Continuous Plankton Records: Plankton Atlas of the North Atlantic Ocean (1958–1999). II. Biogeographical charts

Continuous Plankton Recorder Survey Team*

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The following CPR Atlas contains the biogeographical distribution of 240 common pelagic plankton taxa of the North Sea and North Atlantic Ocean. The biogeographical charts were produced using data collected by the Continuous Plankton Recorder (CPR) survey from 1958 to 1999, incorporating over 155 000 plankton samples. The methodology on spatial interpretation of CPR data and protocols of the CPR survey are fully described in Beaugrand (2004, this volume). The charts are printed in alphabetical order of the genera within each major taxon. Nomenclature for diatoms is based on Hasle & Syvertsen (1996), for dinoflagellates on Steidinger & Tangen (1996), and for copepods on Park (1995) and Mauchline (1998). Details on selected taxa (indicated by * on the charts) are given following the index of the charts.

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- Fig. 130. Ostracoda

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COMMENTS

Diatoms

- Fig. 12. *Coscinodiscus wailesii* – First recorded in European waters in the English Channel in 1977. Details in Robinson et al. (1980) and Edwards et al. (2001)
- Fig. 19. *Ephemera planamembranacea* – First described from CPR samples in the NW Atlantic in 1962. Details in Hendey (1964) and Robinson (1965)
- Fig. 21. *Fragilaria* spp. – May include some chain-forming *Navicula* spp
- Fig. 25. *Pleurosigma* spp. – Includes records of *Gyrosigma* spp.
- Fig. 37. *Navicula* spp. – May include other Naviculoid genera
- Figs. 45 & 46. *Pseudo-nitzschia delicatissima* & *P. seriata* – Accurate species identification in the genus *Pseudo-nitzschia* requires an electron microscope (see Hasle & Syvertsen 1996)

Dinoflagellates

- Fig. 60. *Actiniscus pentasterias* – Species is unarmoured, only the siliceous internal skeleton of 2 star-shaped pentasters is recorded in CPR samples
- Fig. 91. Dinoflagellate cysts – Recorded as present/absent from 1965 onwards; counted in CPR samples from January 1993. Details in Reid (1978)
- Fig. 93. *Dissodinium pseudolunula* – Recorded as resting cysts. Details in John & Reid (1983)
- Fig. 96. *Gonyaulax* spp. – Includes other genera in Gonyaulaceae, e.g. *Alexandrium*. Counted in CPR samples from 1965 onwards
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- Fig. 102. *Prorocentrum* spp. – Mainly *P. micans*; genus now includes *Exuviaella* spp.
- Fig. 103. *Protoperidinium* spp. – Includes some records of *Glenodinium* spp. and *Gonyaulax* spp.; also *Scrippsiella* spp. prior to 1982
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- Fig. 109. Silicoflagellatae – Recorded as present/absent from 1965 onwards; counted in CPR samples from January 1993
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Protozoa

- Fig. 114. Foraminiferida – Counted in CPR samples from January 1993. Details in John (1987)
- Fig. 115. Radiolaria – Includes Acantharia. Counted in CPR samples from January 1993
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- Figs. 117–121. *Dictyocysta* to *Tintinnopsis* (five taxa) counted separately from January 1996
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- Fig. 224. *Pneumodermopsis ciliata* & Fig. 225. *P. paucidens* – Details in Cooper & Forsyth (1963). Records of *P. paucidens* from the American continental shelf are likely to be *Paedocione doliiformis* (G. A. Cooper[†] pers. comm)
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- Fig. 237. Fish larvae – Details in Coombs (1980)

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LITERATURE CITED

- Bainbridge V (1963) Continuous plankton records: contribution towards a plankton atlas of the North Atlantic and North Sea. Part VIII: Chaetognatha. *Bull Mar Ecol* 6:40–51
- Beaugrand G (2004) Continuous Plankton Records: Plankton Atlas of the North Atlantic Ocean (1958–1999). I. Introduction and methodology. *Mar Ecol Prog Ser Suppl* 2004: 3–10
- Colebrook JM (1982) Continuous plankton records: seasonal variations in the distribution and abundance of plankton in the North Atlantic Ocean and the North Sea. *J Plankton Res* 4:435–462
- Coombs SH (1980) Continuous plankton records: a plankton atlas of the North Atlantic and North Sea. *Suppl* 5: young fish, 1948–1972. *Bull Mar Ecol* 8:229–281
- Cooper GA, Forsyth DCT (1963) Continuous plankton records: contribution towards a plankton atlas of the North Atlantic and North Sea. Part VII: The seasonal and annual distribution of the pteropod *Pneumodermopsis* Keferstein. *Bull Mar Ecol* 6:31–38
- Edwards M, John AWG, Johns DG, Reid PC (2001) Case history and persistence of the non-indigenous diatom *Coscinodiscus wailesii* in the north-east Atlantic. *J Mar Biol Assoc UK* 81:207–211
- Frost BW (1989) A taxonomy of the marine calanoid copepod genus *Pseudocalanus*. *Can J Zool* 67:525–551
- Gieskes WWC (1971a) Ecology of the Cladocera of the North Atlantic and North Sea, 1960–1967. *Neth J Sea Res* 5: 342–376
- Gieskes WWC (1971b) The succession of two *Podon* (Crustacea, Cladocera) species in the North Sea. *Neth J Sea Res* 5:377–381
- Hasle GR, Syvertsen EE (1996) Marine diatoms. In: Tomas CR (ed) *Identifying marine diatoms and dinoflagellates*. Academic Press, London, p 5–385
- Hendey NI (1964) An introductory account of the smaller algae of British coastal waters. Part V: Bacillariophyceae (Diatoms). HMSO, London
- Hunt HG (1968) Continuous plankton records: contribution

- towards a plankton atlas of the North Atlantic and North Sea. Part XI: the seasonal and annual distribution of Thaliacea. *Bull Mar Ecol* 6:225–249
- John AWG (1987) The regular occurrence of *Reophax scotti* Chaster, a benthic foraminiferan, in plankton samples from the North Sea. *J Micropalaeontol* 6:61–63
- John AWG, Reid PC (1983) Possible resting cysts of *Disso-dinium pseudolunula* Swift ex Elbrächter et Drebes in the northeast Atlantic and the North Sea. *Br Phycol J* 18:61–67
- Lindley JA (1975) Continuous plankton records: a plankton atlas of the North Atlantic and North Sea. Suppl 3: Tintinnida (Protozoa, Ciliophora) in 1965. *Bull Mar Ecol* 8:201–213
- Lindley JA (1977) Continuous plankton records: the distribution of the Euphausiacea (Crustacea: Malacostraca) in the north Atlantic and the North Sea, 1966–1967. *J Biogeography* 4:121–133
- Lindley JA (1987) Continuous plankton records: the geographical distribution and seasonal cycles of decapod crustacean larvae and pelagic post-larvae in the north-eastern Atlantic Ocean and the North Sea, 1981–3. *J Mar Biol Assoc UK* 67:145–167
- Lindley JA, Hunt HG (1989) The distributions of *Labidocera wollastoni* and *Centropages hamatus* in the North Atlantic Ocean and the North Sea in relation to the role of resting eggs in the sediment. In: Ryland JS, Tyler PA (eds) *Reproduction, genetics and distributions of marine organisms*. Olsen & Olsen, Fredensborg, p 407–413
- Lindley JA, Reid PC (2002) Variations in the abundance of *Centropages typicus* and *Calanus helgolandicus* in the North Sea: deviations from close relationships with temperature. *Mar Biol* 141:153–165
- Mauchline J (1998) The biology of calanoid copepods. *Adv Mar Biol* 33:1–710
- McHardy RA (1970) Distribution and abundance of hyperiid amphipods in near-surface waters of the North Atlantic Ocean and North Sea. PhD thesis, University of Edinburgh
- Owens NJP, Cook D, Colebrook JM, Hunt HG, Reid PC (1989) Long term trends in the occurrence of *Phaeocystis* sp. in the north-east Atlantic. *J Mar Biol Assoc UK* 69:813–821
- Park T (1995) Taxonomy and distribution of the marine calanoid copepod family Euchaetidae. *Bull Scripps Inst Oceanogr* 29:1–203
- Rees CB (1954a) Continuous plankton records: the distribution of lamellibranch larvae in the North Sea, 1950–1951. *Bull Mar Ecol* 4:21–46
- Rees CB (1954b) Continuous plankton records: the distribution of echinoderm and other larvae in the North Sea, 1947–1951. *Bull Mar Ecol* 4:47–67
- Reid PC (1978) Dinoflagellate cysts in the plankton. *New Phytol* 80:219–229
- Robinson GA (1965) Continuous plankton records: contribution towards a plankton atlas of the North Atlantic and North Sea. Part X: *Navicula planamembranacea* Hendey. *Bull Mar Ecol* 6:141–145
- Robinson GA, Budd TD, John AWG, Reid PC (1980) *Coscinodiscus nobilis* (Grunow) in continuous plankton records, 1977–78. *J Mar Biol Assoc UK* 60:675–680
- Roskell J (1975) Continuous plankton records: a plankton atlas of the North Atlantic and North Sea. Suppl 2: the oceanic cirripede larvae, 1955–1972. *Bull Mar Ecol* 8:185–199
- Steidinger KA, Tangen K (1996) Dinoflagellates. In: Tomas CR (ed) *Identifying marine diatoms and dinoflagellates*. Academic Press, San Diego, p 387–584
- Williams R (1975) Continuous plankton records: a plankton atlas of the North Atlantic and North Sea. Suppl 4: the Ostracoda in 1963. *Bull Mar Ecol* 8:215–228
- Williams R, Wallace MA (1975) Continuous plankton records: a plankton atlas of the North Atlantic and North Sea. Suppl 1: the genus *Clausocalanus* (Crustacea: Copepoda, Calanoida) in 1965. *Bull Mar Ecol* 8:167–184
- Williams R, Robins DB (1981) Seasonal variability in abundance and vertical distribution of *Parathemisto gaudichaudi* (Amphipoda: Hyperiidea) in the northeast Atlantic Ocean. *Mar Ecol Prog Ser* 4:289–298

Bacillariophyceae (Diatoms)

Fig. 2. *Asterionellopsis glacialis* Fig. 4. *Bacteriastrium* spp. Fig. 1. *Actinopterychus* spp. Fig. 3. *Bacillaria paxillifera*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 6. *Biddulphia alternans*

Fig. 5. *Bellerophon malleus*

Fig. 8. *Chaetoceros (Hyalochaetae) spp.*

Fig. 7. *Cerataulina pelagica*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ♦: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 10. *Corethron criophilum* Fig. 12. *Coscinodiscus wailesii** Fig. 9. *Chaetoceros (Phaeoceros) spp.* Fig. 11. *Coscinodiscus concinnus*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 14. *Dactyliosolen antarcticus*

Fig. 16. *Detonula confervacea*

Fig. 13. *Cylindrotheca closterium*

Fig. 15. *Dactyliosolen fragilissimus*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 18. *Ditylum brightwellii* Fig. 20. *Eucampia zodiacus* Fig. 17. *Detonula pumila* Fig. 19. *Ephemera planamembranacea**

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 22. *Guinardia delicatula*

Fig. 24. *Guinardia striata*

Fig. 21. *Fragilaria* spp.*

Fig. 23. *Guinardia flaccida*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 26. *Hemitaulus* spp. Fig. 25. *Pleurosigma* spp.* Fig. 28. *Leptocylindrus danicus* Fig. 27. *Lauderia annulata*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 30. *Navicula* spp.

Fig. 29. *Leptocylindrus mediterraneus*

Fig. 32. *Odontella aurita*

Fig. 31. *Nitzschia sigma rigida*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ♦: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 34. *Odontella mobiliensis* Fig. 36. *Odontella rhombus* Fig. 33. *Odontella granulata* Fig. 35. *Odontella regia*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 38. *Paralia sulcata*

Fig. 37. *Odontella sinensis**

Fig. 40. *Podosira stelligera*

Fig. 39. *Planktoniella sol*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 42. *Proboscia alata curvirostris* Fig. 44. *Proboscia alata inermis* Fig. 41. *Proboscia alata alata* Fig. 43. *Proboscia alata indica*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 46. *Pseudo-nitzschia seriata**

Fig. 48. *Rhaphoneis amphicerus*

Fig. 45. *Pseudo-nitzschia delicatissima**

Fig. 47. *Pseudosolenia calcar-avis*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ◆: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 50. *Rhizosolenia bergonii* Fig. 52. *Rhizosolenia imbricata shrubsolei* Fig. 49. *Rhizosolenia acuminata* Fig. 51. *Rhizosolenia hebetata semispina*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; ○: species never recorded; ♦: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms)

Fig. 54. *Rhizosolenia styliformis*

Fig. 53. *Rhizosolenia setigera*

Fig. 56. *Stephanopyxis* spp.

Fig. 55. *Skeletonema costatum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Bacillariophyceae (Diatoms) / Dinophyceae (Dinoflagellates)

Fig. 58. *Thalassiosira* spp. Fig. 60. *Actiniscus pentasterias** Fig. 57. *Thalassionema nitzschoides* Fig. 59. *Thalassiothrix longissima*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; ♦: species never recorded; +: only 1 presence; O: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 62. *Ceratium arcticum*

Fig. 64. *Ceratium azoricum*

Fig. 63. *Ceratium arietinum*

Fig. 61. *Amphisolenia* spp.

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 66. *Ceratium bucephalum* Fig. 68. *Ceratium candelabrum* Fig. 65. *Ceratium belone* Fig. 67. *Ceratium buceros*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 70. *Ceratium compressum*

Fig. 72. *Ceratium extensum*

Fig. 69. *Ceratium carriense*

Fig. 71. *Ceratium declinatum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 74. *Ceratium fusus* Fig. 76. *Ceratium hexacanthum* Fig. 73. *Ceratium furca* Fig. 75. *Ceratium gibberum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Dinophyceae (Dinoflagellates)

Fig. 78. *Ceratium lamellicorne*

Dinophyceae (Dinoflagellates)

Fig. 80. *Ceratium longipes*

Dinophyceae (Dinoflagellates)

Fig. 77. *Ceratium horridum*

Dinophyceae (Dinoflagellates)

Fig. 79. *Ceratium lineatum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 82. *Ceratium massiliense* Fig. 84. *Ceratium pentagonum* Fig. 81. *Ceratium macroceros* Fig. 83. *Ceratium minutum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 86. *Ceratium trichoceros* Fig. 88. *Ceratium vulturn* Fig. 85. *Ceratium teres* Fig. 87. *Ceratium tripos*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 89. *Ceratocorys* spp. Fig. 90. *Cladopyxis* spp. Fig. 92. *Dinophysis* spp.

Fig. 91. Dinoflagellate cysts*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; ✕: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 94. *Glenodinium* spp.

Fig. 96. *Gonyaulax* spp.*

Fig. 93. *Dissodinium pseudolunula**

Fig. 95. *Goniiodoma polyedricum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 98. *Noctiluca scintillans** Fig. 100. *Podolampas* spp. Fig. 97. *Gyrodinium* spp.* Fig. 99. *Oxytoxum* spp.

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Dinophyceae (Dinoflagellates)

Fig. 102. *Prorocentrum* spp.*

Fig. 104. *Ptychodiscus noctiluca*

Fig. 101. *Polykrikos schwartzii* cysts*

Fig. 103. *Protoperdinium* spp.*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ◆: >1 presence data

Dinophyceae (Dinoflagellates) / Other phytoplankton

Fig. 106. *Pyrophacus* spp. Fig. 108. *Trichodesmium* spp. Fig. 105. *Pyrocystis* spp. Fig. 107. *Scrippsiella* spp.*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; $\circ$: species never recorded; $\diamond$: only 1 presence; $+$: >1 presence data

Other phytoplankton

Fig. 110. *Halosphaera* spp.*

Fig. 112. *Coccolithaceae**

Fig. 109. *Silicoflagellatae**

Fig. 111. *Pterosperma* spp.

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ◆: >1 presence data

Other phytoplankton / Protozoa / Ciliophora

Fig. 114. Foraminiferida*

Fig. 116. Total Tintinnidae*

Fig. 113. *Phaeocystis pouchetii**

Fig. 115. Radiolaria*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Fig. 118. *Favella serrata**

Fig. 117. *Dictyocysta* spp.*

Fig. 120. *Ptychocylis* spp.*

Fig. 119. *Parafavella gigantea**

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Ciliophora / Trematoda / Rotifera

Fig. 122. *Zoothamnium pelagicum**

Fig. 124. Rotifer eggs*

Fig. 121. *Tintinnopsis* spp.* Fig. 123. Eggs of *Kuhnia scombri* ('Spindelei')*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Annelida / Cladocera

Fig. 126. *Tomopteris* spp. Fig. 128. *Penilia* spp.

Fig. 125. Polychaeta larvae*

Fig. 127. *Evadne* spp.*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Cladocera / Ostracoda / Copepoda

Fig. 130. Ostracoda*

Fig. 132. *Acartia longiremis* Fig. 129. *Podon* spp.* Fig. 131. *Acartia danae*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Copepoda

Fig. 134. *Aetideus armatus*

Fig. 136. *Calanoides carinatus*

Fig. 133. *Acartia* spp.*

Fig. 135. *Anomalocera patersoni*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 138. *Calanus glacialis* Fig. 140. *Calanus hyperboreus* Fig. 137. *Calanus finmarchicus** Fig. 139. *Calanus helgolandicus**

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 141. *Calocalanus* spp. Fig. 142. *Candacia aethiopica* Fig. 143. *Candacia armata* Fig. 144. *Candacia pachydactyla*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 146. *Centropages chierchiae* Fig. 148. *Centropages typicus** Fig. 145. *Centropages bradyi* Fig. 147. *Centropages hamatus**

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Copepoda

Fig. 150. *Clausocalanus* spp.*

Fig. 152. *Eucalanus hyalinus*

Fig. 149. *Centropages violaceus*

Fig. 151. *Ctenocalanus vanus*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 154. *Euchaeta hebes* Fig. 156. *Euchirella rostrata* Fig. 153. *Euchaeta acuta* Fig. 155. *Euchaeta marina*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 158. *Heterorhabdus papilliger*

Fig. 157. *Heterorhabdus norvegicus*

Fig. 160. *Labidocera wollastoni**

Fig. 159. *Isias clavipes*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 162. *Mecynocera clausi* Fig. 164. *Metridia longa* Fig. 161. *Lucicutia* spp.* Fig. 163. *Mesocalanus tenuicornis*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ◆: only 1 presence; +: >1 presence data

Copepoda

Fig. 166. *Nannocalanus minor* Fig. 168. *Paracandacia bispinosa* Fig. 165. *Metridia lucens* Fig. 167. *Neocalanus gracilis*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Copepoda

Fig. 170. *Paraeuchaeta gracilis* Fig. 172. *Parapontella brevicornis* Fig. 169. *Paracandacia simplex* Fig. 171. *Paraeuchaeta norvegica*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 174. *Pareucalanus attenuatus*

Fig. 176. *Pleuromamma borealis*

Fig. 173. *Para-Pseudocalanus* spp.*

Fig. 175. *Pleuromamma abdominalis*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 178. *Pleuromamma piseki* Fig. 180. *Pleuromamma xiphias* Fig. 177. *Pleuromamma gracilis* Fig. 179. *Pleuromamma robusta*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Copepoda

Fig. 182. *Pseudocalanus* spp.*

Fig. 184. *Scolecithricella* spp.

Fig. 181. *Pontellina plumata*

Fig. 183. *Rhincalanus nasutus*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 186. *Subeucalanus crassus* Fig. 188. *Temora longicornis* Fig. 185. *Scolecithrix danae* Fig. 187. *Subeucalanus monachus*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 190. *Tortanus discaudatus*

Fig. 192. *Undeuchaeta plumosa*

Fig. 189. *Temora stylifera*

Fig. 191. *Undeuchaeta major*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Fig. 193. *Undinula vulgaris* Fig. 195. *Euterpina acutifrons*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Copepoda

Fig. 198. *Corycaeus* spp. Fig. 200. *Sapphirina* spp. Fig. 197. *Copilia* spp. Fig. 199. *Oncaea* spp.

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ◆: >1 presence data

Copepoda / Cirripedia

Fig. 202. *Oithona* spp.

Fig. 204. Cirripede larvae*

Fig. 201. *Urocorycaeus* spp.

Fig. 203. Caligoida*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Cirripedia / Malacostraca

Fig. 206. Stomatopoda

Fig. 208. Caprellidea

Fig. 205. *Lepas nauplii**

Fig. 207. Isopoda

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Malacostraca

Fig. 210. Hyperidea*

Fig. 212. Mysidacea

Fig. 209. Gammaridea

Fig. 211. Cumacea

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Malacostraca/Chaetognatha

Fig. 214. Decapoda larvae*

Fig. 216. Chaetognatha*

Fig. 213. Euphausiacea*

Fig. 215. Sergestidae

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; +: only 1 presence; ◆: >1 presence data

Bryozoa / Gastropoda

Fig. 218. *Atlanta* spp. Fig. 220. *Clio* spp. Fig. 217. *Cyphonautes* larvae Fig. 219. *Cavolinia* spp.

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Gastropoda

Fig. 222. *Limacina* spp. Fig. 224. *Pneumodermopsis ciliata** Fig. 221. *Diacria* spp. Fig. 223. *Clione limacina*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Gastropoda / Lamellibranchia / Cephalopoda

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data

Echinodermata / Larvacea / Thaliacea

Fig. 230. Echinoderm post-larvae

Fig. 232. Total Thaliacea

Fig. 229. Echinoderm larvae*

Fig. 231. Appendicularia*

A Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Thaliacea / Cephalocordata / Osteichthyes

Fig. 234. Salpidae*

Fig. 236. Fish eggs

Fig. 233. Doliolidae*

Fig. 235. *Branchiostoma lanceolatum*

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ●: only 1 presence; +: >1 presence data

Osteichthyes / Miscellaneous taxa

Fig. 238. 'Fusopsis'

Fig. 240. 'Stellate body' (land plant hair)

Fig. 237. Fish larvae*

Fig. 239. *Pinus* pollen

Grey areas: abundance (scale is $\log_{10}(x+1)$); blank areas: no sampling, or no presence data recorded; O: species never recorded; ♦: only 1 presence; +: >1 presence data