

Deep-sea Fauna of European Seas: An annotated species check-list of benthic invertebrates living deeper than 2000 m in the seas bordering Europe. Introduction

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Understanding species diversity in the deep-sea is a fundamental problem in marine biology and biological oceanography. Knowledge of species diversity is critical also for management and conservation of deep-sea ecosystems in view of increasing impacts of human activities on deep-sea habitats and communities. Although the deep ocean remains the least explored and least understood ecosystem on the planet, facts accumulate demonstrating that the deep sea supports one of the highest levels of biodiversity on Earth (for recent review see Ramirez-Llodra et al., 2010).

We will never know the exact number of species in the deep ocean, because its floor is too large and heterogeneous, too difficult to access, and the number of apparently rare species is very high. Apart from difficulties caused by the nature of the abyss, there are various problems related to technology and methodology of deep-sea research. Among such problems is the taxonomy of deep-sea species. The number of deep-sea species waiting for description has been growing at an ever-increasing rate over the last decades and this number already is overwhelming (Ebbe et al., 2010). At the same time the number of taxonomic experts is continuously and dramatically declining worldwide. Today the lack of taxonomists has been recognised on a worldwide scale. For many taxa few specialists exist, and already this problem presents a serious threat to biodiversity research (Kim, Byrne, 2006; Pearson et al., 2011). This situation makes it crucial to concentrate efforts

on the taxonomy in all fields of biodiversity study. The present work is an example of such concentration and cooperation on taxonomic knowledge of deep-sea fauna in the “European Seas”.

This project was initiated by the scientists cooperating in the Volkswagen Foundation grant “Regional patterns and biodiversity on the deep seafloor of European seas” (Project Nr 1/73638, duration 1999–2001). It has been a joint German-Russian project, co-ordinated by H. Thiel and A.V. Gebruk. As a follow-up of this project, a check-list of benthic invertebrate species living deeper than 2000 m in the seas bordering Europe has been generated to support further taxonomic studies. Marine basins considered in this work include the central Arctic (up to the Bering Strait), the Greenland and Norwegian Seas, the Mediterranean Sea and the northeast Atlantic with the border along the Mid-Atlantic Ridge in the west and along the 30°N parallel in the south. The check-list includes about 1300 species representing the following 23 larger taxa (listed in the alphabetic order): Anthipatharia, Aplacophora, Ascidiacea, Asterozoa, Bivalvia, Brachiopoda, Bryozoa, Ceriantharia, Cirripezia, Crinozoa, Echinozoa, Echiura, Gastropoda, Holothurozoa, Monoplacophora, Mysidacea, Ophiurozoa, Ostracoda, Polychaeta, Porifera, Pycnogonida, Scleractinia and Xenophyzoa. The selection of taxa is based first of all on the availability of experts involved in the mentioned project.

All known localities (stations) at depths greater than 2000 m are given for each species (with some

exceptions). In addition all corresponding stations sampled deeper than 2000 m are compiled in a separate list (Appendix 1). Data on some stations (coordinates and depth) taken by “historical” expeditions vary in different early publications. In this case, for consistency we used modern station data sets of various museums and research centres (Musée Océanographique de Monaco, National Oceanography Centre, Southampton and Institut Française de Recherche pour l’Exploitation de la Mer — IFREMER). Information given for each species, when available, includes synonymy, remarks on distribution outside European seas and depth range. Comments are also given for many genera, including the total number of species in the genus and its distribution. Synonymy is not given for Gastropoda owing to the large number of considered species (ca. 220) and many problems and questions related to their taxonomy.

Completion of this work took much longer than anticipated initially. Among the reasons for the delay were uncertainties in the taxonomy of some groups, lack of taxonomic expertise in many taxa, lack of reliable modern taxonomic databases, and also the aging of some taxonomists.

The present check-list will complement such data sets as the European Register of Marine

Species (ERMS) (www.marbef.org/data/erms.php). Unlike many common check-lists, the present one includes information on species records deeper than 2000 m and thus it can be incorporated into the Ocean Biogeographic Information System (OBIS) (www.iobis.org). As a part of the same initiative and project, a check-list of Isopoda living deeper than 2000 m in the European seas has been published separately (Brandt, 2005), and we hope that in the future similar check-lists will be compiled on further taxa.

References

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