on the site and on the research programme, different methods were employed, nonetheless the majority of the samplings were carried out by plankton nets towed by vertical/oblique/horizontal hauls. In addition, samplings were not performed at the same time of the day and were mainly concentrated during the day. These procedures do not allow to sample in the first meters above the bottom where probably *P. marinus* is more abundant during the day time. Such discrepancies cannot be easily addressed, as they would require the redesign of ongoing activities. Heterogeneity was reported also for environmental parameters (e.g., T and S): vertical integration of the variables, surface values or measurements at the same depth of zooplankton collection. It was suggested to emphasize these differences in order to highlight potential sources of inhomogeneity among sites. A starting idea in future project calls is the standardization of the sampling protocol

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for *P. marinus* in different areas, at least in some key moments of the year. It was also suggested to improve the existing table used to screen the occurrence of *P. marinus* in the EUROBUS framework by specifying the sampling strategy used, so as to make the information more complete.

The discussion then focused on the possible uses of *P. marinus* to applied research. This species has a demonstrated ability to grow and reproduce in the laboratory, making it eligible as target species in ecotoxicological studies. In addition, *P. marinus* has the potential to be used as food in aquaculture farms. As such, ideas on possible rearing experiments and on analysis of the nutritional value of *P. marinus* were put forward.

A general consensus on the need of submitting project calls was underlined by all participants. Some possible calls have been identified in the framework of H2020, particularly in consideration of new openings due in the next months, but the necessity of investigating also other levels of funding (e.g., national projects, transnational/bilateral calls, etc.) has been underlined as well. The participants agreed to share information about calls of potential interest within EUROBUS mailinglist.

The morning presentations revealed that, based on present knowledge, *P. marinus* does not impact the structure of the pelagic trophic web in invaded sites, as no competitive exclusion has been yet reported. The participants suggested to focus on possible effects on the benthic community. Since at present this topic is not addressed by any of the participants, it might be a possible focus for future project calls.

To further promote interaction among participants, it has also been underlined the possibility of joint initiatives in the framework of already existing programmes, such as EMBRC-ERIC. In addition, it has been proposed to build up a repository of *P. marinus* specimens collected in different areas. Within MOTax (Marine Organism Taxonomy) infrastructure, the Stazione Zoologica could work as hub for the conservation of specimens preserved in ethanol for subsequent molecular works to be jointly carried out with the researcher who collected the specimens. At present, discussion with MOTax head is in course to define the modalities of networking. In the next weeks, a common protocol will be delivered to all EUROBUS participants with the aim of standardising preservation protocols.

Involvement as ICES Expert Group

As communicated via mail before the workshop, ICES provided a formal endorsement to EUROBUS activities under specific terms of reference (ToR) (see attached file). ICES

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community was so supportive that it has asked EUROBUS participants to create an Expert Group (EG) parented by the Ecosystem Processes and Dynamics Steering Group chaired by Silvana Birchenough. The discussion among participants evidenced a general agreement towards this initiative, which could provide an international support to future initiatives. The establishment of an ICES EG implies the acceptance of the following terms:

- the EG as a 3-year duration, and is renewable over 3-year slots;
- the EG must be led by one chair from an ICES Country member; co-chairing is permitted, but at least one chair must be from an ICES Country member;
- the EG adheres to the ToR established by ICES; selected coordinators for each ToR can be appointed;
- the EG is requested to meet at least once a year and provide a report of the meeting;
- chairs from the different ICES EGs meet annually, promoting exchanges and interactions among EGs;
- ICES provides each EG with an electronic share point and further support to promote the initiatives of the EG and the exchanges within participants;
- ICES does not provide any financial support to EGs.

Connections between EUROBUS activities and already existing ICES EGs (e.g., WGITMO: Working Group on Introductions and Transfers of Marine Organisms; WGIMT: Working Group on Integrated Morphological and Molecular Taxonomy; WGZE: Working Group on Zooplankton Ecology) might add to the potentialities of the working group and might open to further possibilities of exchanges.

Upon ICES endorsements to EUROBUS meeting, a report must be delivered by March 15th. A draft of the report will circulate among participants, and in that occasion a final decision on the formation of an ICES EG must be communicated. For this reason, all participants interested in joining to this initiative are invited to communicate it to Marco Uttieri (marco.uttieri@szn.it) by March 10th.

EUROBUS position paper

The discussion also focused on the opportunity of preparing a position paper for EUROBUS activities. The participants structured the following outline: an introduction to *P. marinus* invasion; a state-of-the-art distribution in European waters, regionalising it in macro-areas within which (if appropriate) detailing the different kinds of environments invaded; a section focusing on the future perspectives in the studies on *P. marinus*, outlining

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priority lines of research and optimisation of the sampling strategy. Future communications on this specific issue will be addressed to all participants who contributed to EUROBUS meeting in Naples. Since the mailnglist also includes some researchers who, although not participating in the meeting are interested in EUROBUS activities, should anyone be interested and willing to share his/her experience adding to position paper please inform Marco Uttieri (marco.uttieri@szn.it) by February 15th.

