European Register of Marine Species

A check-list of the marine species in Europe and a bibliography of guides to their identification

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Photo 1re de couverture : *Simnia patula*, Mollusca, Gastropoda (photo : Claude Huyghens)

Photos 4e de couverture : a b
c d

a - *Himanthalia elongata* (Phaeophyceae) buttons on exposed lower eulittoral rock (photo : Joint Nature Conservation Committee)

b - *Prostheceraeus* sp., Plathyhelminthes, Turbellaria (photo : Claude Huyghens)

c - *Botryllus schlosseri*, Tunicata (photo : Claude Huyghens)

d - *Eunicella verrucosa* with *Alcyonium digitatum* (Cnidaria, Anthozoa), erect sponges and faunal turf on moderately exposed rock (photo : Joint Nature Conservation Committee)

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CONTENTS

EXTENDED SUMMARY

European Register of Marine Species / *Répertoire des Espèces Marines d'Europe.*

Les noms scientifiques forment le véhicule de communication de tous les résultats de recherches et textes réglementaires sur la biodiversité, mais usages et habitudes d'emploi des noms varient encore d'un pays à l'autre. Pour la première fois, le présent volume présente un répertoire complet et coordonné de toutes les espèces –plantes, algues, invertébrés, vertébrés– à l'échelle des mers d'Europe. Il est le fruit du travail collectif de près de 170 scientifiques dans le cadre du projet *European Register of Marine Species* (ERMS), soutenu par la Commission Européenne dans le cadre de son programme Marine Science and Technology (MAST).

Cadre géographique

Le cœur géographique du répertoire est centré sur le plateau continental européen, les Canaries et les Açores, jusqu'à l'Islande et le nord de la Norvège, y compris bien entendu la Méditerranée et la mer Baltique. Dans la présente liste, le terme "espèces marines" s'applique également aux espèces intertidales (littorales) et à celles des eaux saumâtres. Dans la mesure du possible, les données concernant les eaux du large et les grandes profondeur ont été prises en compte, de manière à couvrir la totalité des mers d'Europe (Figure 1). De nombreuses lacunes subsistent sans aucun doute aux frontières géographiques (Océan Arctique, Mer Noire, sud des Açores et des Canaries) et bathymétriques (faunes bathyales et abyssales), et l'objectif d'une prochaine édition du Répertoire devrait être précisément de combler ces lacunes. Une grande partie de la mer Baltique est occupée par de l'eau douce, et il a été laissé à l'appréciation des différents coordinateurs d'inclure, ou non, les espèces de ce secteur dans le Répertoire.

Contenu taxonomique

Le Répertoire catalogue environ 30 000 espèces dans l'ensemble des groupes taxonomiques (Tableau 1). Seuls les noms publiés et nomenclaturalement disponibles ont été pris en considération. A quelques très rares exceptions près, ne sont incluses que les espèces dont l'occurrence à l'intérieur du cadre géographique du projet avait déjà été reconnue dans la littérature. Certains petits groupes taxonomiques sont incomplètement couverts : ainsi, chez les Acariens, seule la famille Halacaridae a été traitée, et le catalogue des Rotifères et des Brachiopodes ne couvre que l'Atlantique nord-est. Les lichens, les diatomées et les cyanobactéries ne faisaient pas partie des objectifs du projet, de même que les bactéries (Eubacteria and Archaea) et les virus. L'opportunité de traiter plusieurs groupes de protistes et les champignons a été saisie, bien que non inclus à l'origine dans les objectifs. Les angiospermes des sols salés sont déjà couverts dans les catalogues de végétaux terrestres, et il n'a pas été jugé utile de les prendre en compte dans ce répertoire.

Présentation des espèces dans le catalogue

Pour faciliter la consultation, les groupes taxonomiques sont présentés selon une séquence qui va des champignons et des plantes aux organismes unicellulaires (protistes), puis aux animaux pluricellulaires, pour terminer avec les oiseaux et les mammifères. Chaque partie du Répertoire a été compilée par un coordinateur (dont les noms figurent à l'Annexe 1), dont c'est la responsabilité de choisir la classification suivie ici, jusqu'au niveau des familles. A l'intérieur de chaque famille, les genres sont présentés alphabétiquement, et à l'intérieur de chaque genre, les espèces le sont également.

Dans les listes d'espèces, les synonymes, ou tout autre nom employé pour désigner une même espèce, sont précédés du signe 'égal' (=). Les codes A et M après un nom d'espèce indiquent que l'espèce est présente dans, respectivement, l'Atlantique (y compris éventuellement l'Arctique, la Baltique, ou les grandes profondeurs) et la Méditerranée (y compris éventuellement

la Mer Noire). De telles indications synonymiques ou géographiques ne sont pas présentes uniformément pour l'ensemble des groupes traités.

Un index bibliographique de 700 titres oriente vers les principaux guides et outils de détermination de la flore et de la faune marines d'Europe.

Le catalogue *European Register of Marine Species* est destiné à devenir un outil de standardisation et de référence pour tous ceux qui sont impliqués dans la recherche, la formation et la gestion de la biodiversité marine en Europe. La présente version papier est publiée parallèlement à la liste électronique consultable sur le site Web du projet à l'adresse http://erms.biol.soton.ac.uk.

INTRODUCTION

The foundation of biodiversity research and management is correctly identifying and naming species. Despite the existence of a system for naming species, different names are used for the same species, and the same names for different species, in different parts of Europe. This leads to considerable confusion, and may cause regulatory problems where a species is listed as a priority for protection under an incorrect name. There will always be debate amongst taxonomic specialists about which name is more correct for some species, but a standard working list of names is essential for non-specialists to use. This volume is the first attempt to list all marine species in Europe. It has been produced as a product of the European Register of Marine Species (ERMS), a project part-funded by the European Commission (EC) Marine Science and Technology (MAST) research programme. All the information in this volume, and additional information, is available from the project web site http://erms.biol.soton.ac.uk.

Lists of species, such as provided here, are only the starting point for marine biodiversity management and research. The value of producing the lists is

- to provide a single nomenclature for European marine species, which will generate further research to clarify anomalies, and
- to form the basis for more elaborate species databases, with more synonyms, and data on species distribution, ecology, conservation importance, economic importance, and so on.

An added benefit has been that the co-operation amongst scientists in producing the register has increased communication and interest in the management and use of taxonomic data throughout Europe. It is anticipated that the Register will become a standard reference and technological tool for marine biodiversity training, research and management in Europe. The species register, with its accompanying bibliography of marine species identification guides, can be used to:

- Check the spelling or find the correct name of a species and the authority;
- For a given species, check what other (or how many) species exist in the same Genus, Family or higher taxa. These species may not be included in the local identification guides;
- Find information on the distribution of species among higher taxa;
- Indicate the level of knowledge of a group of species by analysing the rate of discovery of species;
- Find literature on the identification and other knowledge of marine species in Europe.

Geographic scope

The geographic scope of the register was initially the continental shelf seas of Europe, the Canaries and Azores to Iceland and northern Norway and includes the Mediterranean shelf and Baltic Seas. However, although not part of the EC contract, records from deeper waters were included where possible such that the ERMS area covers all European seas (Figure 1). Future work should aim to complete all lists for the deep sea. The EC contract restricted the project to western European organisations. Thus, the deep sea, Arctic Ocean, Black Sea, and southern limits of the Atlantic within the ERMS area (i.e. south of Azores and Canary Islands) may not be adequately covered. The northern parts of the Baltic Sea are freshwater and it was left to the discretion of list compilers whether to include species there within this check-list or not. Future work should involve the expertise of scientists wherever they are located to fill these gaps.

Species included

The check-list includes about 30,000 species representing all marine taxa in Europe (Table 1). Only published and taxonomically available species names are included. With very few exceptions, only species whose occurrence in the ERMS area (Figure 1) has been previously published are included. Synonyms and other names for a species have been included in some instances. The marine environment was broadly defined to include intertidal (littoral) and brackish water habitats. Parts of a few small groups have not been fully covered, namely other

families of Acarina apart from Halacaridae, and the Rotifera (Rotatoria) and Brachiopoda lists are limited to north-east Atlantic species. Although not part of the EC contract species lists of several protist groups and fungi have also been compiled. Lichens, diatoms and cyanobacteria were beyond the scope of the contract. Saltmarsh angiosperm plants were also excluded as these are generally included in terrestrial plant classifications. It was not possible to use the species concept in a similar manner for bacteria (Eubacteria and Archaea) and viruses, so these groups were also excluded from the project. Future work should aim to compile lists for all taxa where the species concept is applicable.

Listing of species in the check-list

Different phyla may have a few to several thousand species, and different experts have compiled different parts of some groups (e.g. parasitic and non-parasitic nematodes). To facilitate readers, the taxonomic groups have been listed starting from the fungi and plants, to single-celled organisms (protists), to lower animals, and to higher animals (birds, mammals). This project does not deal with systematics or classification of marine taxa. The suprageneric taxa named in the contents of this volume were selected to link with particular lists. The selection of groups so listed vary in their taxonomic rank, most phyla are listed, some classes, and some orders and a few families. Within a particular species list, the classification of families and higher taxa has been decided by the compilers of that list. Within a family, genera are listed alphabetically, and within a genus species are listed alphabetically. Where only some sub-groups are listed in the Contents, this is because these groups were compiled by different persons than the remainder of the list. They thus have a unique Preface and list of source references.

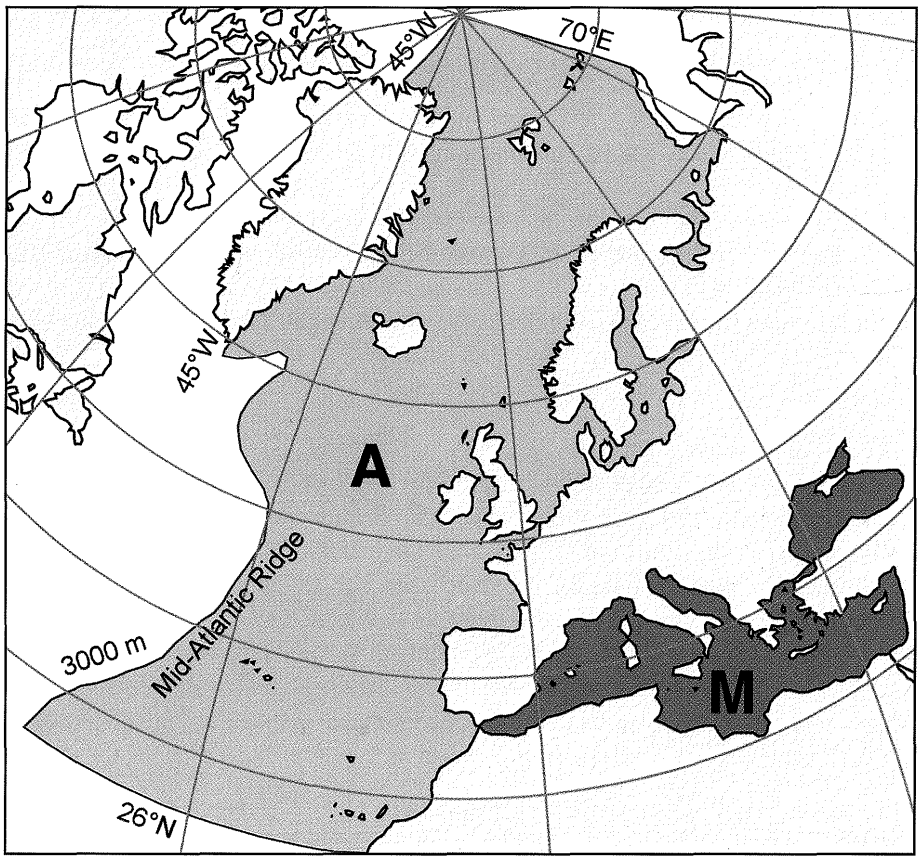

Figure 1. Map showing the geographic scope of the ERMS project. A - Atlantic Ocean and M - Mediterranean Sea.

Layout of each section

Species lists were provided to the project electronically, as spreadsheets and text files. These were converted into web pages and 'rich text format' (rtf) files in the format of this volume. Some lists had additional information on species distribution and other comments that were not included in this volume to maintain as much uniformity between lists as possible. It is anticipated that future editions of this volume will include such additional information.

A strict format for species lists, Preface text, and references, was not insisted upon so as not to delay or inhibit the timely arrival of contributions. Thus the content, style of writing, and format of references, varies between species groups.

In the species lists, synonyms, or other names erroneously used for certain species (i.e. chresonyms) follow an equals (=) sign. The letters A and M after a species name indicate it occurs in the Atlantic (may include Arctic, Baltic and/or deep sea) and Mediterranean (may include Black Sea) respectively. The name of the person who described a species, called the 'taxonomic authority', is provided for almost all species names. The manner of citation of the authority follows normal practice in general zoology (only first authority given), some worm and parasite taxa (person who changed genus name also indicated) and botany; see the Preface to Plants for a fuller description of the citation of authorities.

Some species are not provided with synonyms or chresonyms, and/or distribution or other data. This was generally because the time available did not allow this information to be assembled. However, most list compilers have additional information on the species and would be interested to know what information would be of greatest interest to readers. If you cannot find a species name in this volume there are four possibilities:

1. the name you have is not available (check the spelling)
2. it has been treated as a synonym by the list compiler but not listed as such
3. it is a senior synonym and the list has used the wrong name
4. it has been omitted from the list due to lack of knowledge, uncertainty, or error.

The 'Prefaces' to each species list cite key publications where you will find more detailed information on the species. In addition a bibliography of identification guides to the marine species of Europe is provided at the end of this volume. Having consulted these texts, if you feel the list may be in error or should indicate the synonym for other readers, please contact the list compiler and/or the Secretary of the Society for the management of European biodiversity data. They will note your comments so that future editions may address it. The contact details of compilers are provided in Appendix 1.

Future development

This Register will continue to be updated as new knowledge becomes available. The present lists will vary in quality because of the availability of recent reviews of taxa, existing databases, and time available for people to produce and check them. To facilitate the updating of the Register its copyright has been transferred to a new organisation, namely the 'Society for management of European biodiversity data'. Contributors to ERMS are members of the society and elect a governing council that authorises updates, elaborations, and publications arising from the species lists. Comments on this volume, and offers to revise and expand certain groups, should be addressed to the Secretary of the Society for the management of European biodiversity data: Dr M. J. Costello, EcoServe, 17 Rathfarnham Road, Terenure, Dublin 6W, Ireland; E-mail: mcostello@ecoserve.ie

Acknowledgements

The production of this volume would not have been possible without the good will and co-operation of over 170 scientists. Many of these are named within the volume as compilers of lists or who assisted compilation of lists (Table 1). Other people whose role is less obvious must also be thanked. Their contact details are provided in Appendix 1. Frank Bisby (University of Reading, UK) and Wouter Los (University of Amsterdam, The Netherlands) provided invaluable advice in how to design, execute and continue this project. Dusan Zavodnik (Centre for Marine

Research, Rovinj, Croatia) provided details of species recorded in the Adriatic Sea, including endemic, and other helpful comments, and Mateo Garrido (Universidad of Las Palmas de Gran Canaria) provided lists of species recorded in the Canary Islands. Guenther Radach (Institut für Meereskunde, Kiel) and Herman Hummel (Netherlands Institute of Ecology, Yerseke) participated in discussions and provided advice in relation to data management. David Connor, Frank Bisby, Carlo Heip, Salvatore Aricò, Pamela Harding, Colleen Skule Adam, Pierre Lasserre, Ioannis Karakassis, Jan Marcin Weslawski and others helped the project interact with external (potential end-user) organisations, including the European Environment Agency, International Council for the Exploration of the Sea (ICES), Oslo and Paris Convention for the protection of the marine environment of the north-east Atlantic (OSPAR), Species 2000, Jakarta Marine Mandate of the Convention on Biological Diversity, Diversitas, CIESM and other organisations. John W. Patching (National University of Ireland, Galway) explained how the species concept as used here cannot be similarly applied to bacteria. Ulf Scheller (Järpås, Sweden) confirmed that the Pauropoda are a strictly terrestrial group, although one species *Amphipauropus rhenanus* (Hüther, 1971) lives in coastal sand dunes. Many other people helped the project directly and through assisting others more directly involved. The compilers named in this volume also contributed to the project in its design, communication with other experts, and implementation. This project has demonstrated a co-operative and collegial spirit amongst the scientific community in Europe.

Table 1. The species lists included in this volume, the persons who compiled them and assisted in their compilation, the number of species per group, and an indicator of how complete a list is of the described species. The contact details of the list compilers are in Appendix 1. The status of a list is scored as follows: + = preliminary list, known to be or likely to be incomplete; ++ = compiled from recent authoritative literature; +++ = compiled by expert in the group; ++++ = checked by additional expert in the group; +++++ = checked by several experts in the group; C = confident of reasonable coverage of all European seas, including Arctic, deep sea and Black Sea.

Species group	Compiler(s)	*Assisted by*	Number species	Status	
Fungi	N. Clipson, E. Landy, M. Otte	*G. Bremer, G. Jones*	318	++++	
Macroalgae of Rhodophycota, Phaeophycota, Chlorophycota, and two genera of Xanthophycota	M. D. Guiry	*G. Furnari, F. Rindi, E. Nic Dhonncha, S. Lawson*	1702	+++++	C
Seagrass	M. D. Guiry		5	+++++	C
Apicomplexa (free-living species)	S. Brandt		3	++	
Ciliates - Chonotricha	A. W. Jankowski		37	+++	
Ciliates - folliculinids	M. Mulisch		30	+++	
Ciliates - aloricate oligotrichs	S. Agatha		82	+++	
Ciliates - Rhynchodida	A. W. Jankowski		42	+++	
Dinoflagellates	S. Brandt	*M. Elbrächter*	718	++	
Amoebae - naked	A. Rogerson, A. Goodkov		74	++++	
Amoebae - testate	R. Meisterfeld		97	+++	
Apusomonads	S. Brandt		3	+++	
Choanoflagellates	S. Brandt		98	+++	
Crytophytes	S. Brandt		14	+	
Euglenoids - heterotrophic euglenoids	S. Brandt		26	+	
Euglenoids - kinetoplastids	S. Brandt		13	+++	
Foraminifera	O. Gross		1167	++++	C
Kathablepharids	S. Brandt		2	++	
Haptophytes	S. Brandt		36	+	
Prasinophytes	S. Brandt		24	+	
Bicosoecids	S. Brandt		17	+++	
Labyrinthulids	M. Dick, S. Brandt		10	+++	
Thaustrochytrids	M. Dick, S. Brandt		15	+++	
Stramenopiles *incertae sedis*	S. Brandt		4	+++	
Thaumatomonads	S. Brandt		17	+++	
Xenophyophora	O. Tendal, J. van der Land		20	++++	
Protista *incertae sedis* (heterotrophic species)	S. Brandt		40	+++	
Myxozoa	E. Karlsbakk		230	+++++	C
Porifera	R. W. M. van Soest	*N. Boury-Esnault*	1640	+++	
Placozoa	J. van der Land		2	++	
Mesozoa	J. van der Land, J. Hallan		36	+++	
Octocorallia (excl. Pennatulacea)	L. van Ofwegen, M. Grasshoff, J. van der Land		92	+++++	C
Octocorallia - Pennatulacea	G. C. Williams, J. van der Land		37	+++++	C
Actiniaria	J. van der Land, J. H. den Hartog	*J. Ryland, K. Riemann-Zürneck*	243	++++	C
Antipatharia	J. van der Land, D. M. Opresko		28	++++	C
Scleractinia	S. D. Cairns, B. W. Hoeksema, J. van der Land	*H. Zibrowius*	86	+++++	C
Scyphozoa	P. Cornelius, G. Jarms, Y. M. Hirano, J. van der Land,		53	+++++	C
Cubozoa	P. Cornelius		1	+++++	C
Hydrozoa	J. van der Land, W. Vervoort, S. D. Cairns, P. Schuchert		684	++++	C
Siphonophora	G. M. Mapstone	*P. R. Pugh*	105	++++	
Ctenophora	J. van der Land		38	++	
Turbellaria	A. Faubel, C. Noreña		1137	+++++	C
Aspidogastrea	D. Gibson		4	+++++	C
Digenea	D. Gibson	*M. Køie, P. Bartoli*	592	+++++	C
Monogenea	R. Bray	*L. Euzet, G. Kearn*	353	+++++	C
Cestoda	R. Bray	*B. B. Georgiev, L. Euzet*	312	+++++	C
Rotifera	M. O'Reilly		139	++	
Gnathostomulida	J. van der Land		25	+++	

Species group	Compiler(s)	*Assisted by*	Number species	Status	
Nemertini (Nemertea)	R. Gibson		478	+++++	C
Gastrotrichia	J. L. d'Hondt, J. van der Land		240	++++	C
Cephalorhyncha (= Loricifera, Priapulida, Kinorhyncha, Nematomorpha)	B. Neuhaus, J. van der Land		52	++++	C
Nematoda - free living	G. De Smet, M. Vincx, A. Vanreusel, S. Vanhove, J. Vanaverbeke, M. Steyaert	*F. Riemann*	1625	++++	C
Nematoda -parasitic	D. Gibson	*F. Moravec, H.-P. Fagerholm*	212	++++	C
Acanthocephala	D. Gibson	*C. R. Kennedy, Z. M. Dimitrova*	67	+++++	C
Cycliophora	C. S. Emblow		1	+++++	C
Echiura	J. van der Land	*J. I. Saiz-Salinas*	19	+++	C
Sipuncula	J. van der Land	*J. I. Saiz-Salinas*	44	+++	C
Entoprocta	P. J. Hayward		45	+++++	C
Mollusca	S. Gofas, J. Le Renard, P. Bouchet,	*R. Giannuzzi-Savelli, A. Guerra, D. Heppell, T. Hoisaeter, E. Platts, S. Smith, J.-A. Sneli, A. Warén*	3353	+++++	C
Polychaeta	G. Bellan	*K. Arvanitidis, J. C. Dauvin, F. Gentil, G. Bachelet, H. Hansson, R. Barnich, D. Fiege, M. E. Petersen, T. Brattegard, T. Holthe*	1848	++++	C
Oligochaeta	C. Erséus, B. Healy		190	+++++	C
Hirudinea	J. van der Land		36	++	
Pogonophora	J. van der Land, E. Southward	*T. Brattegard*	23	+++++	C
Tardigrada	J. van der Land		76	++++	C
Chelicerata	A. Legakis		1	+	
Acarina - Halacaridae	I. Bartsch		214	+++++	C
Pycnogonida	J. van der Land, F. Krapp	*J. Stock, Child, R. Bamber*	146	++++	C
Remipedia	G. Boxshall		1	++++	C
Branchiura	G. Boxshall		2	++++	C
Cladocera - Branchiopoda	G. Boxshall		9	++++	C
Ostracoda	D. Horne, A. Bruce, J. Whittaker		769	+++++	C
Pentastomida	J. van der Land		2	+++	C
Mystacocarida	G. Boxshall		2	++++	C
Copepoda - Calanoida	G. Boxshall		649	++++	C
Copepoda - Cyclopoida	G. Boxshall		177	++++	C
Copepoda - Harpacticoida	R. Huys		1357	++++	C
Copepoda - Misophrioida	G. Boxshall		16	++++	C
Copepoda - Monstrilloida	G. Boxshall		33	++++	C
Copepoda - Mormonilloida	G. Boxshall		2	++++	C
Copepoda - Platycopioida	G. Boxshall		3	++++	C
Copepoda - Poecilostomatoida	G. Boxshall	*M. O'Reilly, D. Zavodnik*	353	++++	C
Copepoda - Siphonostomatoida	G. Boxshall		354	++++	C
Tantulocarida	G. Boxshall		13	++++	C
Cirripedia - non-parasitic Thoracica	A. Southward		107	++++	C
Cirripedia - parasitic Ascothoracida	G. Boxshall		10	++++	C
Cirripedia - parasitic Rhizocephala	G. Boxshall		28	++++	C
Stomatopoda	J. van der Land	*P. Noël*	22	+++	C
Euphausiacea	J. van der Land		41	+++	
Decapoda	M. Türkay		672	++++	C
Thermosbaenacea	J. van der Land		7	++	
Mysidacea	J. van der Land, T. Brattegard		198	++++	C
Amphipoda	D. Bellan-Santini, M. J. Costello	*S. Ruffo, J. C. Dauvin, L. Collier*	1183	+++++	C
Cumacea	L. Watling	*T. Brattegard*	188	+++++	C
Tanaidacea	G. Bird	*M. Gutu*	280	+++++	C
Isopoda - excluding Epicaridea	J. van der Land		605	++	
Isopoda, Epicaridea, Bopyridae	J. C. Markham		54	++++	C
Chilopoda	A. Minelli		6	++++	
Diplopoda	A. Minelli		2	++++	
Insecta - Chironomidae	D. Murray		15	++++	C

Species group	Compiler(s)	*Assisted by*	Number species	Status	
Insecta	A. Legakis		19	++++	
Phoronida	C. Emig, C. Roldán, J. M. Viéitez		9	+++++	
Bryozoa	P. J. Hayward	*J. Harmelin*	724	+++++	C
Brachiopoda	C. Howson		18	++	
Chaetognatha	J. van der Land, H. Kapp		42	++++	C
Hemichordata	J. van der Land		17	+++	
Echinodermata	H. G. Hansson	*S. Stöhr, C. Massin, A. Gebruk, A. Mironov, A. Smirnov, D. Zavodnik, M. Garrido*	648	+++++	C
Ascidiacea & Sorberacea	C. Monniot,	*D. Connor, P. Lozouet, J. Marmayou*	393	+++++	C
Thaliacea	J. van der Land, R. van Soest		35	++++	C
Appendicularia	J. van der Land		53	++	
Cephalochordata	J. van der Land		2	++	
Pisces - Agnatha	J. van der Land, M. J. Costello, N. Bailly, W. N. Eschmeyer, R. Froese	*L. Collier*	5	+++++	C
Pisces - Chondrichthyes	J. van der Land, M. J. Costello, D. Zavodnik, R. Serrão Santos, F. Mora Porteiro, N. Bailly, W. N. Eschmeyer, R. Froese	*L. Collier*	145	+++++	C
Pisces - Osteichthyes	J. van der Land, M. J. Costello, D. Zavodnik, R. Serrão Santos, F. Mora Porteiro, N. Bailly, W. N. Eschmeyer, R. Froese	*L. Collier*	1199	+++++	C
Tetrapoda - Aves	J. van der Land	*M. Ramos, J. Templado*	74	+++++	C
Tetrapoda - Reptilia	J. van der Land	*M. Ramos, J. Templado*	5	+++++	C
Tetrapoda - Mammalia	J. van der Land	*M. Ramos, J. Templado*	50	+++++	C
TOTAL			29,714		

CEPHALORHYNCHA

Kinoryncha

Compiled by Birger Neuhaus and Jacob van der Land

The ERMS list for Kinorhyncha and Loricifera was compiled by J. van der Land and Birger Neuhaus. The list of valid species of Kinorhyncha is based on an unpublished list of synonymies by Robert P. Higgins made available to B. Neuhaus.

The Kinorhyncha are a group of microscopic marine animals that comprise some 130 valid species (Pardos *et al.* 1998). Few species live exclusively in eulittoral sediments (e.g., *Echinoderes coulli* Higgins, 1977, *E. caribiensis* Kirsteuer, 1964) or in beach sands (e.g., *Cateria styx* Gerlach, 1956). However, most species inhabit the eulittoral and sublittoral including the deep-sea. Kinorhyncha live in the interstitial cavities and crevices of coarse or fine sandy substrate or of muddy sediments (Gerlach 1956, Higgins 1990, Vanhove *et al.* 1995, Zelinka 1928). Only the upper 1-10 cm of oxygen-rich substratum contain Kinorhyncha both in the eulittoral and sublittoral (Horn 1978, Thistle *et al.* 1985). Kinorhyncha feed on diatoms or bacteria (Higgins 1990, own observations). Kinorhyncha can be extracted from the sediment by the bubble and blot technique (Higgins & Thiel 1988). Higgins & Thiel (1988) describe additional suggestions for specimen processing.

Close to nothing is known about the biogeography of kinorhynch species. Every scientist trying to identify Kinorhyncha from the area covered by ERMS is, therefore, well advised to consider species described from neighbouring areas as well, such as the following recorded from other parts of the Arctic Ocean: *Echinoderes angustus* Higgins & Kristensen, 1988, *Echinoderes aquilonius* Higgins & Kristensen, 1988, *Echinoderes arlis* Higgins, 1966, *Echinoderes eximus* Higgins & Kristensen, 1988, *Echinoderes peterseni* Higgins & Kristensen, 1988, *Echinoderes tubilak* Higgins & Kristensen, 1988, *Pycnophyes borealis* Higgins & Korczynski, 1989, *Pycnophyes canadensis* Higgins & Korczynski, 1989, *Pycnophyes chukchiensis* Higgins, 1991, *Pycnophyes cryopygus* Higgins & Kristensen, 1988, *Pycnophyes greenlandicus* Higgins & Kristensen, 1988, *Pycnophyes mokievskii* Adrianov, 1995, *Pycnophyes spitsbergensis* Adrianov, 1995

It is also not impossible that species described from the North American coast may occur in European waters or species new to science may turn up. More recent keys for identification include Adrianov (1995), Higgins (1983), Higgins & Kristensen (1988), Huys & Coomans (1989), Pardos *et al.* (1998). Valuable information is also found in Adrianov & Malakhov (1994), Higgins (1977, 1978, 1985, 1990), Moore (1973), Nebelsick (1990), and Zelinka (1928).

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PHYLUM CEPHALORHYNCHA

Class Kinorhyncha

Order Cyclorhagida

Family Antygomonidae

Antygomonas
incomitata Nebelsick, 1990 M

Family Centroderidae

Campyloderes
adherens Nyholm, 1947 vanhoffen A
macquariae Johnston, 1938
Centroderes
eisigii Zelinka, 1928 M
spinosus (Reinhard, 1881) M
Condyloderes
multispinosus (McIntyre, 1962) A

Family Echinoderidae

Echinoderes
agigens Bacescu, 1968 M

cantabricus Pardos, Higgins & Benito, 1998	A
capitatus (Zelinka, 1928)	M
citrinus Zelinka, 1928	M
druxi d'Hondt, 1973	M
dujardini Claparède, 1863	A
elongatus Nyholm, 1947	A
ferrugineus Zelinka, 1928	M
gerardi Higgins, 1978	M
higginsi Huys & Coomans, 1989	
hispanicus Pardos, Higgins & Benito, 1998	A
krishnaswamyi Higgins, 1985	A
kristenseni Higgins, 1985	A
levanderi Karling, 1954	A
riedli Higgins, 1966	M
setiger Greef, 1869	
worthingii Southern, 1914	A
Family Semnoderidae	
Semnoderes	
armiger Zelinka, 1928	A M
ponticus Bacescu & Bacescu, 1956	M
Family Zelinkaderidae	
Zelinkaderes	
submersus (Gerlach, 1969)	A
Order Homalorhagida	
Family Neocentrophyidae	
Paracentrophyes	
quadridentatus (Zelinka, 1928)	A M
Family Pycnophyidae	
Kinorhynchus	
giganteus (Zelinka, 1928)	A M
paraneapolitanus Sheremetevskij, 1974	M
Pycnophyes	
calmani Southern, 1914	A
carinatus Zelinka, 1928	M
communis Zelinka, 1908	A M
dentatus (Reinhard, 1881)	A M
flaveolatus Zelinka, 1928	A M
kielensis Zelinka, 1928	A M
maximus Reimer, 1963	A
ponticus (Reinhard, 1881)	M
robustus Zelinka, 1928	M
rugosus Zelinka, 1928	M
zelinkaei Southern, 1914	A

Loricifera

Compiled by Jacob van der Land and Birger Neuhaus

The marine Loricifera are now known with 11 species from North America, Europe, and the Japanese deep-sea (Higgins & Kristensen 1986, Kristensen 1983, Todaro & Kristensen 1998). Only 2 species have been reported from Europe (Kristensen 1983, Todaro & Kristensen 1998). Loricifera inhabit various kinds of sediment from coarse sand or shelly gravel to red clay with silt and sand. They may be extracted from the substratum either by freshwater shock (Kristensen 1983) or by multiple decantations (Todaro & Kristensen 1998). It is certain that species new to science inhabit the area covered by the ERMS programme.

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Todaro, M. A. & R. M. Kristensen 1998: A new species and first report of the genus *Nanaloricus* (Loricifera, Nanaloricida, Nanaloricidae) from the Mediterranean Sea. *Italian Journal of Zoology* 65: 219-226.

Class Loricifera

Family Nanaloricidae	
Nanaloricus	
mysticus Kristensen, 1983	A
khaitatus Todaro & Kristensen, 1998	M

Nematomorpha and Priapulida

Compiled by Jacob van der Land

The ERMS lists for Priapulida and Nematomorpha were based on Adrianov & Malakhov (1996) and on Malakhov & Adrianov (1995).

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Class Nematomorpha

Order Nectonematida

Family Nectonematidae	
Nectonema	
agile Verril, 1879	A M
svensksundi Bock, 1908	A
munidae Brinkmann, 1930	A

Class Priapulida

Family Chaetostephanidae	
Maccabeus	
tentaculatus Por, 1973	M
Family Priapulidae	
Halicryptus	
spinulosus von Siebold, 1849	A
Priapulopsis	
bicaudatus (Koren & Danielssen, 1868)	A
cnidephorus Salvini-Plawen, 1973	M
Priapulus	
abyssorum Menzies, 1959	A M
caudatus Lamarck, 1816	A
Family Tubiluchidae	
Tubiluchus	
arcticus Adrianov *et al.*, 1989	A