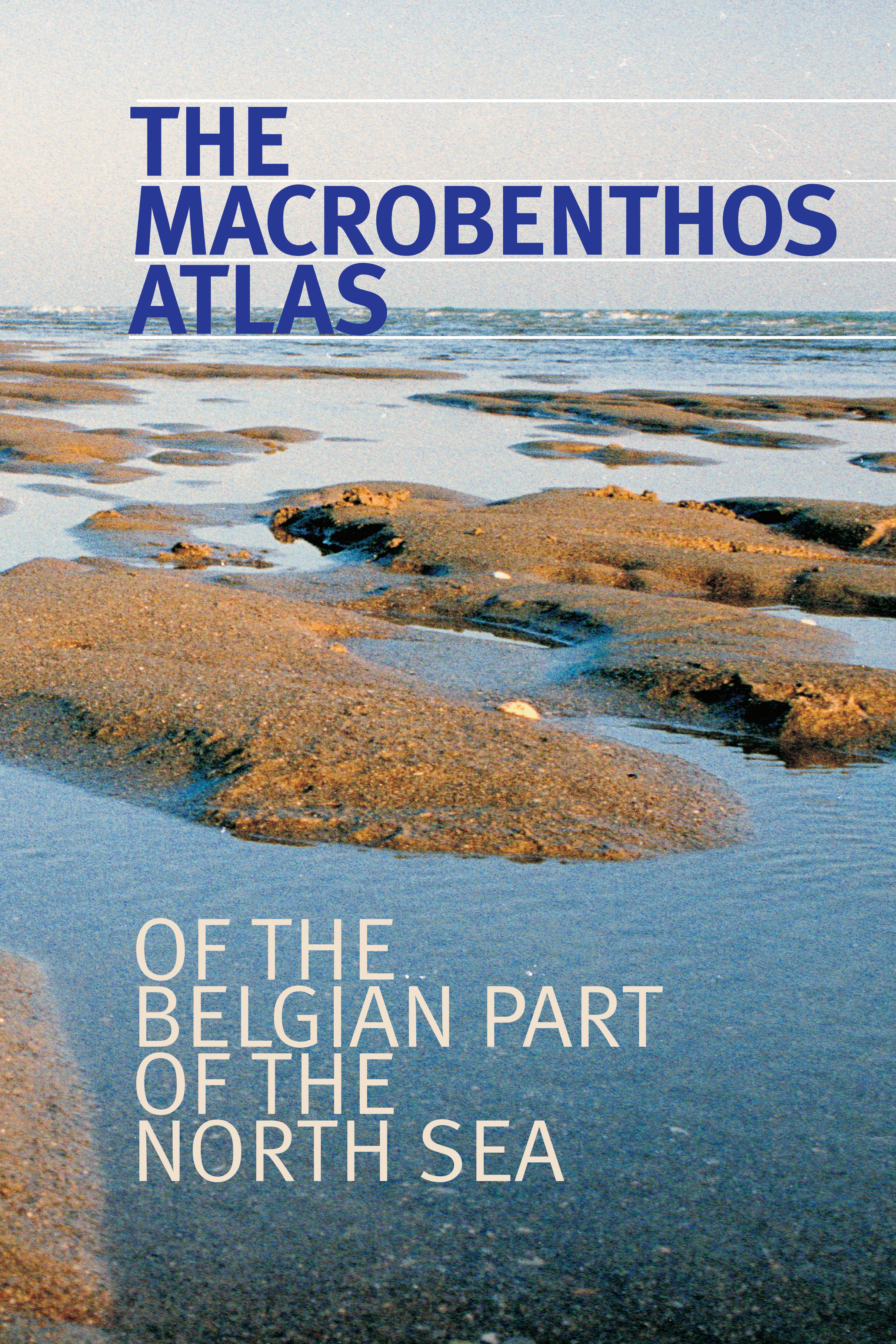
THE MACROBENTHOS ATLAS

OF THE BELGIAN PART OF THE NORTH SEA



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Cover illustration:
Broers Bank at spring tide low water

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PREFACE

Seabed animals are little known to the public. Nevertheless, benthic species play an important role in the food web and the ecosystem; they contribute to the biodiversity and productivity of the sea and act as key indicators of the 'health' of marine systems.

The Marine Biology Section of Ghent University, the initiator of this atlas, is known throughout the world for its expertise in research on marine benthic species. Over a period of more than thirty years the team has achieved this status, first with the study of microscopically small animals and later also with the study of larger organisms such as shellfish, crustacean and fish species. During these studies special attention has always been paid to the influence of man on the marine ecosystem. In all these fields the team has attained great fame under the current leadership of professors Magda Vincx, Ann Vanreusel and Tom Moens. However, a younger generation is on the rise with researchers such as Steven Degraer, who made a major contribution to this publication. This expertise was complemented with the knowledge on marine benthic life in the North Sea collected by the Monitoring Cell of the Institute for Agricultural and Fisheries Research, the successor of the Sea Fisheries Department. This cell has monitored the changes in the benthic life of the North Sea for over 30 years. The realisation of this unique publication would not have been possible without the combination of the data of both institutes.

The experience and expertise of the researchers was used to publish an atlas that compares the distribution of some major benthic species in two time periods twenty years apart. In this manner it is possible to determine whether and to what extent the Belgian North Sea has changed and what may have caused these changes: the eutrophication of coastal waters, beam trawling, climate changes, introduction of new species; all these processes exert a certain influence and it is sometimes hard to determine what exactly caused the changes.

In my capacity as co-ordinator of the Marine Biodiversity and Ecosystem Functioning EU network of excellence MarBEF I consider it an honour to write the preface to this atlas. The main objective of MarBEF is the integration of scientific research on marine biodiversity in Europe and the communication of its results to policy-makers and the public at large. It is the production of publications like this atlas that makes it possible to give this task a local interpretation in the different countries of the European Union that is indispensable for a better understanding of marine biodiversity and the various factors affecting this biodiversity.

Prof. Dr Carlo Heip

INTRODUCTION

Objective

Benthic animals live an almost 'invisible' life. Most people are surprised by the quantity of animals that can be found between the sand grains of the beach or of the sea bottom. Yet these benthic animals play an important part in the marine food web (see below) and serve e.g. as food for various fish species including sole, plaice and turbot. The presence of these benthic animals is to a large extent determined by the quality of the sea water and sea bottom; for this reason the marine benthic animals are used as a bio-indicator of the 'quality' of the sea.

The objective of this atlas is to provide a clear picture of the medium-term evolution (comparison of 1976-1986 period with 1994-2001 period) of the occurrence of some major macrobenthos species (benthic animals larger than 1mm, see below) on the Belgian part of the North Sea (BPNS) by means of distribution maps of these species. In addition the suitability of the bottom (mud content and grain size of the sand) for the various species is discussed as well.

The MACROBEL research project, financed by the Belgian Science Policy, constitutes a collaboration project between the Biology Department (Marine Biology Section) of Ghent University and the Institute for Agriculture and Fisheries Research in Ostend. MACROBEL provides a complete overview of all observations of macrobenthos on the BPNS from 1976 to 2001. This data can be found on the MACROBEL website:
http://www.vliz.be/Vmdcdata/macrobel/index.php.

This concise atlas gives an overview of 53 macrobenthic species, with special attention being paid to:
• a brief description of each species,
• a picture (usually taken under a binocular magnifier as most animals are smaller than 1 cm),
• the distribution of the species on the BPNS in the 1976-1986 and 1994-2001 periods,
• the preference of the species for specific sediment types.

In an introduction to these presentations the main physical and biological characteristics of the benthic ecosystem of the BPNS as well as the composition of this atlas are discussed.
This atlas gives the reader a clear picture of the distribution of the various species and their evolution over the years in a relatively short time.

Target audience

This atlas will open a whole new world for those interested to know more about the little-known life on the bottom of the North Sea. Examining the distribution maps of the various species the interested reader instantly gets a clear picture of the densities in which the bottom animals, all illustrated with pictures, occur in the area. As there is a close relationship between the grain size of the sediments and the occurrence of the species, the habitat preference of the species at the BPNS is described in an original manner. This information can be used to answer scientific questions (what is the impact of human actions on the disturbance of the sea bottom? fining or coarsening of sediments? and the relationship with the fauna?) so as to orientate impact studies. However, it is not possible to make predictions on the evolution of benthic fauna within the framework of impact studies on the basis of these maps. Predictions still require scientific expertise taking into account the biology of the species, which is far more than just the spatial distribution. Readers seeking further information are welcome to contact the authors of this book or their institutions.

The Belgian part of the North Sea

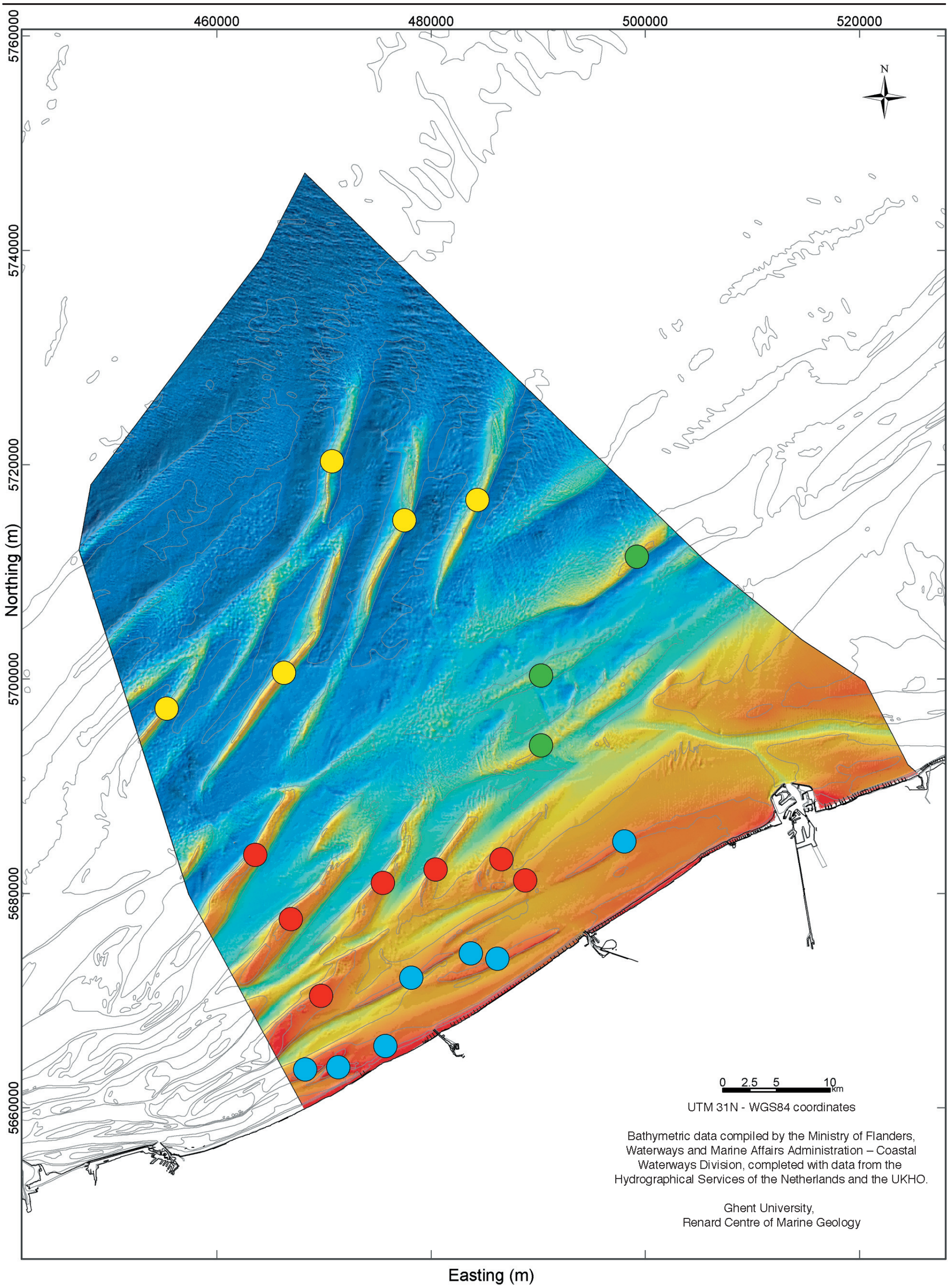
The natural environment: Situation, geomorphology, hydrodynamics and sediment

The Belgian part of the North Sea (BPNS) covers the most south-western part of the North Sea and is bordered by the English Channel to the south-west and by the central part of the North Sea to the north-east (*Figure 1*). The BPNS borders the part of the North Sea of France, the Netherlands and even the United Kingdom. Compared to the part of the North Sea of the above countries the BPNS is rather small. Its overall surface is only 3600 km^2 or 0.6% of the overall North Sea surface whereas the part of the North Sea of the countries neighbouring Belgium is at least 57,000 km^2 large (the Netherlands). This small section of the North Sea nevertheless covers almost 11% of the total surface area of Belgium.

The BPNS is completely situated below the low-water mark and has a maximum depth of 46 metres. It is characterised by a continuous succession of deep and shallow areas, as demonstrated on the water depth, or bathymetric, map (*Figure 2*). The BPNS can consequently be compared with a gently sloping underwater landscape. Up to 40 km off the coast sites are found where the depth of the sea does not exceed 5.4 m (i.e. the shallowest point on the West Hinder sandbank). The shallow areas on the BPNS are the sandbanks; the deeper areas between the sandbanks are called gullies.

Figure 1
The Belgian part of the North Sea, surrounded by France, the Netherlands and the United Kingdom, is situated between the English Channel and the central part of the North Sea.

On the basis of their orientation and depth four sandbank systems can be identified on the BPNS. The sandbank system that is nearest to the coast, the Coastal Banks, runs parallel to the coastline and stretches between the beach and some kilometres off the coast. At low tide the tops or crests of these sandbanks are located only a couple of metres below the water surface. A number of crests are sometimes even uncovered at low tide (see cover picture). The Flemish Banks consist of a series of parallel, south-west/north-east oriented banks situated approximately 10 to 30 km off the coast. At low tide the crests of these banks are situated at an average depth of four metres. Parallel to the coast and at a distance of 15 to 30 km the Zeeland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Bathymetric data compiled by the Ministry of Flanders, Waterways and Marine Affairs Administration – Coastal Waterways Division, completed with data from the Hydrographical Services of the Netherlands and the UKHO.
Ghent University,
Renard Centre of Marine Geology

Figure 2
The sandbank systems are the main feature of the Belgian part of the North Sea: Coastal Banks (blue) (east to west: Wenduine Bank, Stroom Bank, Baland Bank, Nieuwpoort Bank, den Oever, Broers Bank and Trapegeer), (2) Flemish Banks (red) (east to west: Ravelingen Bank, Oostende Bank, Middelkerke Bank, Kwinte Bank, Smal Bank, Buiten Ratel and Oost Dyck), (3) Zeeland banks (green) (east to west: Thornton Bank, Goote Bank, Akkaert Bank) and (4) Hinder Banks (yellow) (east to west: Bligh Bank, East Hinder Bank, North Hinder Bank, West Hinder Bank and the Fairy Bank).

Banks can be found. With a single exception, the crests of these banks are located below the 10 m depth line. The last sandbank system, the Hinder Banks, is located 35 to 60 km off the coast. These banks have a south-west/north-east orientation and just like the Zeeland Banks they are located below the 10 m depth line.

The sandbanks on the BPNS came into existence as the result of sediment deposition near hard-core bulges in the underlying substrate. The sediment was mainly deposited during the Holocene. This happened in different stages and depended on the prevailing hydrodynamic conditions and the supply of sediments.

The seawater at the BPNS is continuously moving because of the prevailing tidal currents and the wave action, also called hydrodynamics. At high tide Atlantic water flows through the English Channel into the North Sea. At low tide part of this water flows back in the direction of the Atlantic Ocean. This so-called tidal current is oriented mainly parallel to the coast and results in a well-mixed water column near the BPNS. Apart from this oceanic seawater the BPNS is also influenced by a constant freshwater supply from the rivers Somme, Canche, Authie, Yser, Scheldt, Meuse and Rhine (south to north). Combined with numerous other processes, including wave action, these currents result in a clear gradient in the seawater in the direction of the coast. The near-coastal zone is characterised by mainly turbid and nutrient-rich water whereas the water farther off the coast is more transparent and poorer in nutrients.

The strong tidal currents and wave action are furthermore responsible for the highly dynamic nature of the sandbank systems. In stormy weather the sand of the shallow crest zone is transported to the gully under the influence of the wave action. Erosion takes place. In calm weather this erosion is compensated by so-called helicoidal flows. These flows develop as a result of the fact that the tidal currents are weaker near the sides of the sandbanks than in the gullies. To compensate this difference in speed the water flows from the gully towards the crest according to a helicoidal pattern. This water entrains sand and the sand in the crest zone is thus replenished. Accretion takes place.

Although one may deduce that these sandbanks are constantly on the move, most banks and gullies appear to be generally very stable. During the past 180 years the sandbanks have more or less remained at exactly the same spot. The dynamic nature of sandbanks is therefore mainly observed in the crest zones while the geographical position of the sandbank itself changes hardly or not at all.

The combination of a complex bathymetry and hydrodynamics is responsible for a high diversity of sediment types on the BPNS (*Figure 3*) varying from very fine

Figure 3

The Belgian part of the North Sea is characterised by a wide range of sediment types. Silty areas alternate with coarse-grained substrates. Here and there large stones were even discovered on the sediment surface (Lanckneus et al.*, 2002)[1].*

Median grain size of the sand fraction (surficial sediments)

63 - 125 µm: very fine sand

125 - 250 µm: fine sand

125 - 250 µm: medium to coarse sand

mud to coarse sand. In some places, gravel beds, even large stones measuring some tens of centimetres in diameter were found on the sediment surface. Coarser sediment is generally deposited in places with a strong current or with strong wave action whereas finer sediments occur in places where the current and the wave action are weaker. However, the sediment supply is also important.

For example, much mud is deposited between Ostend and Zeebrugge as a consequence of the local accumulation of mud in the water column. This accumulation is due to the specific hydrodynamic conditions of the area, resulting, as it were, in the creation of a mud trap. The high mud concentrations increase the chance of mud deposition, as a result of which the area is characterised by vast mud beds.

The occurrence of gravel beds is a second example of the importance of sediment supply. On the BPNS flint nodules can be found measuring some tens of centimetres in diameter. These stones are thought to originate from the collapse and successive erosion of the chalk cliffs in the Dover straights (along the Cap Blanc Nez – Dover axis). After local deposition the flint nodules were transported by the tidal currents and thus reached the BPNS.

The presence of sandbank systems, the complex hydrodynamics and the high diversity of sediment types make the BPNS unique in the North Sea not only from a geological but also from a biological point of view.

Human impacts: Fisheries, sand extraction and eutrophication

The Southern Bight of the North Sea and in particular the part along the Belgian and Dutch coasts is the centre of intense commercial activity aimed at the exploitation of mineral (oil, gas, gravel) and living resources (fish, shrimps), transportation (pipelines, commercial shipping), infrastructure works (drilling rigs, buoys) and recreation (pleasure cruising, coastal tourism).

Especially the following activities affect the ecosystem of the Belgian part of the North Sea (BPNS):

- fishing and the removal of natural plant and animal reserves,
- sand and gravel extraction,
- chemical pollution (PCBs and heavy metals) and seawater eutrophication (nutrient supply process induced by human activities that stimulates primary production and disturbs the balance of the food web),
- changes in the coastal landscape induced by the construction of tourist centres and resulting in dune erosion and the disintegration of the natural coastal defence structures, and
- global climate changes (including temperature increases).

Normally, the effects of similar disturbances are much more negative on land than in the sea. The sea actually works as a very large dynamically balanced buffer. Recovery thus remains possible to a certain extent at this time. However, it is currently not possible to assess the buffer capacity of the North Sea. It is therefore recommended to manage this environment carefully.

Two activities have a considerable environmental influence on the BPNS: fisheries and sand extraction. The impact of

Figure 4
Beam trawling seriously affects benthic communities.

both activities on the natural ecosystem is discussed below.

Offshore fishing

The tickler chains of the frequently used beam trawl (a fishing device dragged along the bottom to catch bottom fish such as plaice, sole and cod) plough the bottom to a depth of over ten centimetres. All organisms in the upper sediment layers are thus uncovered and washed through the net, after which they sink back to the bottom. Several organisms manage to burrow in the bottom again, but many are injured so severely that they die.

The survival rate differs strongly depending on the species. Bivalves (Bivalvia) for example have hard shells and consequently have a better chance of escaping from the net unharmed than e.g. sea potatoes (Echinodermata: *Echinocardium cordatum*), who have a fragile skeleton, or bristle worms (Polychaeta), who do not have any hard body parts. As every square metre of the bottom of the North Sea is fished with a beam trawl on average once a year and every square metre of the North Sea off the Belgian coast is fished with a beam trawl over ten times a year, beam trawling is considered to have a detrimental effect on benthic communities.
Until now it has not yet been possible to make an exact assessment of the extent to which beam trawling results in a loss of biodiversity. Because of the strong surge in the shallow North Sea sediments are turned over very regularly and the benthos surviving there is adapted to these highly hydrodynamic environments.

The Institute for Agriculture and Fisheries Research investigates and develops methodologies to reduce the detrimental impacts of beam trawling on the benthic life, among which the use of electrical pulses instead of tickler chains in shrimp fisheries, or the introduction of an "escape panel" in the lower part of the net.

Sand extraction

Sand and gravel is removed (dredged) from various sandbanks on the BPNS. This sand is used in the building industry, for land reclamation (e.g. the port of Zeebrugge), for shoreface nourishment as a means of coastal defence (e.g. shoreface De Haan) or for beach nourishment (e.g. the beach in front of the centre of Ostend). Valuable habitat is lost in this manner. Insofar the banks continue to exist, the bottom animals living there suffer under the dredging operations. They are sucked up together with the sediment and dumped in the dredger. Many organisms return to the sea together with the excessive water, but they will be badly injured and die. Dredging furthermore leads to the pumping and turning-over of sediments, which usually results in clouding of the water (mud in the water column) and/or brings about changes in the sediments. The turbid water hampers the respiration of different benthic organisms, usually resulting in death, while altered sediments may no longer be suitable as a habitat for the communities originally living there.

Figure 5
Many benthic organisms are sucked up together with the sand during sand extraction and will die as a consequence of the incurred injuries.

Life at the bottom of the sea

The benthic ecosystem components

Marine benthic animals or zoobenthos (also abbreviated to benthos) occur in large numbers on and in all substrates of the sea (soft sediments and rocks). The benthos is subdivided into five groups of organisms that are distinguished on the basis of their size and/or occurrence in the substrate.

Just above the soil we can find the hyperbenthos (esp. opossum shrimps, amphipods and larvae from the epibenthos) and the epibenthos (esp. fish, crustaceans and sea stars). Organisms living in the bottom are classified from small to large: the microbenthos (esp. bacteria and unicellular organisms), the meiobenthos (esp. nematodes or roundworms and copepod crustaceans) and the macrobenthos (esp. bristle worms, shellfish and crustaceans).

Figure 6
The amphipod Gammarus *and the opossum shrimp* Neomysis *are typical representatives of the hyperbenthos.*

The hyperbenthos

The lower layers of the water column, just above the sea bottom, are inhabited by a group of typical, small animals (a few mm long) that constitute the hyperbenthos. They represent an important link in the food web as a source of food for e.g. young fish and shrimps. The composition of these species is very typical and mainly consists of small crustaceans (*Figure 6*). In late spring the larvae of bottom fish live close to the bottom as well and constitute a major part of the hyperbenthos (especially in shallow areas such as the North Sea). As the hyperbenthos lives in the water the species interact both with the plankton (lives exclusively in the water column and feeds on food from the water) and with the benthos (hyperbenthos mainly feeds on food located near or on the sea bottom). Some hyperbenthic species live very close to the bottom or burrow regularly, as a result of which they are frequently found during macrobenthos sampling.

The epibenthos

The sediment surface is inhabited by a community of large, active animals including sea stars, brittle stars, crabs, lobsters, bottom fish and cephalopods. These species usually crawl across the sea bottom but some of them are also able to swim. Most species are notorious predatory animals (predators) that feed on smaller bottom animals and fish. These species are sampled by means of a beam trawl in the same manner as consumable bottom fish (e.g. sole, turbot) are caught (*Figure 7*). When caught by commercial fishermen these benthic species are thrown back into the sea, but only a small percentage will survive.

Figure 7

A beam trawl is used to bring a rich epibenthic community of large, active animals such as sea stars, brittle stars, crabs, lobsters, bottom fish and cephalopods on deck.

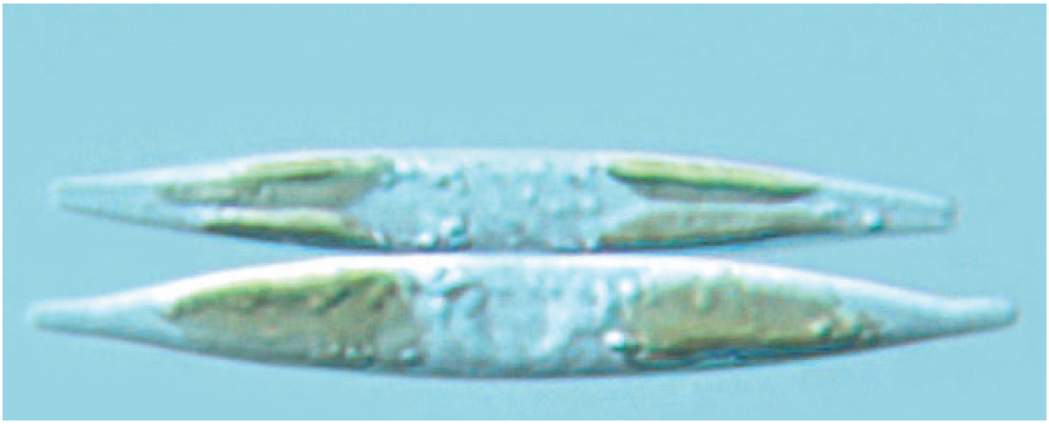


Figure 8
The microbenthos covers a multitude of unicellular organisms.

The microbenthos

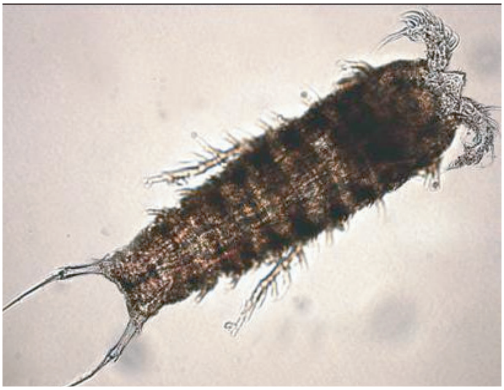
Between and on the sand or silt grains on the sea floor unicellular organisms (diatoms, ciliates...) and bacteria can be found that constitute a very important link in the microbial loop of the food web (*Figure 8*). The microbenthos consists of very small creatures occurring in very large numbers, and covers a wide range of different species. The major part of the microbial food web of the sea is still unknown!

The meiobenthos

The meiobenthos comprises all multicellular animals measuring less than 1 mm long. The meiobenthic biotope is mainly confined to the interstitial space (filled with seawater) between the sand grains. The meiobenthos is characterised by a large variety of invertebrates and can be found in many forms at the bottom of the sea (*Figure 9*). In addition, the evolutionary relationships between these faunal groups are still far from clear. There is a close correspondence between the multitude of species of the meiobenthos and the grain size composition of the sediment: substrates with an average grain size of 300-400 µm house the largest number of species (up to 100 meiobenthic species per 10 cm^2).

Figure 9

The meiobenthos is characterised by a large variety of invertebrates, including copepod crustaceans or Copepoda and roundworms or Nematoda.



The macrobenthos

The macrobenthos is generally defined as the collection of animals that live buried in the sea bottom and measure over 1 mm long. Synonyms for the term macrobenthos are macro-infauna and macro-endobenthos. These species will be discussed more elaborately in this atlas.

The macrobenthos lives freely in and on the sea bottom, in burrow systems between the sand grains (e.g. lugworm

Figure 10

By building burrow systems and tubes the lugworm Arenicola marina *and the sand mason* Lanice conchilega *play an important part in the ecosystem of the sea bottom.*

Arenicola marina) or in self-constructed tubes (e.g. sand mason *Lanice conchilega*) consisting of sand grains cemented together with slime produced by the animals themselves (*Figure 10*). In this manner the macrobenthos fixes the sediment and thanks to their activity within these burrow systems and tubes they ensure a better oxygen distribution in the bottom. The presence of macrofauna also plays an important structural part in the composition of the entire ecosystem of the sea bottom.

Soft sediments are mainly inhabited by bivalves (Bivalvia), bristle worms (Polychaeta), small crustaceans (Crustacea such as amphipods and isopods) and echinoderms (Echinodermata) (*Figure 11*).

The ***bivalves*** or ***Bivalvia*** (including the cut trough shell *Spisula subtruncata* and the white furrow shell *Abra alba*) as well as six other groups belong to the molluscs or Mollusca. The other groups are: Aplacophora (worm-like molluscs), Monoplacophora (limpet-like molluscs), Polyplacophora (chitons), Gastropoda (univalves), Scaphopoda (tusk shells) and Cephalopoda (cephalopods).
The most common group in the macrobenthos of the North Sea are the Bivalvia.

Figure 11
The macrobenthos of a piece of the bottom of the North Sea after sieving through a 1 mm sieve and seen under a binocular magnifier.

The body of the Bivalvia is typically covered by two calcareous valves (hence its name) and has two siphons at the back. These siphons can be protruded between the valves and serve to suck up water as well as oxygen and food particles. Animals living deeply buried (up to 50 cm) have long siphons to reach the sediment surface whereas species living just under the sediment surface typically have very short or even no siphons. The species can be recognised by the structure of the shells.

The ***bristle worms*** or ***Polychaeta*** (including the sand mason *Lanice conchilega*, the clam worm *Eunereis longissima* and the white catworm *Nephtys cirrosa*) as well as the Oligochaeta (including the nightcrawler *Lumbricus terrestris*) and the Hirudina (the leeches) belong to the segmented worms or Annelida. As the name suggests, their body consists of a whole series of successive segments that bear hairs or bristles on the sides. Most are only some centimetres long but some species can measure up to tens of centimetres.

The majority of bristle worms live buried in the sediment. Their food consists of small particles of organic matter. They either get this food from between the sand grains (the deposit feeders and predators, which feed on micro- and meiobenthos) or have long tentacles with which they collect food particles from the top of the substrate (the selective deposit feeders) or filter food from the water column with a crown of pinnate tentacles (filter feeders).

The ***crustaceans*** or ***Crustacea*** (including the amphipod *Urothoe poseidonis* and the thumbnail crab *Thia scutellata*) as well as the insects and spiders belong to the arthropods or Arthropoda. The crustaceans are sometimes called the 'insects of the sea' because of the multitude of crustacean species in the sea, where there are no insects. The most common groups in the macrofauna are the amphipods (Amphipoda), cumaceans (Cumacea), buried crabs and lobsters (Decapoda) and isopods (Isopoda).

The body consists of a head (*cephalon*), a middle region (*thorax*) and a hind region (*abdomen*) with a tail (*telson*) and is completely covered by a calcified skeleton. Crustaceans need to shed their skin regularly in order to be able to grow; if their armature becomes too small it breaks open, the animal crawls out and builds a new, larger skeleton. Head and thorax segments may be fused and partially or completely covered by a carapace. Both the head, the thorax and the abdomen bear various segmental appendages used for food absorption, running and swimming. The head features antennae used for feeling and smelling as well as eyes.

Within the ***echinoderms*** or ***Echinodermata*** (including the sea potato *Echinocardium cordatum* and the sand brittle-star *Ophiura ophiura*) six groups can be discerned: the Crinoidea (sea lilies), Concentricycloidea (sea daisies), Asteroidea (sea stars) and Holothuroidea (sea cucumbers), Ophiuroidea (brittle stars) and Echinoidea (sea urchins). At the BPNS mainly the latter two groups can be found.

Echinoderms have a characteristic build: pentaradial symmetry and an internal skeleton consisting of numerous calcareous plates. The calcareous plates are held together by muscles and ligaments, resulting in a versatile body as found in sea stars and brittle-stars or in a solid box-like skeleton as found in sea urchins. Locomotion is achieved by means of a unique system in which muscles control the contractions of numerous suction feet. The latter are also used as palps or for breathing and feeding. Like most other echinoderms, brittle stars and sea urchins are deposit feeders and collect food from between the sand grains with the little suction feet located around the mouth opening whereas their close relatives, the large epibenthic sea stars, are mostly predators which bulge out their stomach between the shells of bivalves and thus digest their prey.

The macrobenthos of the Belgian part of the North Sea

The five benthic ecosystem components of the Belgian part of the North Sea (BPNS) have been studied with varying intensity since 1970. A summary of this data is represented in the overview article of Cattrijsse & Vincx (2001)[2]. This part of the atlas discusses the macrobenthos of the BPNS in greater detail.

Up to now, 265 macrobenthic species have been discovered on the BPNS. Please refer to the Appendix for a complete overview of these species. The most numerous representatives of the macrobenthos of the BPNS are the Polychaeta or bristle worms, the Bivalvia or bivalves and the Amphipoda or amphipods. In addition, macrobenthic Decapoda or crabs and shrimps, Echinodermata or echinoderms and Gastropoda or univalves are regularly found on the BPNS. Representatives of 12 other higher taxa are furthermore observed sporadically.

The macrobenthic diversity is not the same everywhere on the BPNS: areas with a high diversity alternate with areas with a low diversity (*Figure 12*). A high diversity of species (up to 81 species per station) and a high density (up to 144,493 macrobenthic organisms per square metre) are recorded near the western coastal zone, the eastern part of the Flemish Banks and the southern part of the Zeeland Banks. The western part of the Flemish Banks is characterised by an average diversity of species, but a relatively high macrobenthic density. An average diversity of species and an average density is found in the open sea zone whereas the eastern coastal zone is generally characterised by the lowest diversity of species and the lowest density.

The macrobenthic species are not randomly spread across the BPNS either. A species can only survive in a suitable habitat. In this context, a habitat is defined as the environment in which the species occurs. Some species are able to adapt to a wide range of environmental conditions (eurytopic species) whereas others can only tolerate a narrow range of environmental conditions (stenotopic species). A habitat is characterised by elements such as the composition of the sediment, the flow patterns, the availability of oxygen and food and the presence of other species. This atlas describes the habitat of each species in terms of the average grain size and mud content of the sediment.

Species that prefer the same habitat are often found together. The combination of these species is called a community. Currently five communities can be distinguished in the soft substrates of the BPNS. Each of these communities is named after the most typical species within the community. A brief description of these communities and their habitat is given below. For a more detailed description please refer to Van Hoey *et al.* (2004)[3].

The communities can be classified according to the grain size of the sediment and each of them is found in a typical area of the BPNS (*Figure 13*). Coarse-grained sediments, especially far off the coast, are mainly inhabited by the *Ophelia limacina – Glycera lapidum* community. This community is characterised

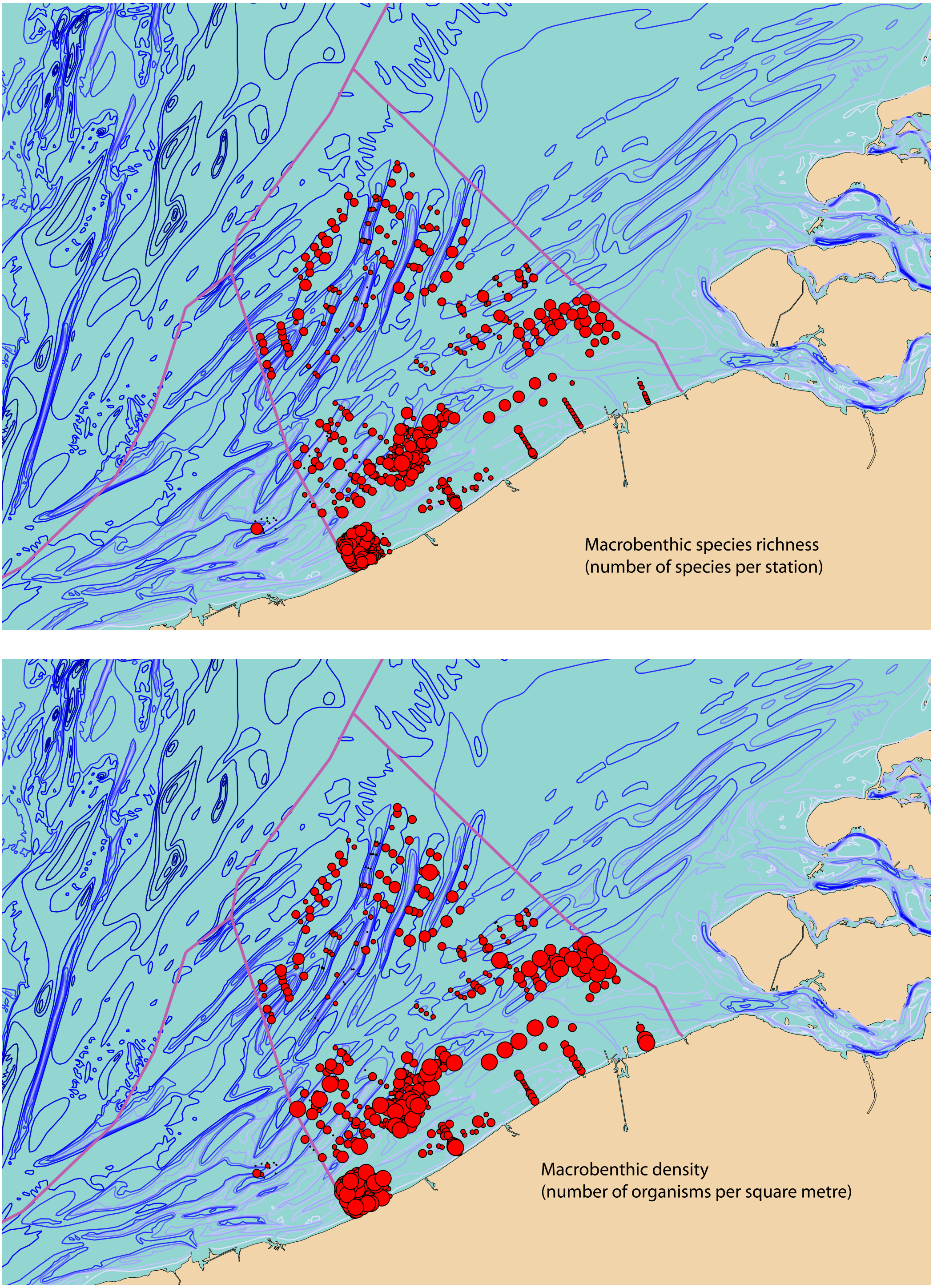


Figure 12

Areas with a high macrobenthic diversity alternate with areas with a lower diversity on the Belgian part of the North Sea. The areas with the highest diversity are the western coastal zone, the eastern part of the Flemish Banks and the southern part of the Zeeland Banks.

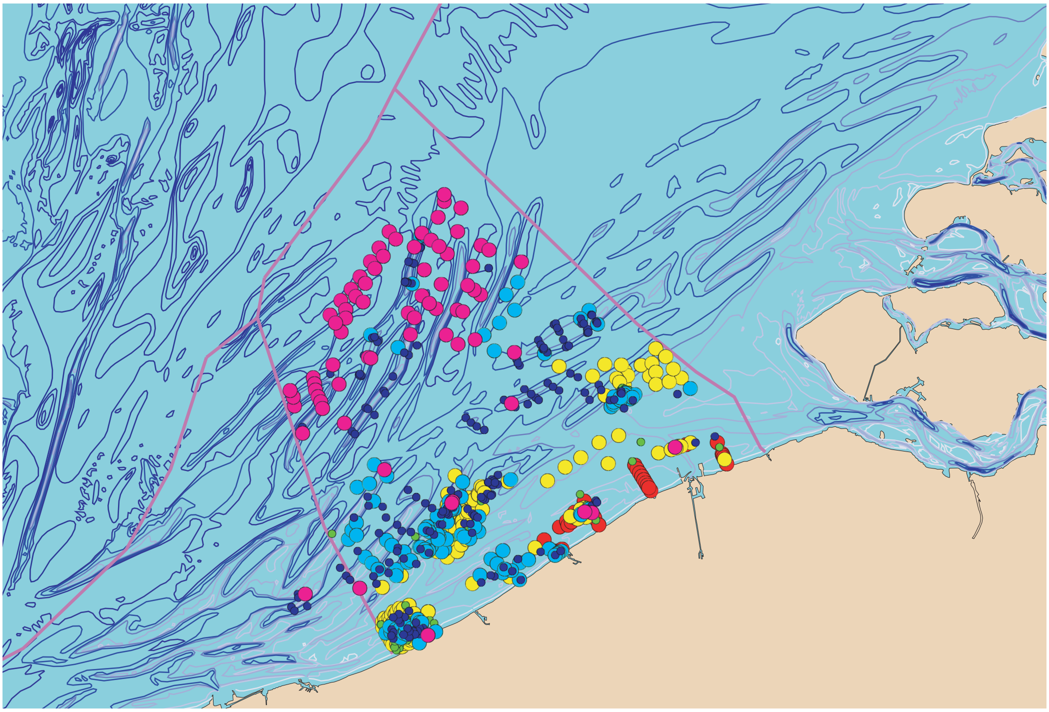


Figure 13

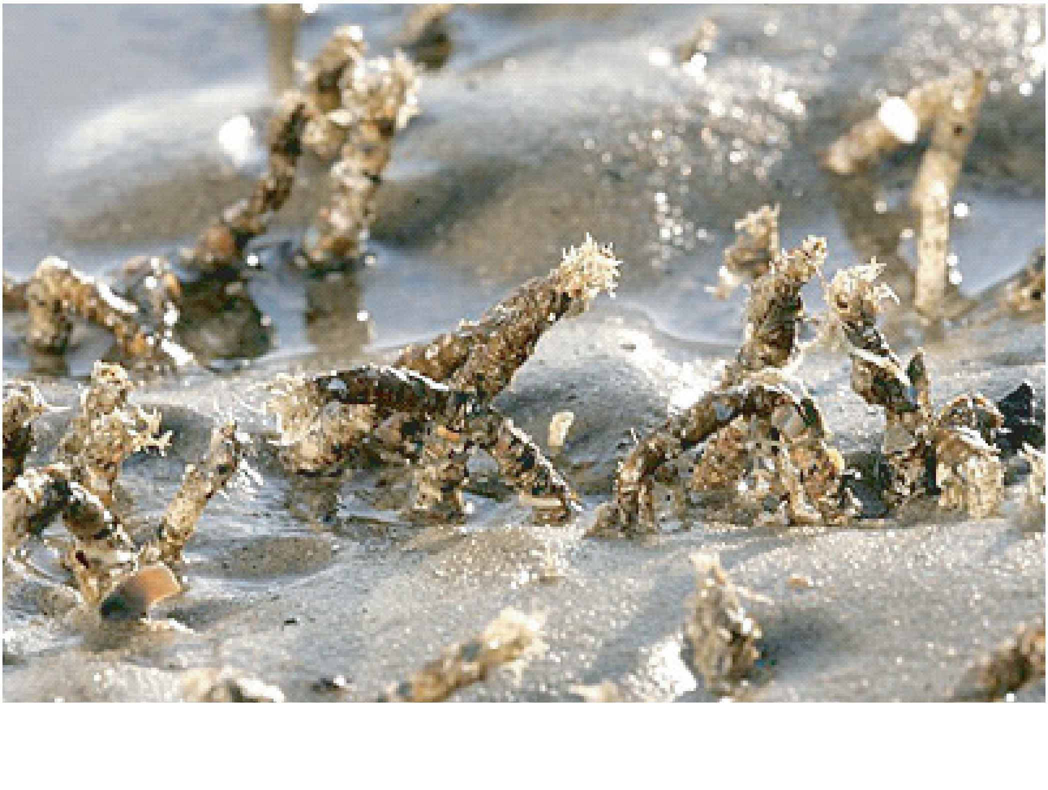
Four macrobenthic communities are commonly observed on the Belgian part of the North Sea. They each have a specific distribution pattern and gradually blend into each other through transient species associations. Large dots: Purple, Ophelia limacina – Glycera lapidum *community; Light blue,* Nephtys cirrosa *community; Yellow,* Abra alba – Mysella bidentata *community; Red,* Macoma balthica *community. Small dots: Green, transient species association between* A. alba – M. bidentata *community and* N. cirrosa *community; Dark blue, transient species association between* N. cirrosa *community and* O. limacina – G. lapidum *community.*

by a very low diversity of species and a very low density. The *Nephtys cirrosa* community – the most widely spread community on the BPNS – occurs in somewhat more fine-grained sediments and has a low diversity of species and a low density. In finer sediment enriched with mud we can find the *Abra alba – Mysella bidentata* community. This community is characterised by a high diversity of species and a high density and is considered the most diverse macrobenthic community of the soft substrates of the BPNS. This community is mainly found in the near-coastal zone. In even more fine-grained sediments enriched with more mud the diversity of species and the density decrease. Here we can find the habitat of the *Macoma balthica* community, which is mainly observed in the eastern coastal zone. Naturally there are no clear boundaries between these communities; they gradually blend into each other. Such transitions are called transient associations.

The *Barnea candida* community is the only exception to this pattern. This community features a low diversity and density and is typically found in places where compact, tertiary clay layers outcrop. The rarity of this community is directly linked to the rarity of its habitat (not represented in Figure 13).

The physical habitat is not the only decisive factor for the distribution of the species. Some macrobenthic species play a significant structural part in the benthic habitat. Sites on the BPNS with a high density of the sand mason *Lanice conchilega* act as a refuge for several other macrobenthic as well as epibenthic species (*Figure 14*). *Lanice conchilega* builds tubes that protrude up to several centimetres above the surface. When this bristle worm occurs in high densities (up to several thousands per square metre!) this goes hand in hand with a very high macrobenthic density and diversity of species. In such cases the term '*Lanice* reef' is sometimes used.

Figure 14
Fields of the sand mason Lanice conchilega *result in a high macrobenthic density and diversity of species. Such fields are called a '*Lanice *reef'.*



The macrobenthos atlas of the Belgian part of the North Sea

Data availability

The macrobenthos of the Belgian part of the North Sea (BPNS) was intensively sampled and studied during the 1976-1986 and 1994-2001 periods. A total of 979 samples were collected at 771 different sampling points (*Figure 15*); 135 of these locations were sampled in the 1976-1986 period, 647 were sampled in the 1994-2001 period.

The samples were collected within the scope of various research projects, each with a unique objective. Consequently, the intensity of sampling in both periods is not evenly distributed over the BPNS. In both periods research mainly focused on the western Coastal Banks and the Flemish Banks. Occasional samples were furthermore collected in both periods near the other Coastal Banks, the Zeeland Banks and the Hinder Banks. Whereas the sampling in the 1976-1986 period mainly focused on the crests of the sandbanks quite a number of samples were also collected from the gullies between the sandbanks in the 1994-2001 period.

All samples were collected with a Van Veen grab (*Figure 16*). This grab allows swift collection of samples of the macrobenthos of the sea bottom. The Van Veen grabs used within this context dig out the sediment over an area of 0.1 or 0.12 m^2 to a depth of about 10 cm. As nearly all macrobenthic species live in the upper 10 cm of the sediment the Van Veen grab digs out the majority of the macrobenthos with the sediment over an area of 0.1 or 0.12 m^2.

After sampling the macrobenthos is separated from the sediment by sieving the sample over a sieve with a standard mesh size of 1 mm. The sediment passes through the sieve while the macrobenthic organisms and coarse sediment particles remain behind. The macrobenthos is subsequently fixed and preserved in an 8% formaldehyde-seawater solution.
This strategy was followed in the 1994-2001 period. In the 1976-1986 period, however, an alternative method was used. The macrobenthos was fixed before being sieved and the sieve used had a mesh width of 0.86 mm. When the macrobenthos is rinsed alive (fixation after sieving) some species can actively slip through the meshes of the sieve. If a sieve with finer meshes is used, smaller species will also remain behind. Consequently, more and smaller macrobenthic organisms remained behind in the 1976-1986 period than in the 1994-2001 period. Such a difference poses problems for detailed interpretation of data, but causes only minor disturbance of the general patterns. The general patterns discussed in this atlas are only slightly affected by the difference in methods between both periods.

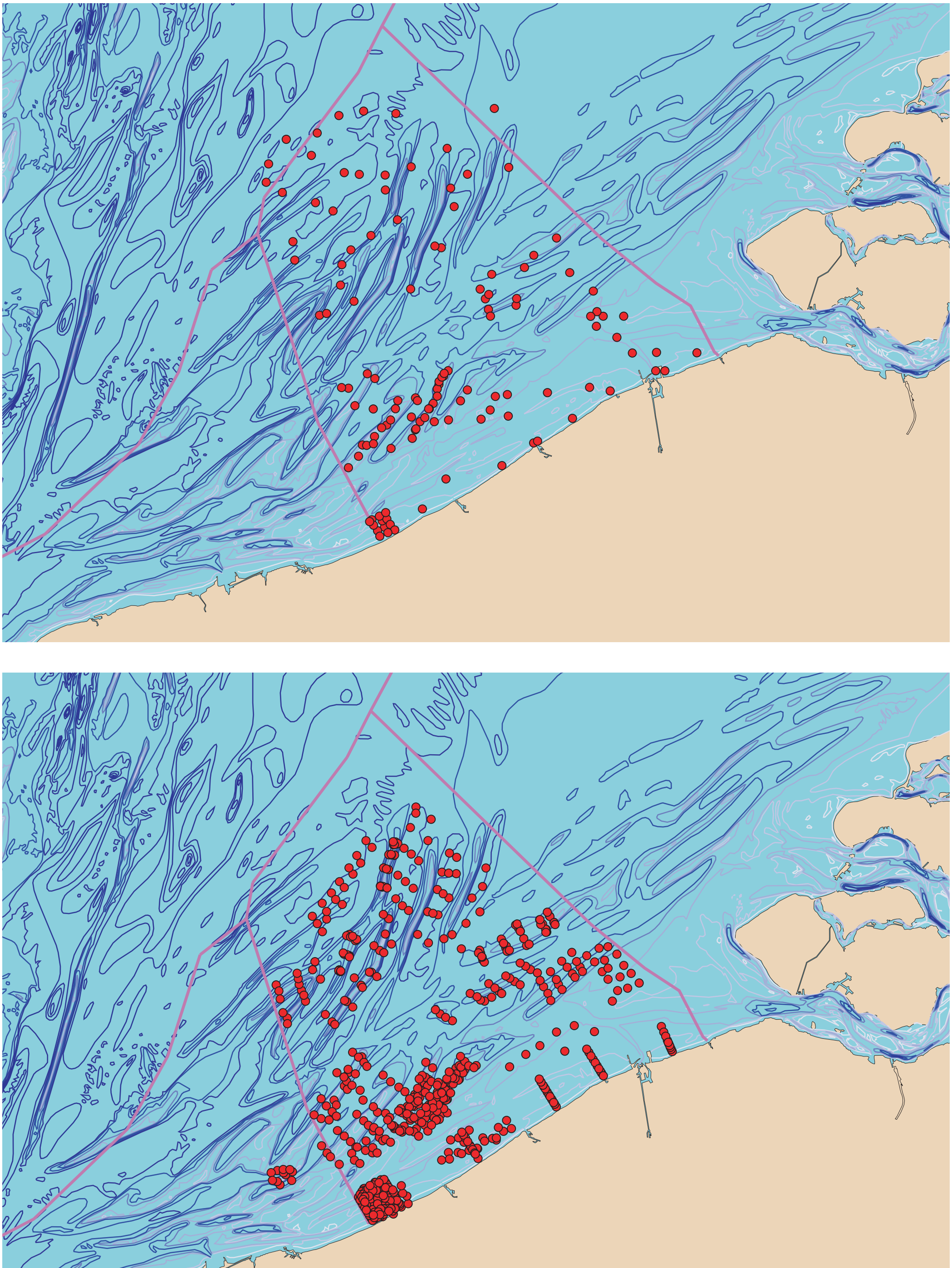
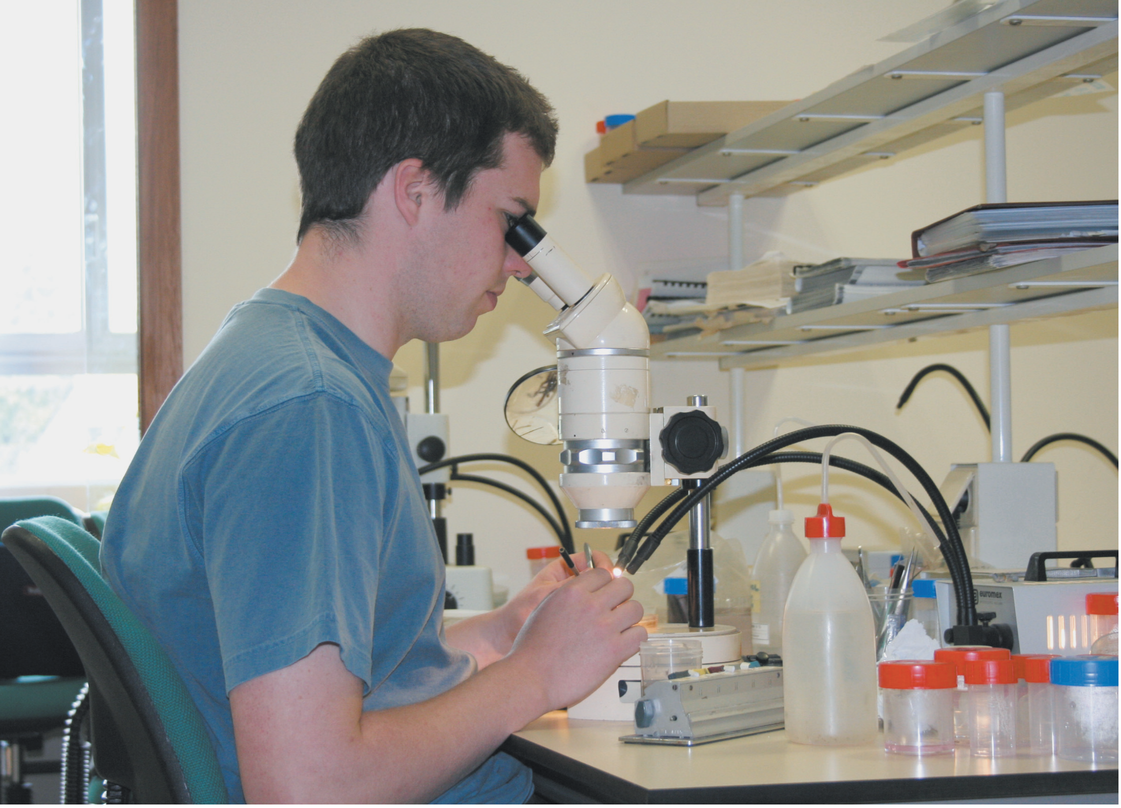


Figure 15

The macrobenthos of the Belgian part of the North Sea was sampled at 135 locations in the 1976-1986 period (top) and at 647 locations in the 1994-2001 period (bottom).

Figure 16

Samples of the macrobenthos are collected by means of a Van Veen grab and passed over a sieve with a mesh size of 1 mm.



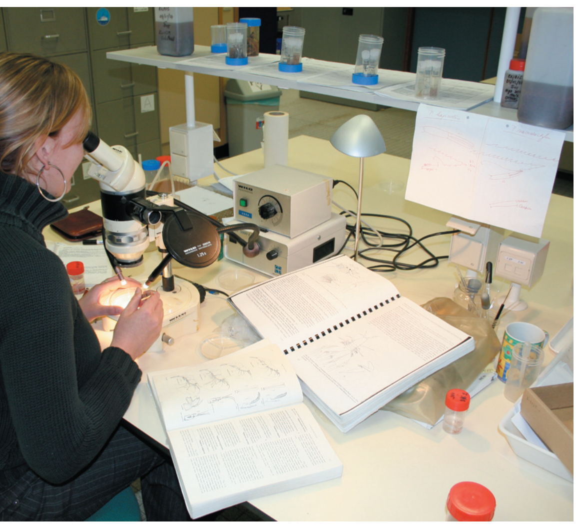


Figure 17
All organisms are identified in the laboratory to the level of species.

By means of specialised identification keys all organisms were indentified up to the level of species in the laboratory (*Figure 17*). The number of individuals per species and per sample were counted and standardised to the number of individuals per square metre. This standardisation is generally used for the examination of the macrobenthos.

The data is stored in the MS Access "MACROBEL" database. The MACROBEL database was developed at Ghent University (Tim Deprez) and passed on to the Flanders Marine Institute (VLIZ) within the scope of this project. The MS Access database was subsequently converted into an MS SQL database. The database consists of 31 related tables and constitutes a collection of 265 species names, 771 stations and 21,041 distribution data elements. Apart from these numbers, biomasses and densities, granulometric data of the sediment samples was collected as well.

Species selection

Not all 265 macrobenthic species are discussed in this atlas. Only those species that meet the following three criteria were selected:

(1) All selected species need to be collected with the Van Veen grab in a correct manner. Apart from the macrobenthos different species not belonging to the macrobenthos can accidentally end up in the grab. Free-swimming organisms such as most opossum shrimps (Mysida), crab larvae or fish are sometimes found in the Van Veen grab. These species were not sampled in a correct manner and were therefore not included in the atlas.
(2) All selected species need to be collected with the Van Veen grab in a representative manner. The Van Veen grab collects all organisms up to a depth of approximately 10 cm in the sediment. This means that deeply buried species such as the razor clams *Ensis* spp. and the lugworm *Arenicola marina* are not efficiently sampled. The grab only holds a portion of the specimens present and the sample consequently does not give a representative picture of the density and distribution of these species. These species were not included in the atlas either.
(3) Only common species qualified for selection. Common species are defined as species that have a high occurrence frequency and/or occur in high densities. There is not enough data available on rare species to investigate their distribution and habitat preference in a reliable manner. Rare species were not included in the atlas.

On the basis of the criteria above 53 species were selected. These species belong to different taxonomic groups or taxa: eleven species belong to the bivalves or Bivalvia, 25 to the bristle worms or Polychaeta, twelve to the crustaceans or Crustacea, four to the echinoderms or Echinodermata and one to the lancelets or Cephalochordata.

The species are ordered by taxon. Within each taxon the species are arranged alphabetically.

For the distribution maps of the non-selected species please refer to the MACROBEL website http://www.vliz.be/Vmdcdata/macrobel/index.php or the attached CD-ROM.

Species discussion

Taxonomy

Taxonomy is more than Latin animal names.

Taxonomy ('taxis' and 'nomos' are the Greek words for 'order' and 'law' respectively) is the science concerned with the classification and naming of all living creatures. The classification is a hierarchical system in which smaller entities are grouped into larger entities. The system was founded by the Swede Carolus Linnaeus (1707-1778). He was also the man who invented a naming system still used today: the binomial system. In this system each species is given a unique name represented by two Latin names: the first name refers to the genus, the second name refers to the species.

An example of taxonomic classification with the usual Latin name is:

Homo sapiens, man

- *Kingdom (Regnum): Animals (Animalia)*
- *Phylum (Phylum): Vertebrates (Chordata)*
- *Class (Classis): Mammals (Mammalia)*
- *Order (Ordo): Primates (Primates)*
- *Family (Familia): Hominids (Hominidae)*
- *Genus (Genus): Man (*Homo*)*
- *Species (Species): 'knowing man' (*sapiens*)*

The systematic place of a species is a representation of the relationships between the different organisms. In this atlas the systematic place of each species is given in accordance with the data to be found in the Register of Marine Species - APHIA database of the Flanders Marine Institute (VLIZ, 2005; http://www.vliz.be/Vmdcdata/aphia/index.htm). This list is based upon the most recent scientific literature.

Synonyms

The correct scientific name of each species is mentioned in this atlas together with the name of the author responsible for the naming. Very frequently species are described as new although it appears later that they were known already. For this reason names can be synonymised.

Common names

As most macrobenthos species are rather small and live without being noticed, there are only few known common names. However, if the species has a commonly used name in Dutch, English, German and/or French, this name is included in the discussion of the species.

Picture

A picture is shown of each species. Most pictures were taken of dead and fixed specimens, which explains why most of the animals have lost their colour and are dirty white. Some animals are coloured pink as a result of the colouring agent (Bengal Rose) added to the samples to facilitate sorting and counting of the animals.

The pictures of the larger organisms were made with a digital camera (Traveller DC6300). The smaller species were photographed with a digital camera (Zeiss Axiocam MRc) under a binocular magnifier (Zeiss Stemi 2000-C) against a dark background and with side lighting. To increase the depth of field several pictures were taken of each organism with focus in different planes. These pictures were subsequently converted into a single picture and refreshed in great detail with the software programme Paint Shop Pro version 8 and 9.

Description

The most striking features of the appearance and build (morphology) of each species are discussed briefly. However, it is not the objective to summarise all characteristics required to distinguish the species from other species.

Distribution

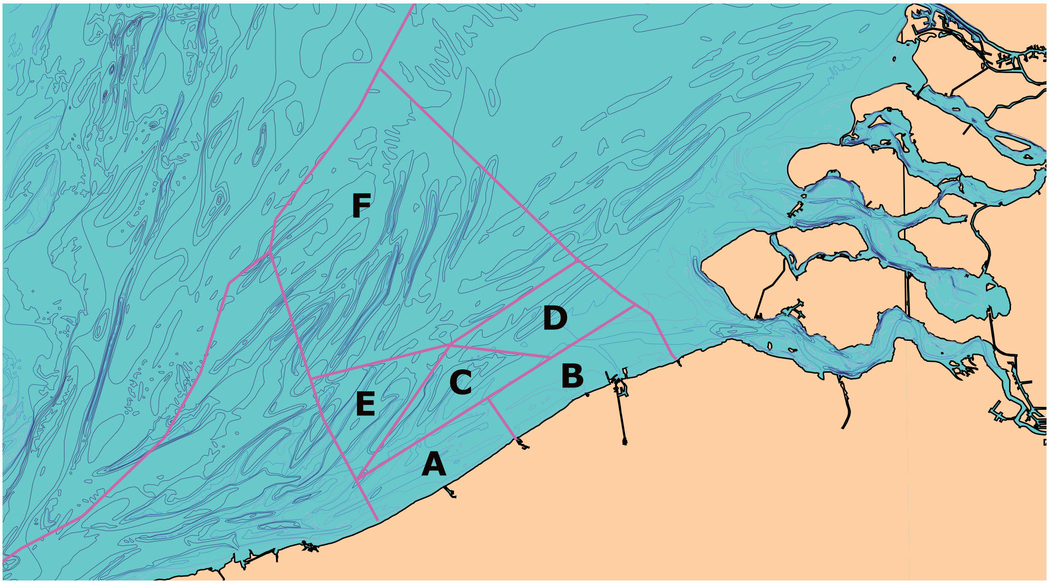
The distribution of the macrobenthic species is illustrated and discussed by means of two maps. The first map displays the distribution in the 1976-1986 period, the second in the 1994-2001 period.
The species is present if the sampling point is coloured red and absent if coloured black. The density in which a species was found on a specific site is represented by the size of the red dot. The larger the dot, the more individual specimens found at this site. The legend of each map indicates the maximum number of individuals found per square metre. This maximum number only takes into account adult individuals. The largest red dot corresponds to this maximum density.

The most remarkable distribution patterns are discussed briefly for each species. As numerous macrobenthic species are prominently present or absent in clearly defined areas of the Belgian part of the North Sea (BPNS), the distribution of the species is discussed on the basis of their occurrence in different zones of the BPNS (*Figure 18*).

Habitat preference

For each species included in the macrobenthos atlas of the BPNS the habitat preference with regard to sediment type is investigated. The species-specific preference regarding the mud content in the

Figure 18
The distribution of the macrobenthic species is described on the basis of their presence or absence in different zones of the Belgian part of the North Sea. A, western coastal zone; B, eastern coastal zone; C, eastern Flemish Banks; D, southern Zeeland Banks; E, western Flemish Banks; F, open sea zone; A+B, coastal zone; A+B+C+D, near-coastal zone; A+C, western near-coastal zone.



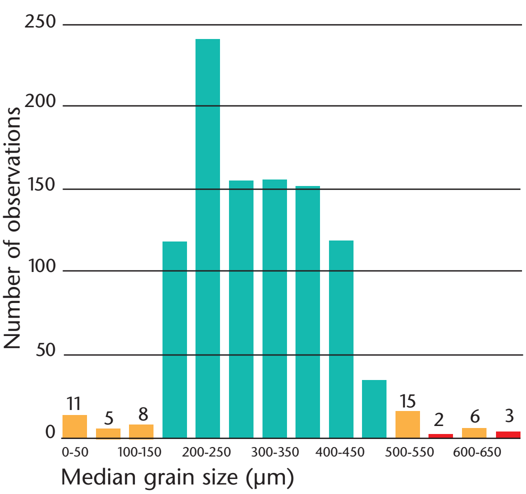
sea bottom and the median grain size of the sediment is represented in a diagram. This diagram is based on the combined data of the 1976-1986 and 1994-2001 periods, so as to obtain a higher number of observations and to maximise the reliability of the characterisation of the habitat preference.

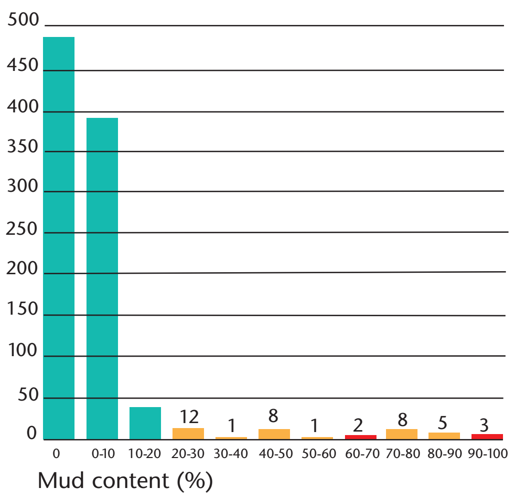
To calculate the habitat preference the mud content and the median grain size were first subdivided into equally sized classes. The mud content – from 0 to 90% – was subdivided into classes of 10%. The median grain size – from 15 to 650 µm – was subdivided into classes of 50 µm. The relative occurrence of each species in each of the classes was calculated next. A species with a relative occurrence of 100% in a specific class means that the species was observed in all samples within this class. A relative occurrence of 0% means that the species was not found in any sample within this class. If a species occurs in 30% of the samples within a specific class, this species has a relative occurrence of 30% within this class. If the relative occurrence of a species within each of these classes is set out in a diagram, the habitat preference of this species is illustrated in that diagram.

As not all sediment types were sampled to the same extent, the number of available samples for each of the classes differs substantially (*Figure 19*). For instance, only two samples were collected with a median grain size between 550 and 600 µm whereas there are 242 samples available with a median grain size between 200 and 250 µm. In addition, 493 samples have a mud content of 0% whereas only two samples have a mud content between 60 and 70%.

The reliability of the calculated relative occurrence naturally decreases as the number of available samples decreases.

Figure 19
In the context of the calculation of the relative occurrence of a species within each of the sediment classes the reliability increases as the number of observations increases. Red, unreliable (< 4 observations); Yellow, moderately reliable (4 to 20 observations); Green, very reliable (> 20 observations). The number of observations within the unreliable and moderately reliable classes is illustrated.





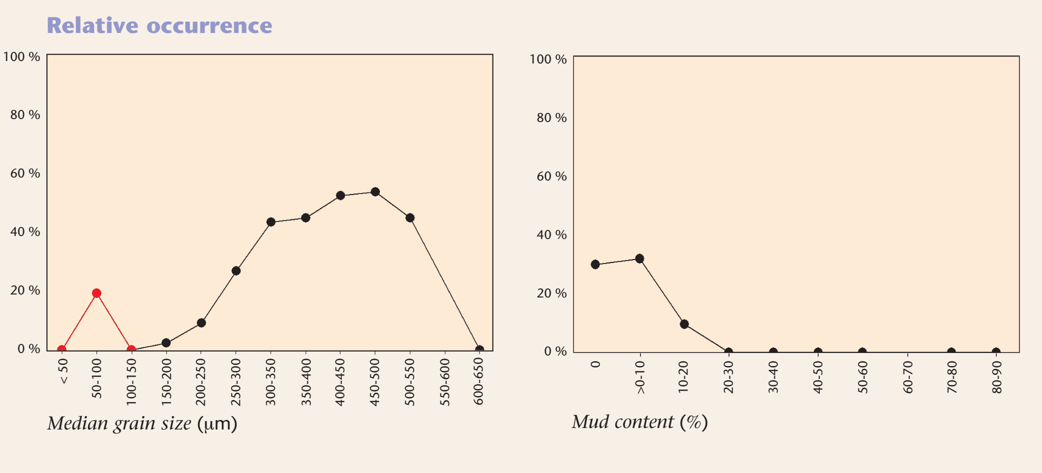


Figure 20
The habitat preference of the bristle worm Ophelia limacina *on the basis of the median grain size and silt content of the sediment. The outlier is indicated in red.*

Although the typical habitat of each species can be defined clearly, each species can – exceptionally – also been found outside this habitat. A high number of observations minimises the share of these exceptional observations and thus increases the reliability of the calculated relative occurrence. In case of a low number of observations these exceptional observations will have a substantial influence and thus generate an erratic relative occurrence. Such deviations are called outliers. Outliers are not supported by the general pattern and can usually be found in classes with a low number of observations. These outliers should not be given serious consideration for the interpretation of the habitat preference.
To optimise both the reliability and the interpretation of the diagrams the relative occurrence was not calculated in classes with a very low number of observations. A minimum of four observations was taken as the threshold value.

Calculations based on four to 20 observations are considered moderately reliable. Outliers can especially be expected in these classes. Calculations based on over 20 observations are considered very reliable.

The habitat preference of the bristle worm *Ophelia limacina* is represented in *Figure 20* as an example for the interpretation of the habitat preference.
The species *O. limacina* typically occurs in coarse-grained sediments (mainly 200 – 550 µm) with a relatively low mud content (exclusively < 20%).
The chance of finding the species is the highest (> 50%) in sediments with a median grain size of 450 to 500 µm. Moreover, the species was found in more than 30% of the samples with a mud content of 0 to 10%.
Although *O. limacina* clearly displays a preference for coarse-grained sediments, the species nevertheless reaches a relative occurrence of 20% in fine-grained sediments (50 to 100 µm). In this specific case the species was – exceptionally – found in one of the five observations within the relevant grain size class, as a result of which a relative occurrence of 20% was calculated.
This is a typical example of an outlier.
The dot is not supported by the general

pattern and is to be found in a moderately reliable class (four to 20 observations).
It is advisable not to give serious consideration to this outlier for the interpretation of the habitat preference of the *O. limacina*.

[1] Lanckneus, J., V. Van Lancker, G. Moerkerke, D. Van den Eynde, M. Fettweis, M. De Batist & P. Jacobs (2002). *Onderzoek van natuurlijke zandtransporten op het Belgisch Continentaal Plat: BUDGET*. Belgian Science Policy, PODO I. Final report. Brussels.

[2] Cattrijsse, A. & M. Vincx (2001). *Biodiversity of the benthos and the avifauna of the Belgian Coastal Waters. Summary of data collected between 1970-1998*. Belgian Science Policy, PODO I. Report. Brussels.

[3] Van Hoey, G., S. Degraer & M. Vincx (2004). Macrobenthic communities of soft-bottom sediments at the Belgian Continental Shelf. *Estuarine, Coastal and Shelf Science*, 59: 601-615.

The research vessel Zeeleeuw, a former pilot ship, is put at the disposal of the Flemish, Belgian and international marine scientific community. The 'SMS Fleet' (of the Agency for Maritime Services and Coast) manages the Zeeleeuw, carries all operational costs and supplies its crew. The Flanders Marine Institute (VLIZ) coordinates the sailing programme and administers its scientific equipment.

The oceanographic research ship Belgica belongs to the Belgian State and falls under the responsibility of the Belgian Science Policy. The ship and its scientific equipment are managed by MUMM, which is also responsible for planning and organising scientific campaigns at sea. The Belgian navy provides the crew and takes care of the operational aspects as well as the moorage in Zeebrugge, the Belgica's home port.

BIVALVIA OR BIVALVES

Abra alba • white furrow shell

Donax vittatus • banded wedge shell

Macoma balthica • Baltic tellin

Montacuta ferruginosa

Mysella bidentata

Petricola pholadiformis • American piddock

Spisula solida • thick trough shell

Spisula subtruncata • cut trough shell

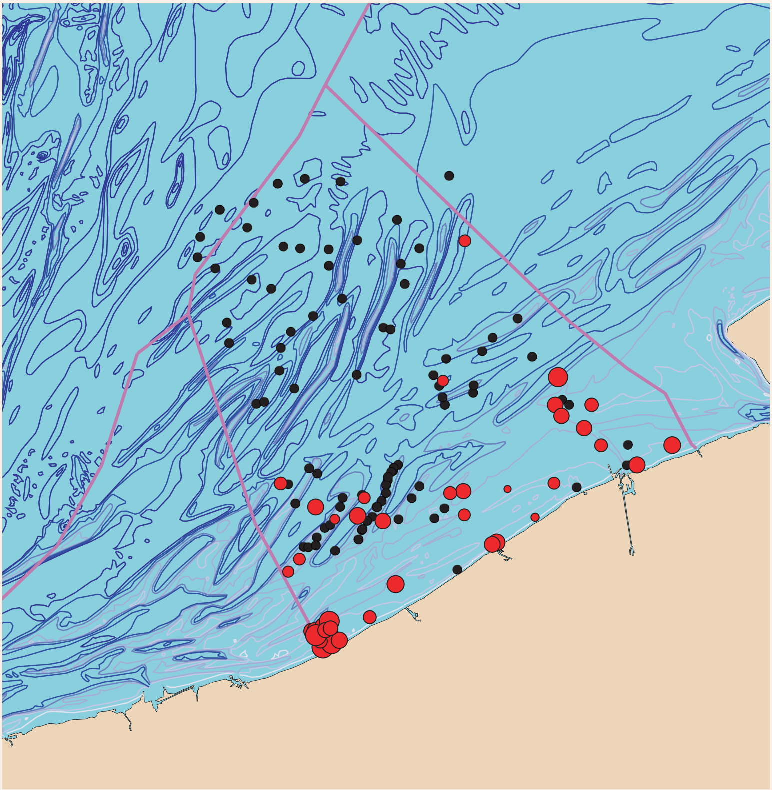
Tellina fabula

Tellina tenuis • thin tellin

Venerupis senegalensis • pullet carpet shell

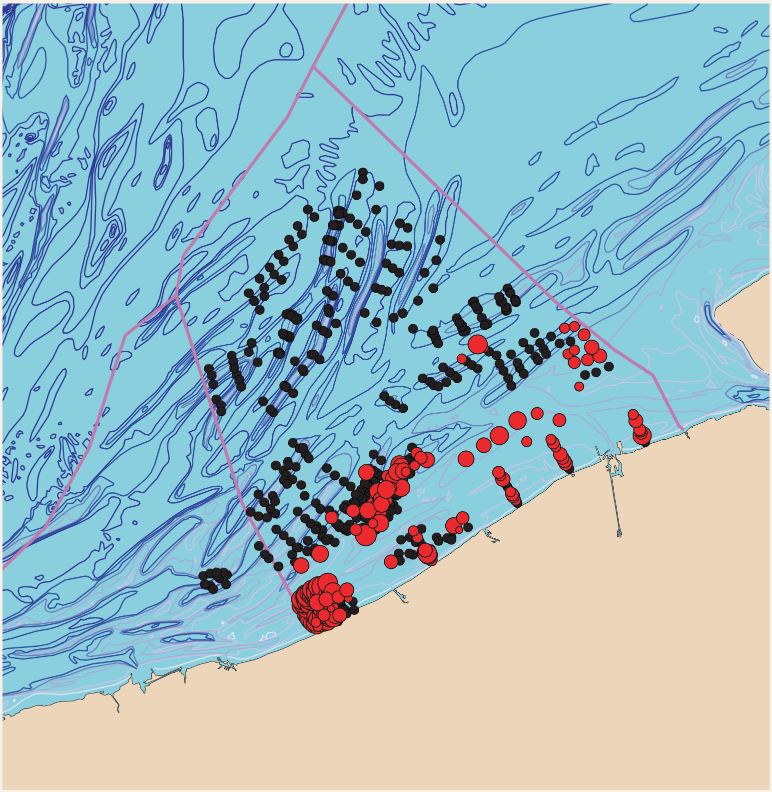
1976 • 1986

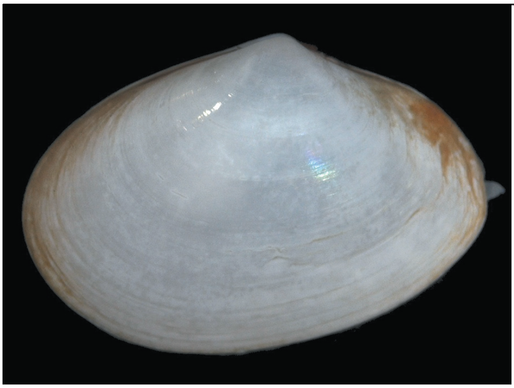
max 13888 ind./m²



1994 • 2001

max 4834 ind./m²





Abra alba

(W. Wood, 1802)

Taxonomy

Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Semelidae
- *Abra* Leach in Lamarck 1818

Common names

N witte dunschaal F syndesmye blanche
E white furrow shell D kleine Pfeffermuschel, weiße Pfeffermuschel

Description

Small (up to 25mm long), thin and fragile shell. Oval shape, rather flat with thin concentric growth lines. The shells are shiny white and somehow transparent. *Abra alba* lives rather deep in the bottom and feeds on sediment by means of long, individually separated stretchable siphons.

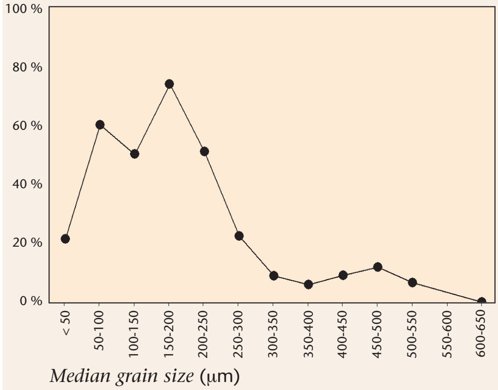
Distribution

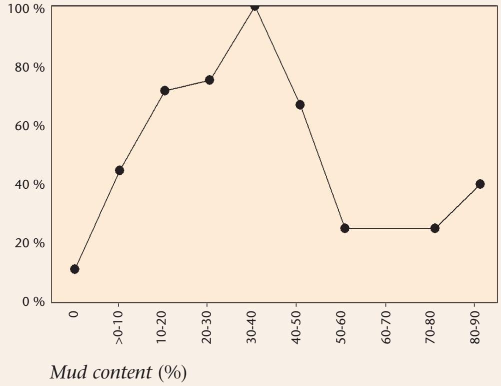
During both periods *Abra alba* is a common species in the near-coastal zone. The species is only rarely found further than 30 km off the coast. *Abra alba* locally reaches very high densities: up to about 14,000 ind./m^2 in the 1976-1986 period and appr. 5,000 ind./m^2 in the 1994-2001 period. The highest densities are observed near the western coastal zone in both periods.

Habitat preference

Abra alba can be found in all sediment types. However, the species does tend to prefer (> 50% of the samples) fine-grained sediments with a median grain size between 50 and 250 µm and a mud content of 10-50%. In coarse sediments (median grain size > 300 µm) with a low mud content (< 10%) the *A. alba* is rather rare.

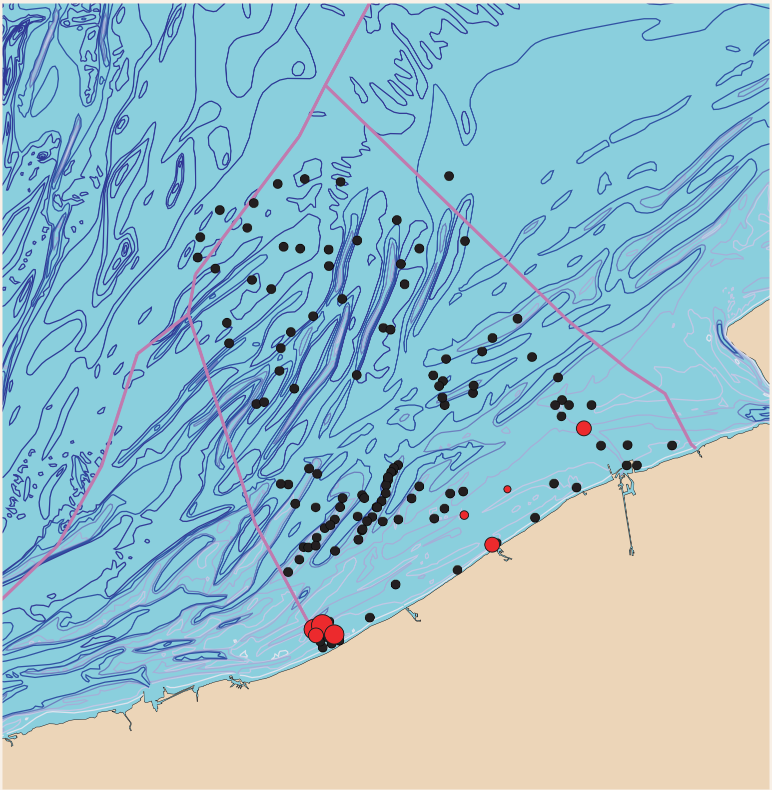
Relative occurrence





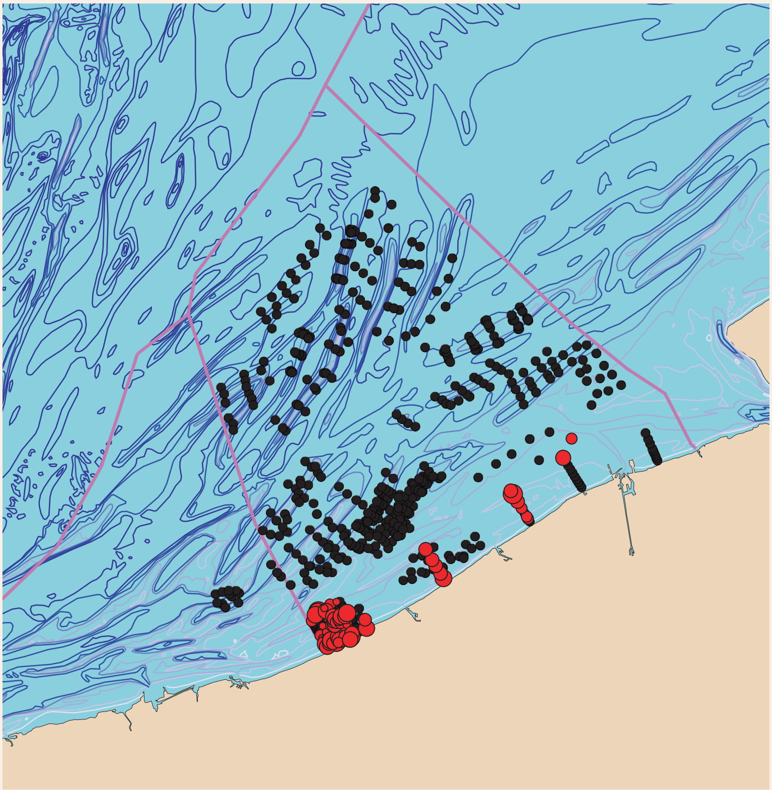
1976 • 1986

● max 42 ind./m²



1994 • 2001

● max 302 ind./m²



Donax vittatus
(Da Costa, 1778)

Taxonomy
Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Donacidae
- *Donax* Linnaeus, 1758

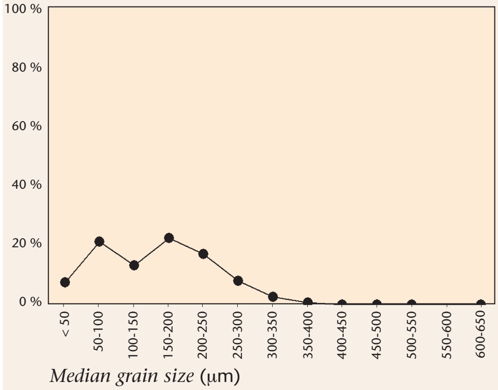
Common names
N zaagje F flion, olive de mer
E banded wedge-shell D gebänderte Dreiecksmuschel, Sägemuschel

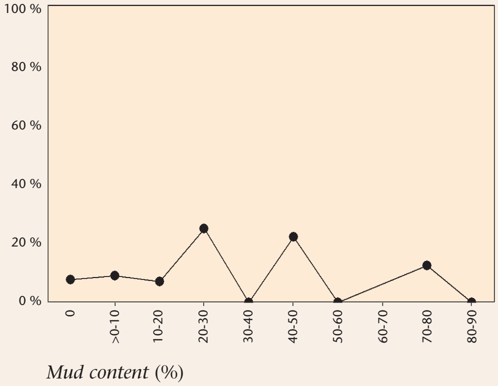
Description
Slim, somewhat triangular and elongated shell with the top directed to the back. Up to 40 mm long and 16 mm high. The back is somewhat acuminate and truncate, the front is more rounded. The sculpture consists of fine grooves radiating from the top that are crossed by growth lines. The lower edge is very convex and coarsely serrated at the inside, hence the Dutch name “zaagje” (literally: little saw). Living specimens are coloured yellow or light purple. The inside of the shell is often yellow ochre or purple. They live directly under the sea floor. In case of disturbance they are able to burrow exceptionally fast.

Distribution
The distribution area of *Donax vittatus* is limited to the coastal area of the Belgian part of the North Sea. During both periods the species seems to prefer the western coastal zone. The detailed distribution of *Donax vittatus* reveals itself best in the 1994-2001 period, when numerous samples were collected in the coastal zone. During this period the species was commonly present from De Panne to Wenduine whereas it was almost absent further to the east. In general, the density remained rather low: up to 40 ind./m² in the 1976-1986 period and up to 300 ind./m² in the 1994-2001 period.

Habitat preference
Donax vittatus tends to prefer fine-grained sediments (median grain size 50-250 µm). However, the chance of finding this species in these sediments is not higher than 20%. The species is absent in sediments with a median grain size exceeding 400 µm. *Donax vittatus* is found in sediments with a mud content ranging from 0 to 80% without a clear preference for a certain mud content.

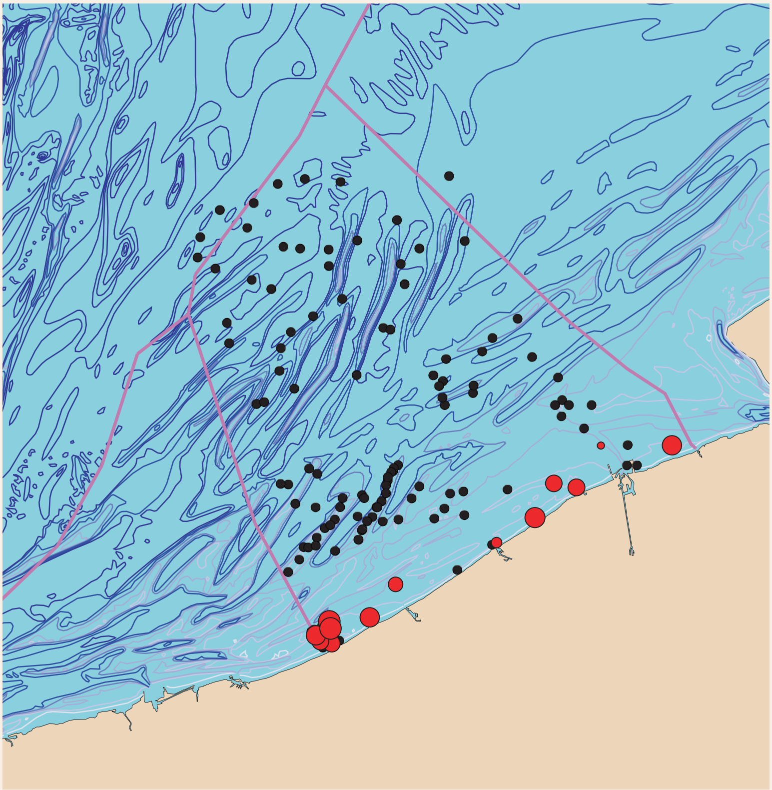
Relative occurrence





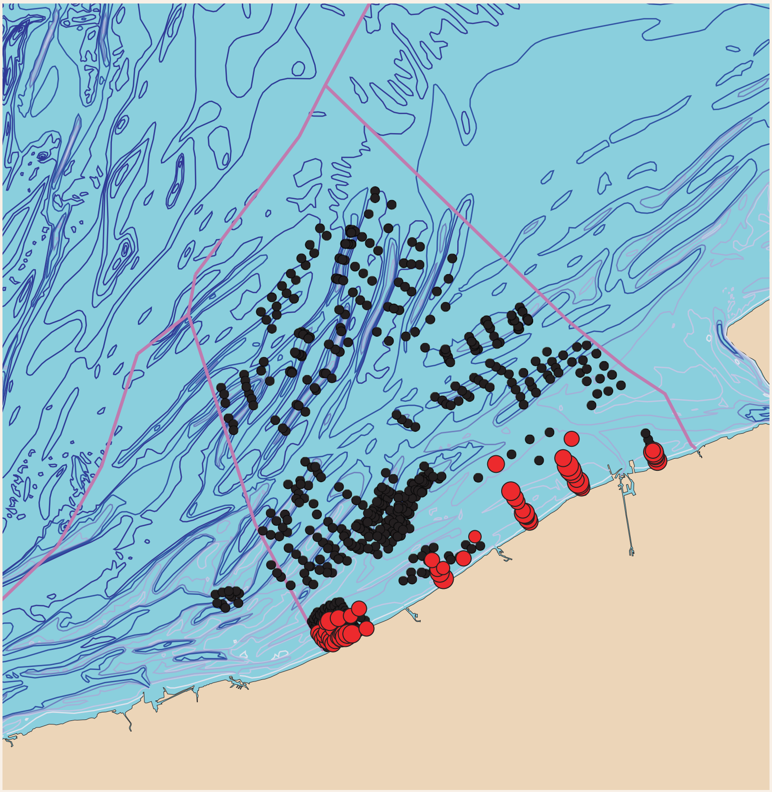
1976 • 1986

max 13 ind./m^2



1994 • 2001

max 165 ind./m^2



Macoma balthica
(Linnaeus, 1758)

Taxonomy
Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Tellinidae
- *Macoma* Leach, 1819

N nonnetje, gewoon nonnetje F telline baltique
E baltic tellin D baltische Tellmuschel, Plattmuschel, rote Bohne

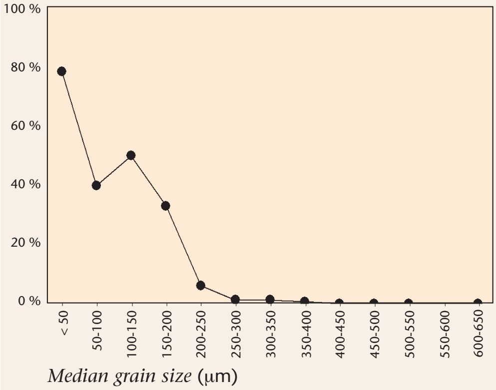
Synonyms
Tellina balthica Linnaeus, 1758

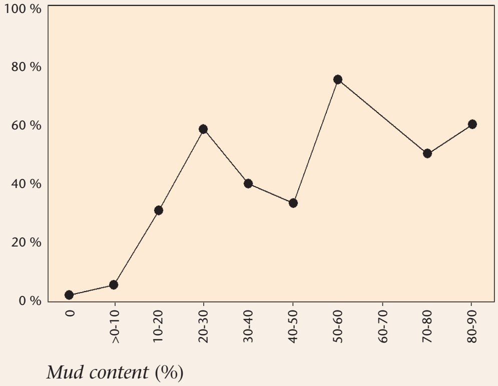
Description
A rather thick, broadly oval shell up to 30 mm long. The top of the shell is somewhere in the middle of the shell. The back is slightly acuminate. The shell surface is smooth with very fine concentric growth lines. Its colour varies: white, yellow, orange to reddish. They burrow shallowly in fine, muddy sand bottoms and feed on food particles located on top of the sediment that they manage to suck up by means of their very long, individually separated stretchable siphons.

Distribution
Macoma balthica typically occurs in the coastal zone of the Belgian part of the North Sea. In the 1976-1986 period only low densities were observed (up to 10 ind./m^2) whereas densities up to 170 ind./m^2 were found in the 1994-2001 period. In this period the highest densities seemed to occur near the eastern coastal zone.

Habitat preference
Macoma balthica tends to prefer very fine sediments (median grain size < 200 µm) with high mud contents (> 20%). The maximum relative occurrence (80%!) is reached in sediments with a median grain size of 0-50 µm and a mud content of 50-60%.

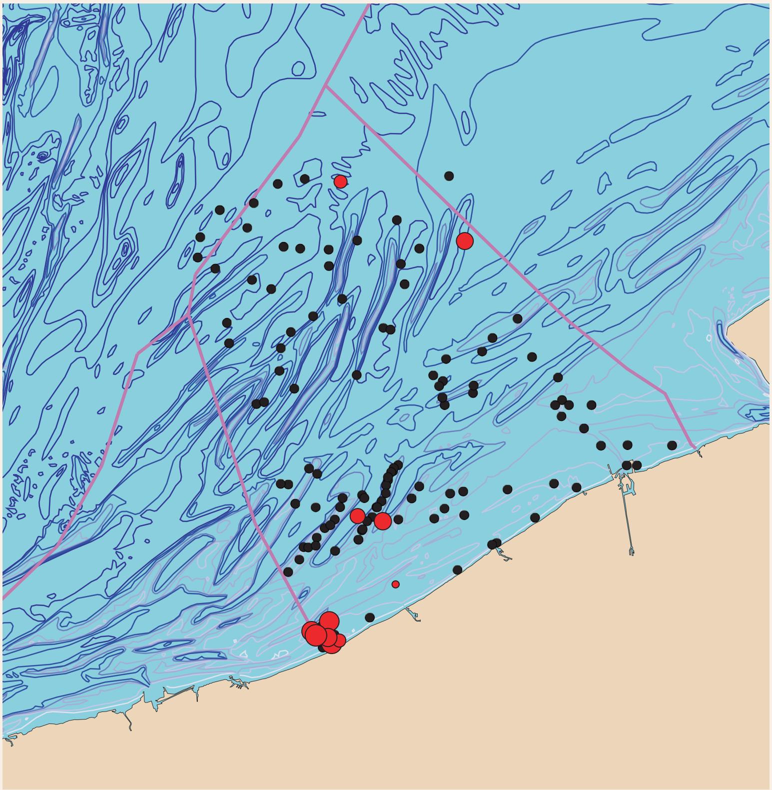
Relative occurrence





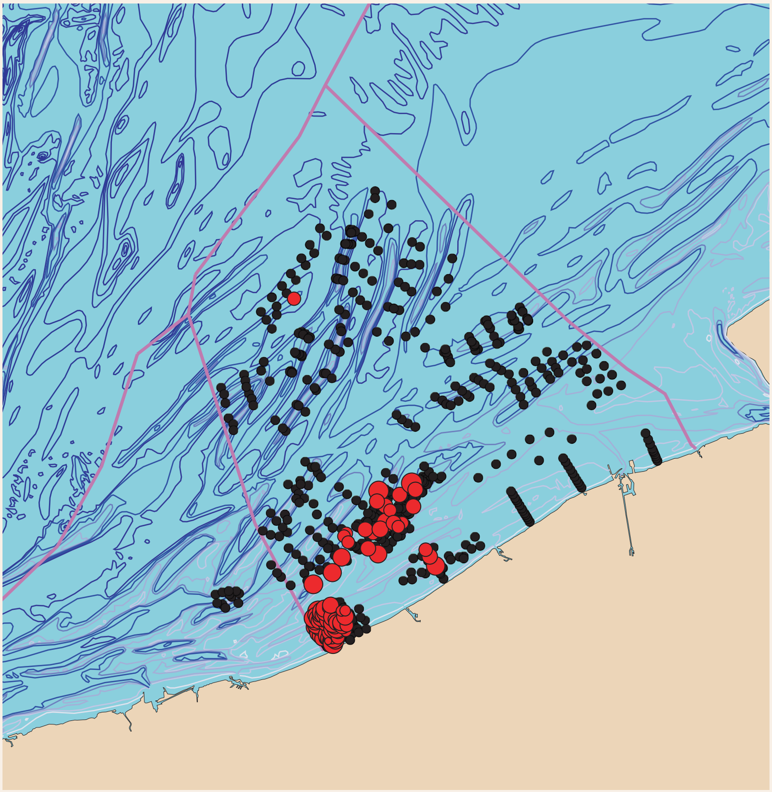
1976 • 1986

max 178 ind./m²



1994 • 2001

max 224 ind./m²



Montacuta ferruginosa

(Montagu, 1808)

Taxonomy

Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Montacutidae
- *Montacuta* Turton, 1822

Common names

N ovale zeeklitschelp, zeeklitmosseltje F unknown
E unknown D rostrote Mondmuschel

Synonyms

Tellimya ferruginosa (Montagu, 1808)

Description

A thin, elongated shell up to 10 mm long. The outside is smooth with very fine growth lines (not always visible). The shell is coloured white or yellowish white and is sometimes covered with a thick, granular, rusty deposit. The inside is coloured white, there is no mantle bend.

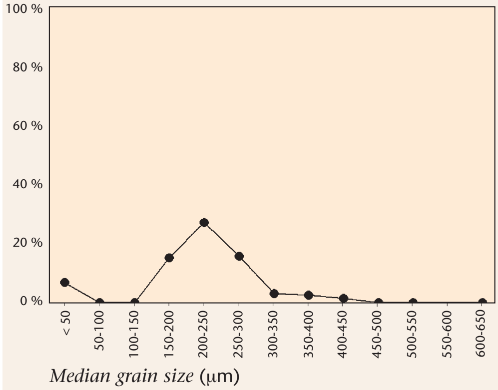
Distribution

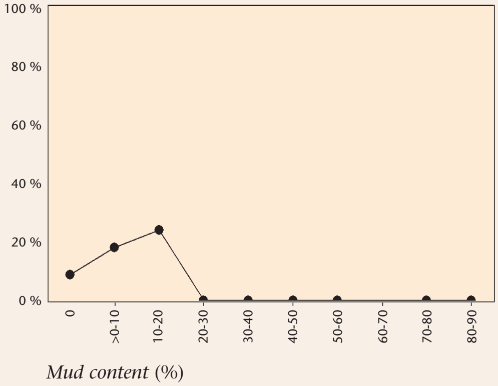
The distribution area of the *Montacuta ferruginosa* on the Belgian part of the North Sea was mainly limited in both periods to the western near-coastal zone. In the 1976-1986 period the species was found only locally whereas *Montacuta ferruginosa* was spread more widely in the 1994-2001 period. The species reached a maximum density of 180-220 ind./m^2 in both periods.

Habitat preference

Montacuta ferruginosa clearly prefers fine to medium sand (median grain size 150-300 µm) with low mud content (maximum 20%). Especially the mud content seems to be decisive: the species has never been found in sediments with a mud content exceeding 20% whereas *Montacuta ferruginosa* occurs over a wide spectrum of the median grain size.
Lives together with invertebrates that dig in the sand, such as the sea potato *Echinocardium cordatum.* In 35% of all findings of *Montacuta ferruginosa*, it co-occurred with *Echinocardium cordatum.*

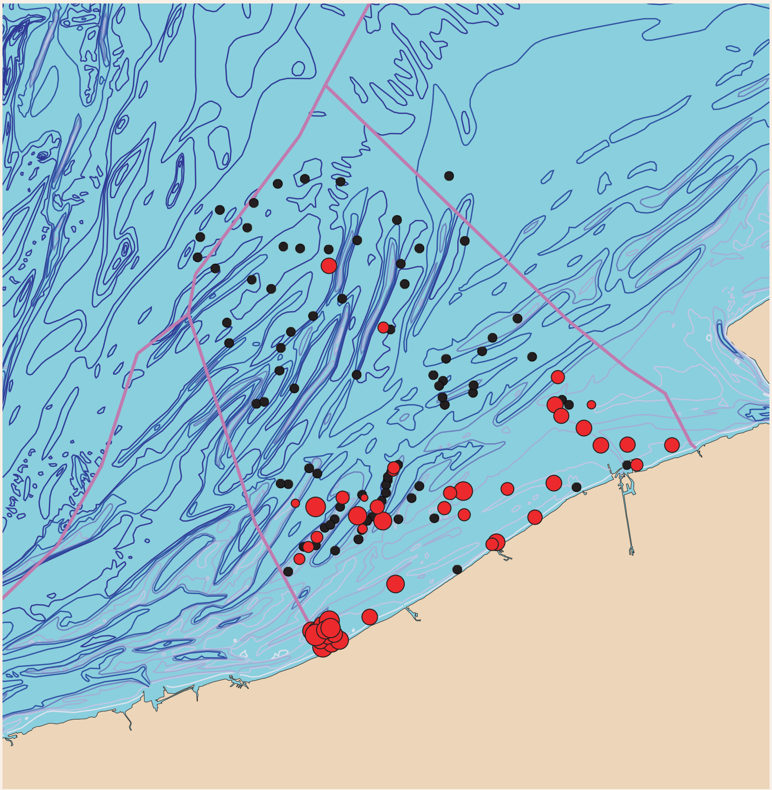
Relative occurrence





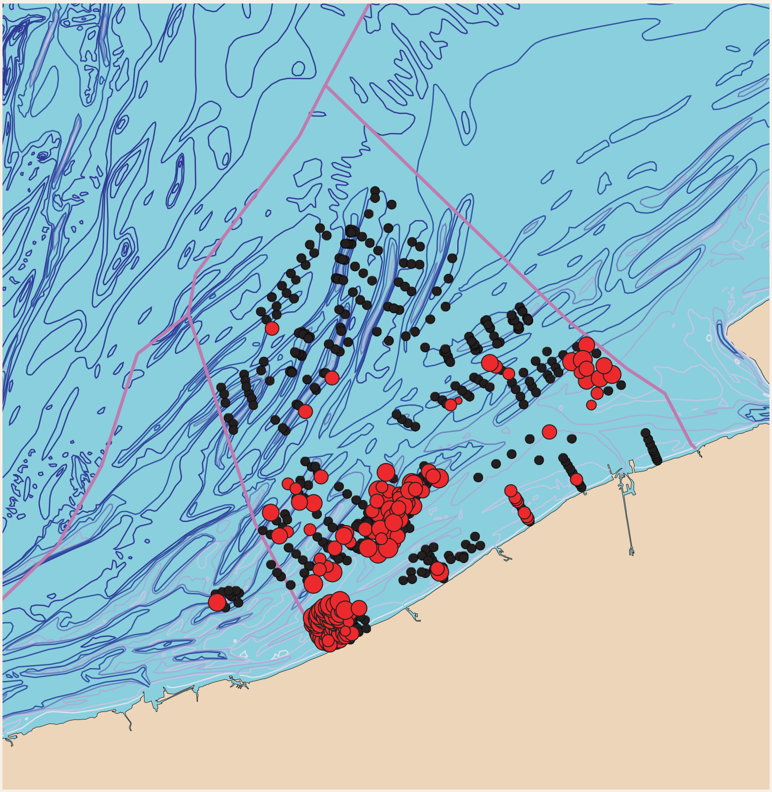
1976 • 1986

max 4096 ind./m^2



1994 • 2001

max 4644 ind./m^2



Mysella bidentata
(Montagu, 1803)

Taxonomy
Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Montacutidae
- *Mysella* Angas, 1877

Common names
N tweetandmosseltje, tweetandschelp, dwergmosseltje F unknown
E unknown D kleine Linsenmuschel

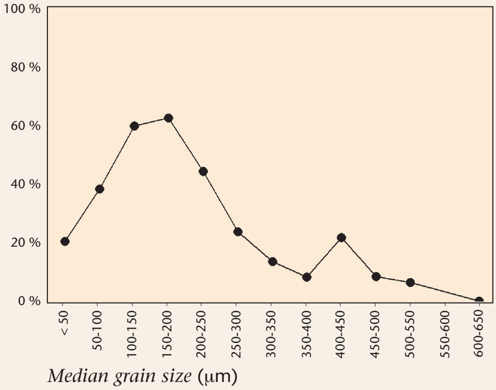
Synonyms
Erycina nucleola Récluz, 1843
Mya bidentata Montagu, 1803

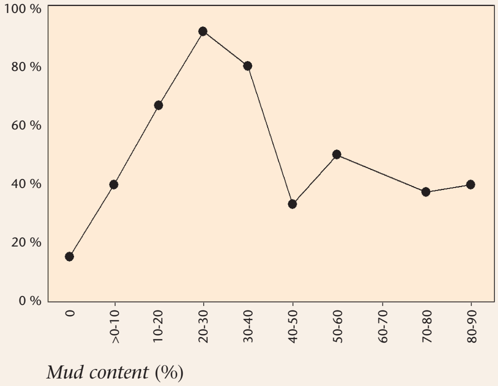
Description
A thin, oval shell measuring 3 mm long. The outside is smooth with a sculpture of fine concentric growth lines located close to each other. The colour of the shell varies from yellowish white to dark reddish brown. Frequently lives in association with the brittle star *Acrocnida brachiata*.

Distribution
Although *Mysella bidentata* can be found across the entire Belgian part of the North Sea, the species mainly occurs in the near-coastal zone. In this zone the species reaches a high relative occcurence. In the 1976-1986 period the species was found to occur commonly in the eastern coastal zone, whereas *Mysella bidentata* was almost completely absent in that area in the 1994-2001 period. During both periods the maximum density was 4,000 to 4,500 ind./m^2.

Habitat preference
Mysella bidentata can be observed in all sediment types to be found on the Belgian part of the North Sea. The species nevertheless tends to prefer fine-grained sediments (median grain size 50-250 µm) with a mud content of 10-40%. In sediments with a mud content of 20-30% a relative occurrence of 90% can be observed.

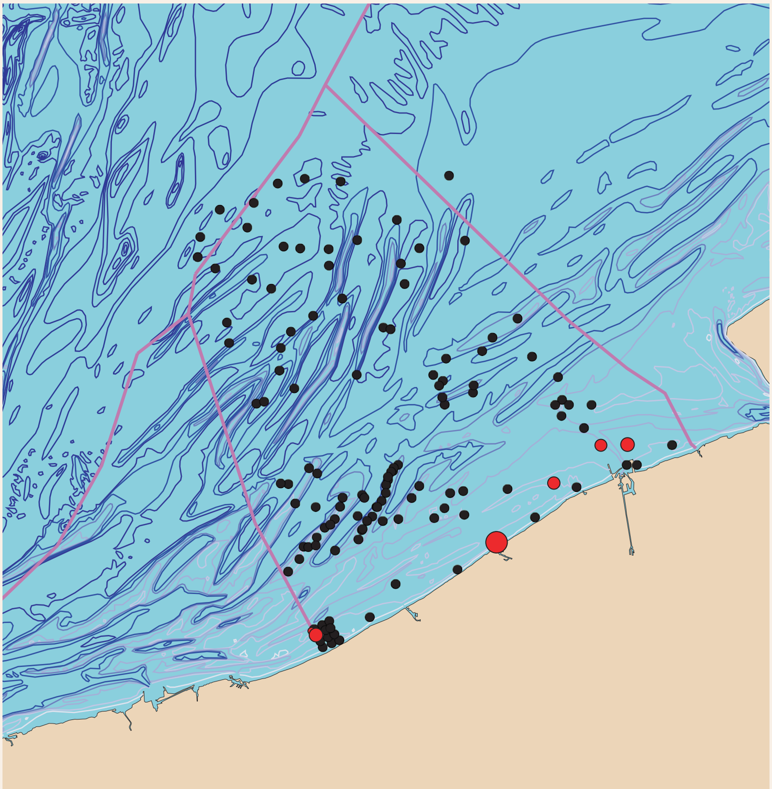
Relative occurrence





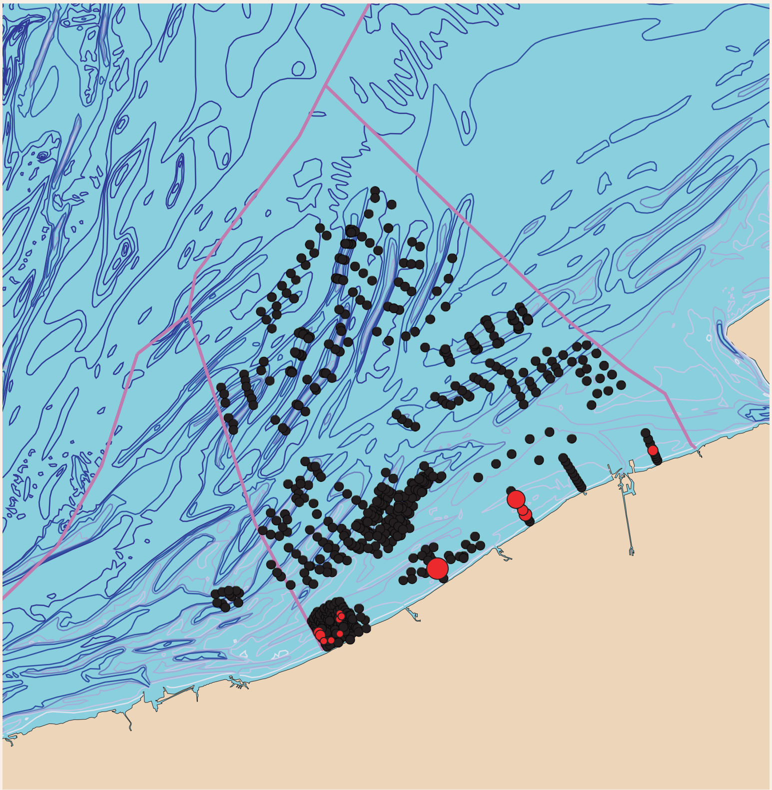
1976 • 1986

max 475 ind./m²



1994 • 2001

max 925 ind./m²



Petricola pholadiformis

Lamarck, 1818

Taxonomy

Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Petricolidae
- *Petricola* Lamarck, 1801

Common names

N Amerikaanse boormossel F petricole pholadiforme, fausse aile d'ange
E American piddock D Amerikanische Bohrmuschel

Description

A thin, fragile elongated shell up to 65 mm long. The outside of the shell is covered with ribs radiating from the top that are crossed by the growth lines. The ribs in the front part under the top bear clear squamous projections used to 'bore' through the substrate. The colour is lime white or yellowish white; older specimens are coloured brownish yellow. Bores in hard clay, limestone and solid mud as well as in pieces of peat and wood.

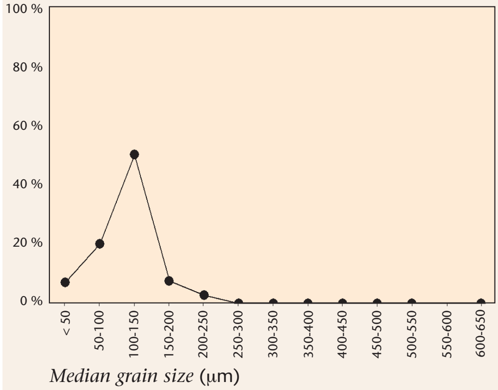
Distribution

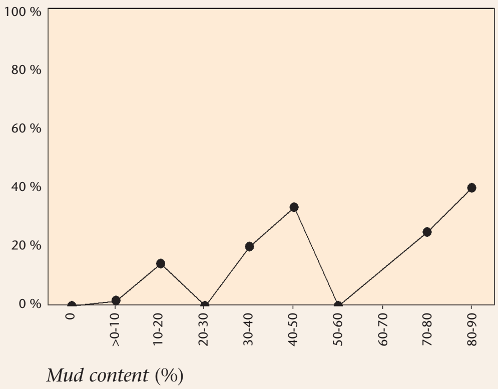
In both periods *Petricola pholadiformis* could only be found in the coastal zone, with a clear preference for the eastern coastal zone. Although the distribution of the species was limited, high densities were observed locally: up to 500 ind./m^2 in the 1976-1986 period and up to 1,000 ind./m^2 in the 1994-2001 period.

Habitat preference

Petricola pholadiformis is only found in fine sediments with a median grain size < 250 µm. In sediments with a median grain size of 100-150 µm a relative occurrence of 50% is even noted. The mud content seems less decisive for the habitat preference; however, the species does not occur in sediments without mud and the relative occurrence increases as the mud content of the sediment increases.

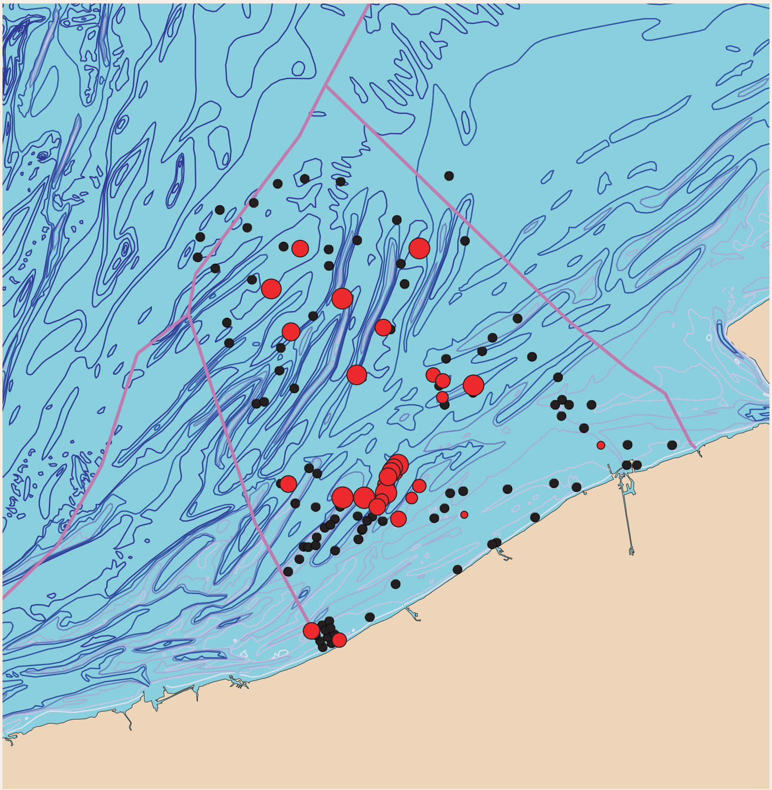
Relative occurrence





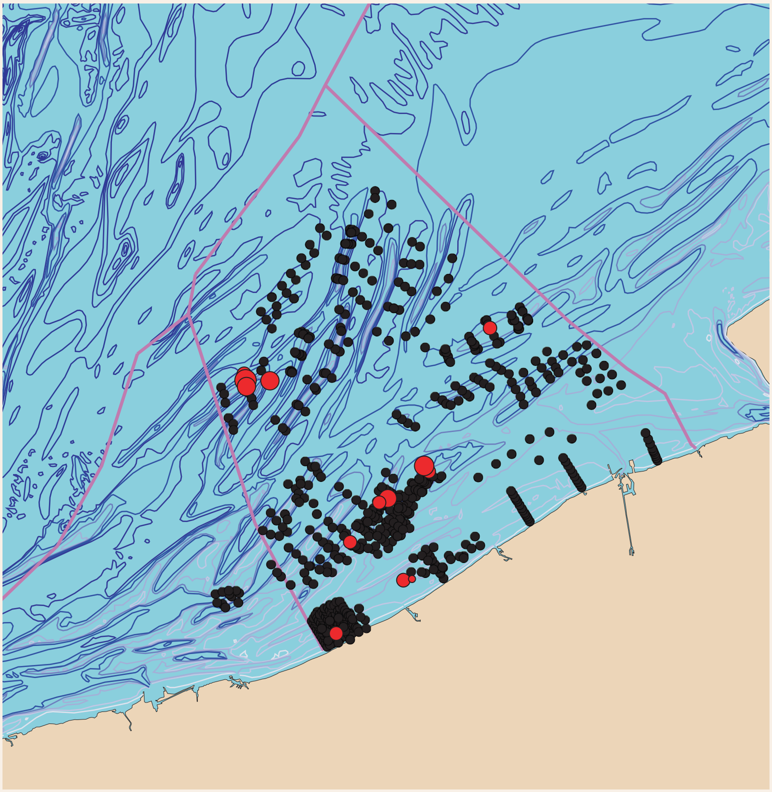
1976 • 1986

max 39 ind./m²



1994 • 2001

max 39 ind./m²



Spisula solida

(Linnaeus, 1758)

Taxonomy

Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Mactridae
- *Spisula* Gray, 1837

Common names

N stevige strandschelp
F spisule solide, mactre solide
E thick trough shell
D dickschalige Trogmuschel

Description

A thick oval shell, mostly coloured dirty white and measuring up to 50 mm long. Concentric lines at the front and back are reasonably coarse, growth lines are clear. A shallow burrowing suspension feeder.

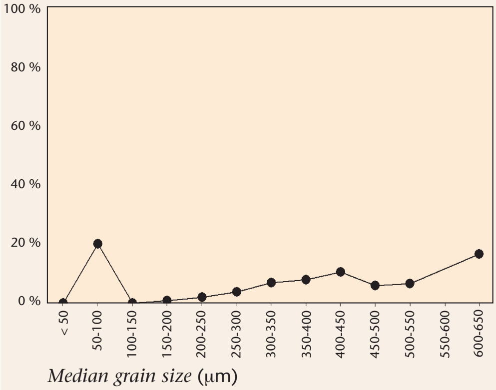
Distribution

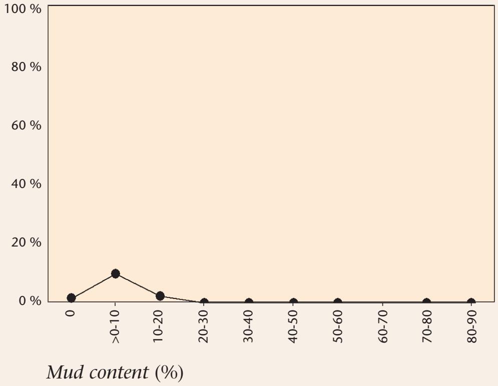
With observations in the coastal zone up to in the open sea the distribution of *Spisula solida* covers the entire Belgian part of the North Sea. The species is mainly found on the tops of the sandbanks. During the 1976-1986 period *S. solida* was found in a relatively high number of locations. In the 1994-2001 period, however, the distribution frequency decreased considerably. In both periods *S. solida* reached a maximum density of 40 ind./m^2.

Habitat preference

Spisula solida mainly prefers coarse-grained sediments: the higher the median grain size, the higher the relative occurrence (up to 20%). The species furthermore also tends to prefer the presence of a low mud content (0-20%). The species does not occur in sediments with a mud content exceeding 20%. The high relative occurrence (20%) in sediments with a median grain size of 50-100 µm is considered unreliable (outlier).

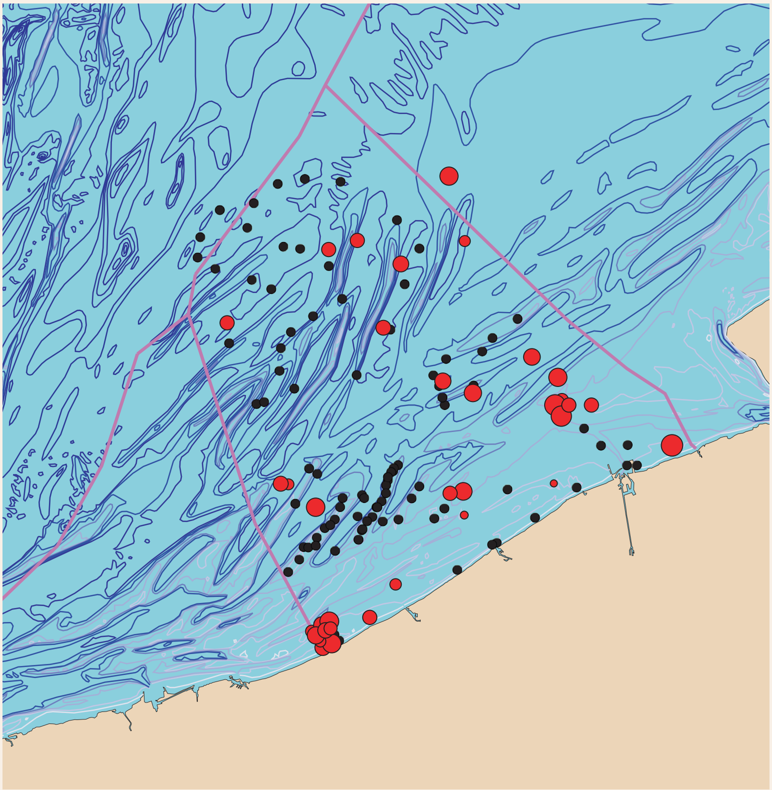
Relative occurrence





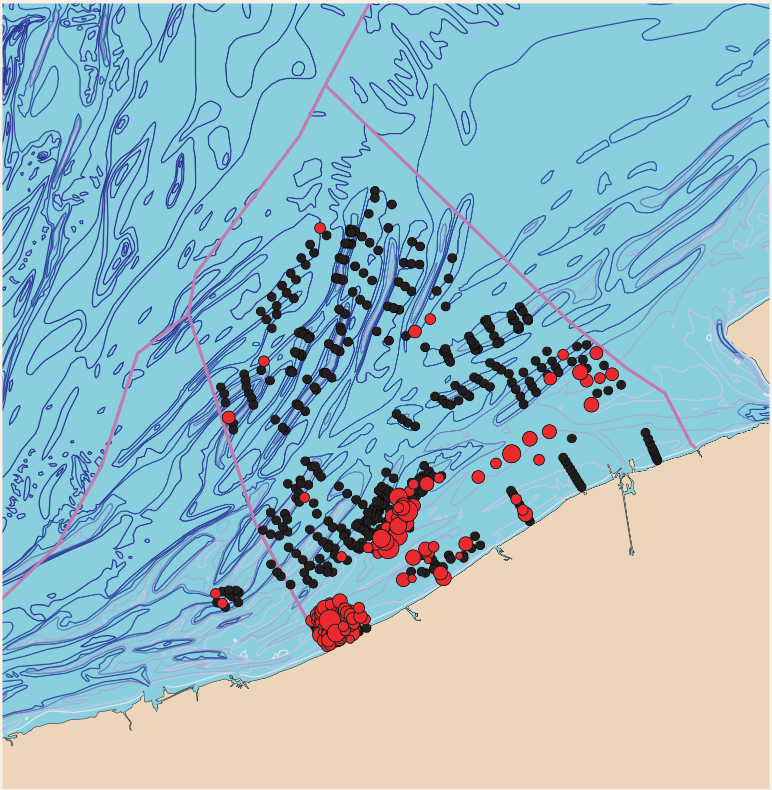
1976 • 1986

max 351 ind./m²



1994 • 2001

max 1308 ind./m²



Spisula subtruncata
(da Costa, 1778)

Taxonomy
Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Mactridae
- *Spisula* Gray, 1837

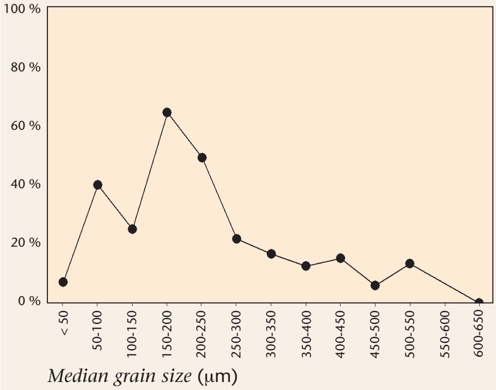
Common names
N halfgeknotte strandschelp F spisule tronquée
E cut trough shell D gedrungene Trogmuschel

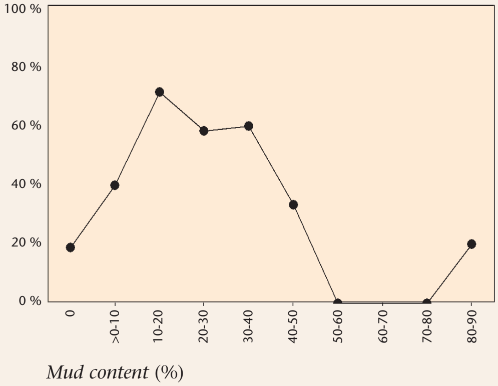
Description
A solid shell with a more or less triangular shape but assymmetrical: the back is somewhat more rounded than the front. A sculpture of fine concentric lines and grooves cover the shell. The growth lines are clearly visible. Measures up to 30 mm long. Fresh specimens are cream-coloured or yellowish white with a dun epidermis.

Distribution
The distribution area of *Spisula subtruncata* stretches across the entire Belgian part of the North Sea. In the 1994-2001 period, however, a preference for the near-coastal zone could be observed. Very high concentrations (up to 1,300 ind./m^2) were especially observed near the western near-coastal zone.

Habitat preference
Spisula subtruncata occurs in different sediment types: from very fine to coarse sand and from low to high mud content. However, a preference can be observed for rather fine-grained sediments (median grain size 150-250 µm) enriched with mud (mud content of 10-40%). *Spisula subtruncata* is present in 60% of these sediment types.

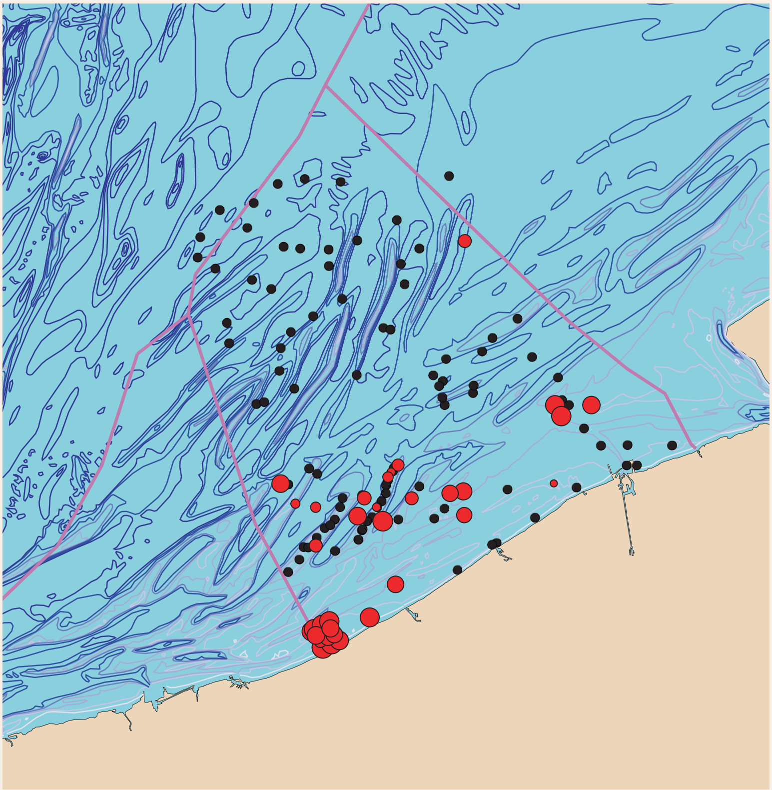
Relative occurrence





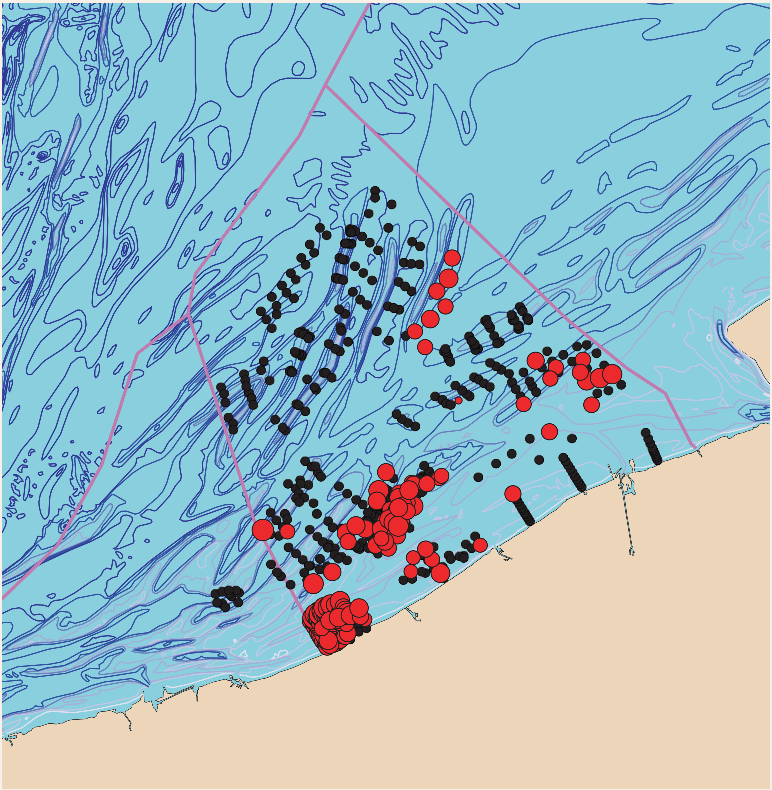
1976 • 1986

max 955 ind./m^2



1994 • 2001

max 1340 ind./m^2



Tellina fabula

(Gmelin, 1791)

Taxonomy

- Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Tellinidae
- *Tellina* Linnaeus, 1758

Common names

N rechtsgestreepte platschelp F telline striée
E unknown D Bohnen-Plattmuschel, gerippte Tellmuschel

Synonyms

Angulus fabula (Gmelin, 1791)
Fabulina fabula (Gmelin, 1791)

Description

A thin, fragile shell up to 20 mm long. The back is clearly acuminate. The right valve features ribs running from the dorsal front edge to the ventral back edge; the left shell half is smooth. Both halves have a sculpture of very fine concentric lines. The colour of the shell ranges from white to orange-yellow. Burrow shallowly in fine, mudy sand or muddy bottoms.

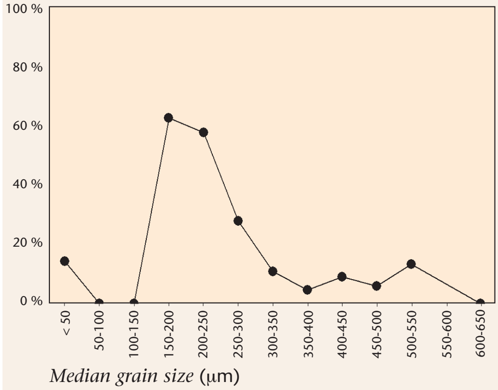
Distribution

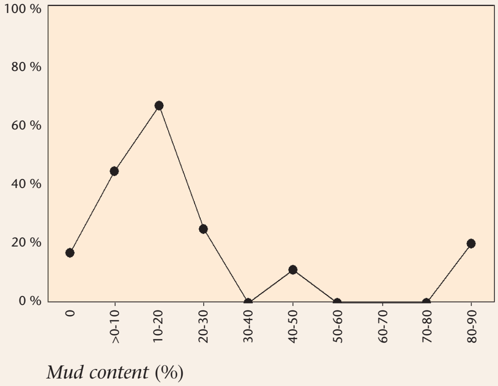
In both periods the *Tellina fabula* was mainly found near the coast. Further than 20 km off the coast the species was only observed near the Bligh bank. In both periods the species especially occured in the western near-coastal zone. In the eastern coastal zone the species was almost absent. Maximum density was 1,000 to 1,500 ind./m^2.

Habitat preference

Tellina fabula occurs in a wide range of sediments. The species nevertheless prefers sediments with a median grain size of 150 to 250 µm (relative occurrence of 60%). The species has a low relative occurrence in sediments without mud or with a mud content of > 20%. The highest relative occurrence (70%) is reached in sediments with a mud content of 10-20%.

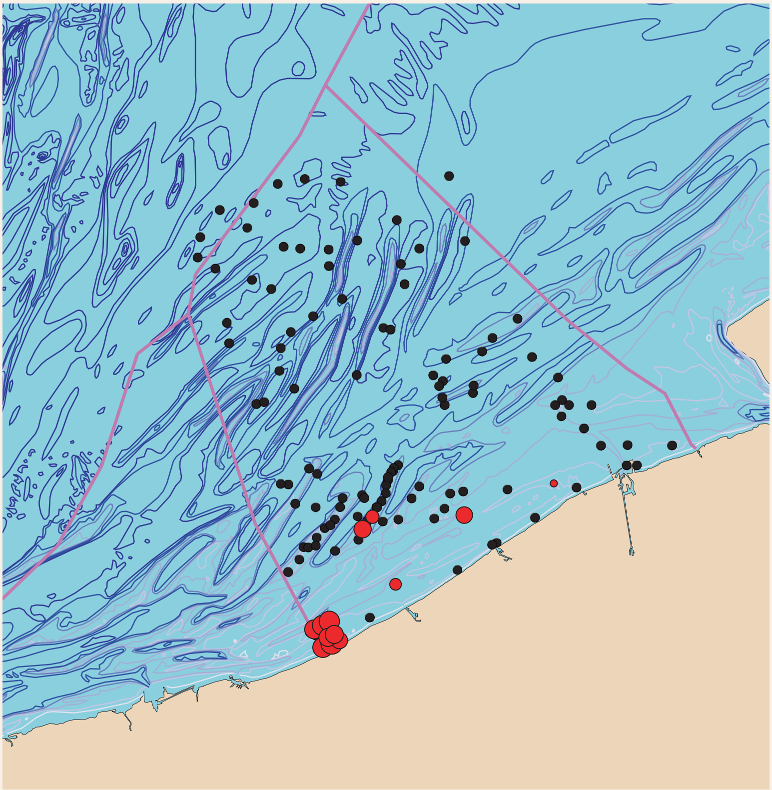
Relative occurrence





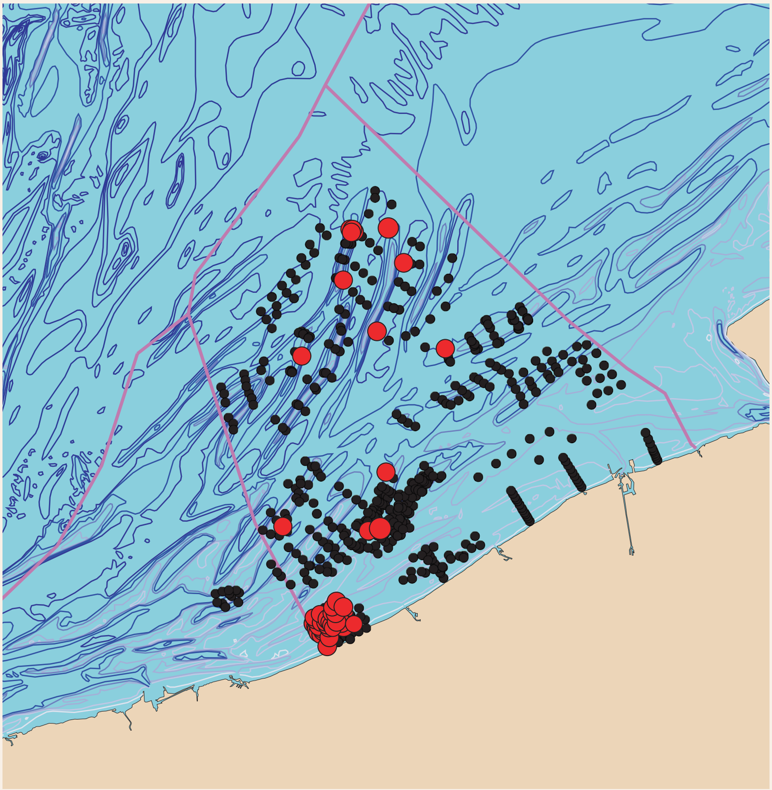
1976 • 1986

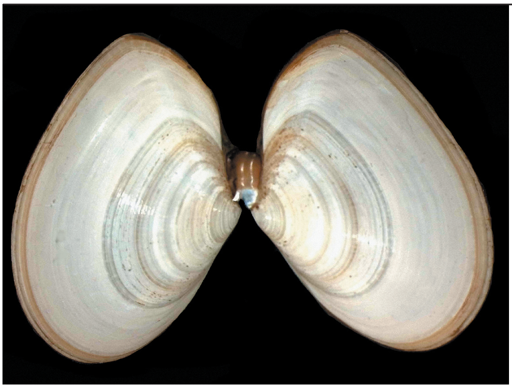
max 35 ind./m²



1994 • 2001

max 33 ind./m²





Tellina tenuis
(da Costa, 1778)

Taxonomy
Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Tellinidae
- *Tellina* Linnaeus, 1758

Common names
N tere dunschaal F telline mince, papillon
E thin tellin D dünne Plattmuschel, platte Tellmuschel

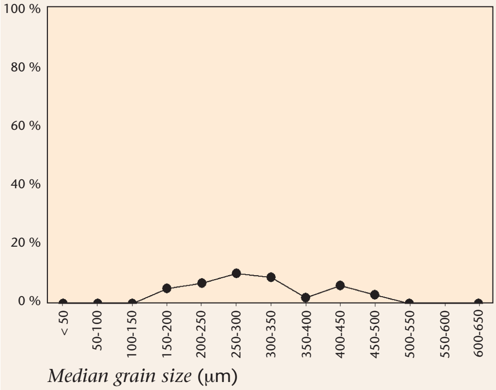
Synonyms
Angulus tenuis (da Costa, 1778)

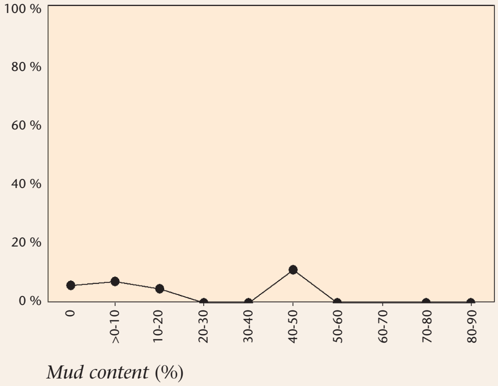
Description
A thin, strongly flattened shell with an irregular oval shape. Front edge broadly rounded, back edge tapering in a clear angle. The back is somewhat less acuminate than in the *Tellina fabula*. The shell surface is practically smooth with only fine growth lines. Measures up to 30 mm long. The colour varies from white with dark colour bands to pinkish red.

Distribution
Tellina tenuis was found in both periods in the western near-coastal zone. In addition, the species was also observed in the area of the Hinder Banks, but only in the 1994-2001 period. The frequency of occurrence in both periods was relatively low and the species never reached high density levels (maximum 30 ind./m^2).

Habitat preference
Tellina tenuis occurs in a wide range of sediments: median grain size of 150 to 500 µm. The main restrictive factor appears to be the mud content: the species only occurs in sediments with a mud content < 20%. The relative occurrence of 10% in sediments with a mud content of 40-50% is considered an outlier and hence seen as unreliable.

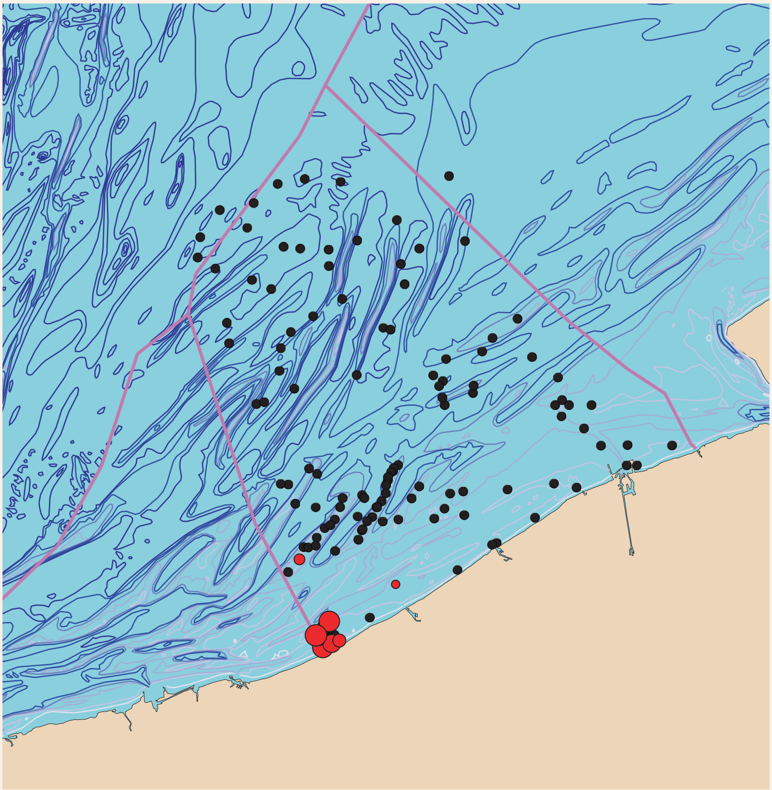
Relative occurrence





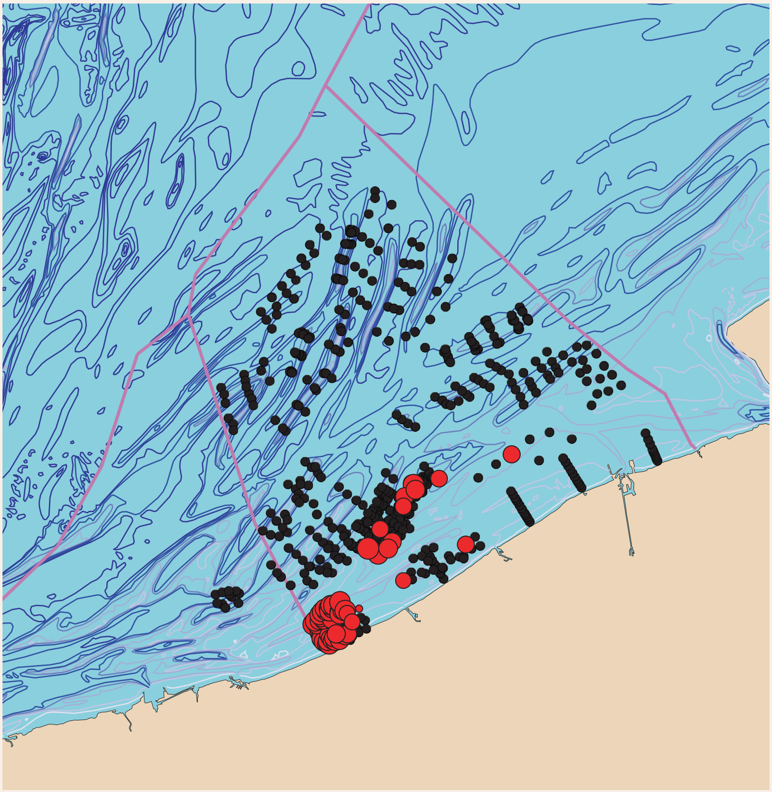
1976 • 1986

max 536 ind./m²



1994 • 2001

max 253 ind./m²



Venerupis senegalensis
(Gmelin, 1791)

Taxonomy
Phylum Mollusca
- Classis Bivalvia
- Ordo Veneroida
- Familia Veneridae
- *Venerupis* Lamarck, 1818

Common names
N tapijtschelp F palourde géographique
E pullet carpet shell D Teppichmuschel

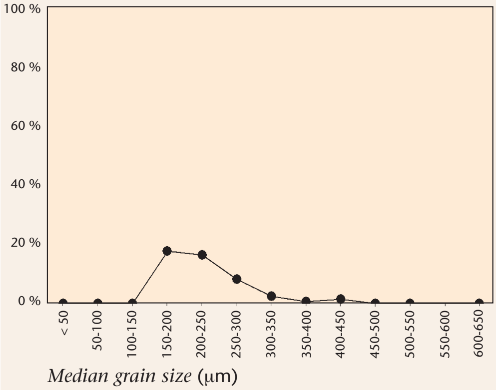
Synonyms
Venerupis pullastra (Montagu, 1803)
Venerupis saxatilis (Fleuriau)
Venerupis corrugata

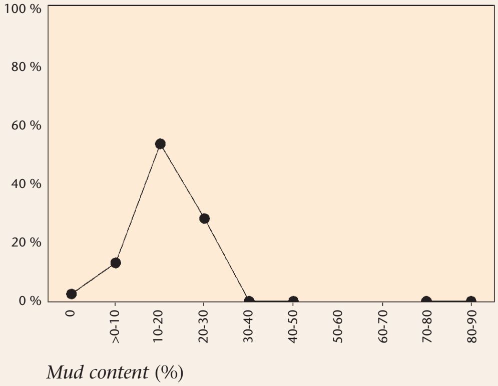
Description
Elongated oval shell, front rounded, back nearly straight. Sculpture of thick concentric and radial lines, the latter most prominent at the back. Shiny inside at the back and under the hinge with blue or purple hues. The shells measure up to 50 mm long and have a yellowish white or dun colour.

Distribution
In both periods *Venerupis senegalensis* was only observed in the western near-coastal zone. The frequency of occurrence in this zone increased from the first to the second period. The maximum density in both periods varied between 250 and 550 ind./m^2.

Habitat preference
Although *Venerupis senegalensis* can be found in sediments with a median grain size between 150 and 450 µm, the species clearly prefers a median grain size between 150 and 250 µm. *Venerupis senegalensis* can be expected in sediments with a mud content < 30%, but prefers a mud content of 10-20% (relative occurrence: > 50%).

Relative occurrence





POLYCHAETA OR BRISTLE WORMS

Aonides paucibranchiata

Capitella capitata - *C. minima* • gallery worm

Eteone longa • paddleworm

Eumida sanguinea

Eunereis longissima • clam worm

Glycera alba

Glycera capitata

Hesionura elongata

Heteromastus filiformis • capitellid thread worm

Lanice conchilega • sand mason

Magelona johnstoni

Nephtys cirrosa • white catworm

Nephtys hombergii • catworm

Notomastus latericeus

Ophelia limacina

Owenia fusiformis

Pectinaria koreni • trumpet worm

Pholoe minuta

Phyllodoce mucosa - *P. maculata*

Poecilochaetus serpens

Scolelepis bonnieri

Scoloplos armiger

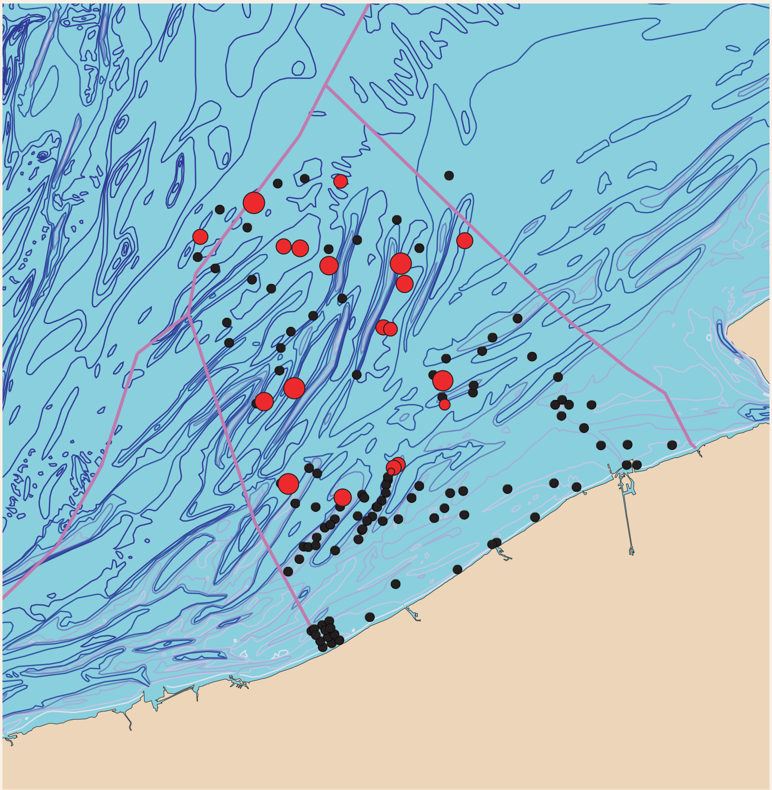
Sigalion mathildae

Spiophanes bombyx • bee spionid

Sthenelais boa • burrowing scale worm

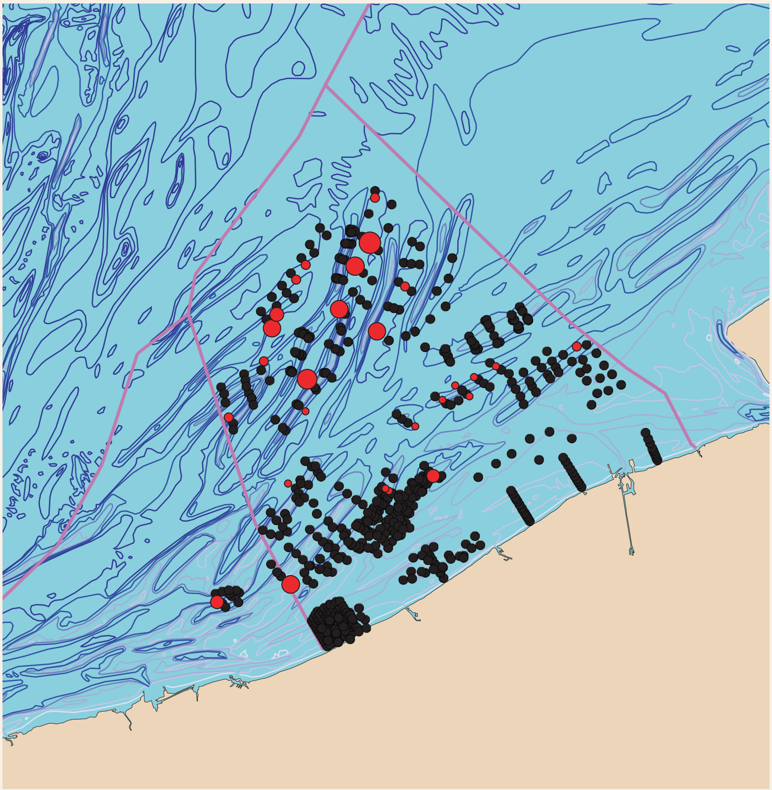
1976 • 1986

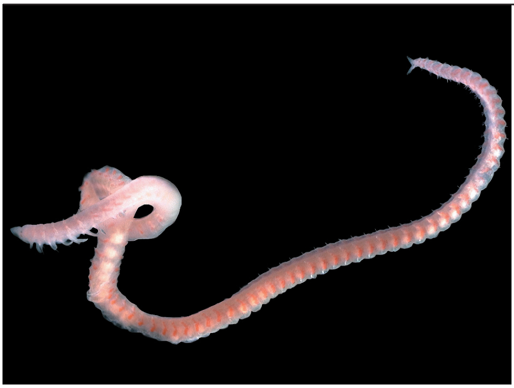
● max 97 ind./m²



1994 • 2001

● max 107 ind./m²





Aonides paucibranchiata

Southern, 1914

Taxonomy

- Classis Polychaeta
- Ordo Spionida
- Familia Spionidae
- *Aonides* Claparède, 1864

Common names

N unknown F unknown

E unknown D unknown

Description

Bristle worm with elongated body. Conical and blunt head with four eyes. Gills present from the second segment onwards, gills absent in the behind-most segment.

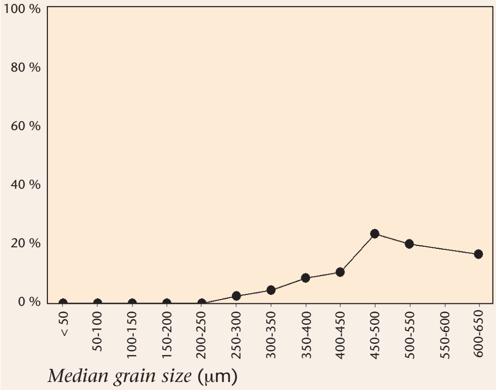
Distribution

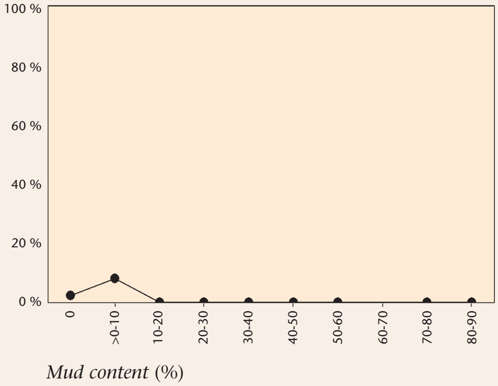
Aonides paucibranchiata was observed in both periods across the entire Belgian part of the North Sea with exception of the coastal zone. Contrary to the 1994-2001 period this species had a high distribution frequency in the 1976-1986 period. The maximum density in both periods amounted to approximately 100 ind./m².

Habitat preference

Aonides paucibranchiata is typically found in coarse sediment (median grain size > 250 µm). From a median grain size of 450 µm the chance of finding this species amounts to 20%. *Aonides paucibranchiata* is solely observed in sediments with a mud content < 10%.

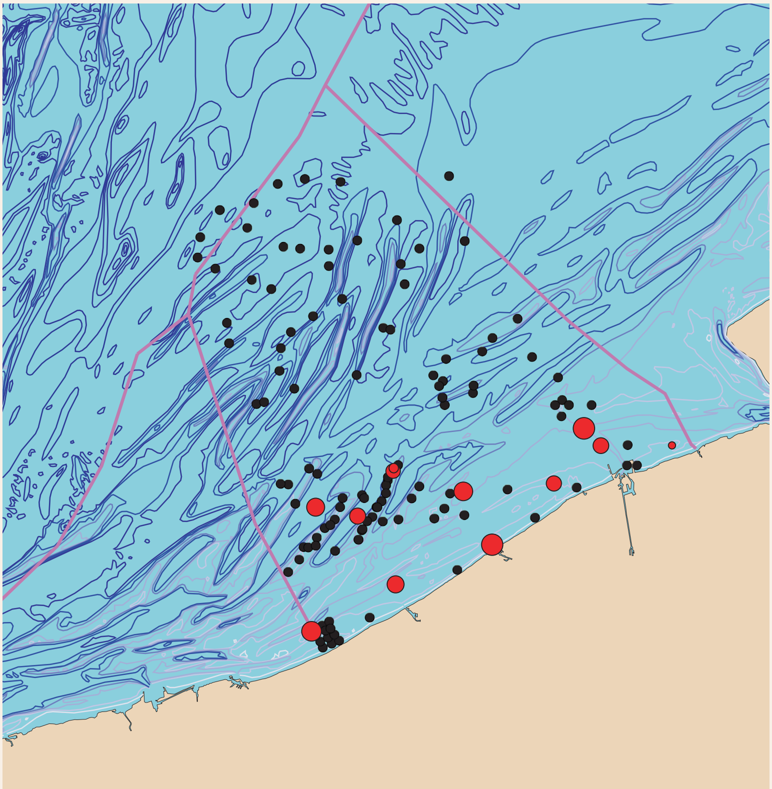
Relative occurrence





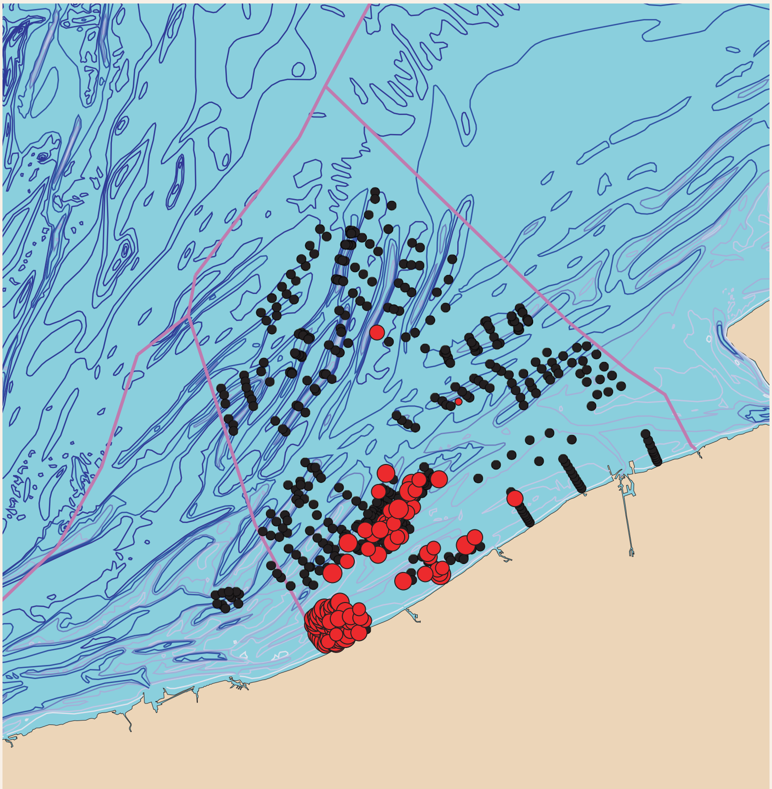
1976 • 1986

max 43 ind./m²



1994 • 2001

max 696 ind./m²



Capitella capitata
(Fabricius, 1780)

Capitella minima
Langerhans, 1880

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Capitellida
- Familia Capitellidae
- *Capitella* Blainville, 1828

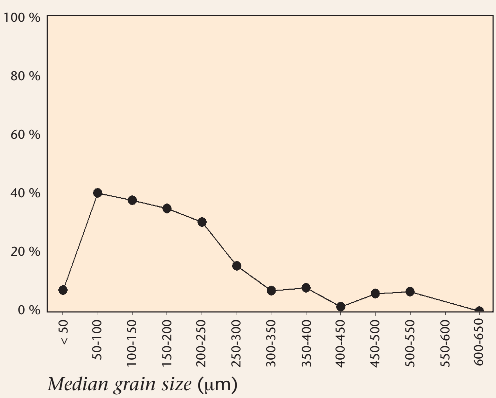
Common names
N slangpier F capitelle
E unknown D unknown

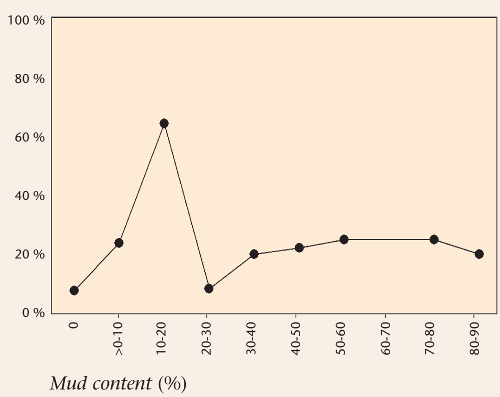
Description
Two twin species can be found in the North Sea: *Capitella capitata* and *Capitella minima*. These two species are morphologically very hard to distinguish from each other, hence we speak of a *Capitella* complex. *Capitella* looks like earthworms because the exterior appendages (parapodia and gills) are very much reduced. The body is rather fragile and may contract and/or expand. The head is built rather simply and tapers conically. The colour of the living specimens is purple.

Distribution
Barring a single exception the distribution of *Capitella capitata/minima* is limited to the near-coastal zone. In the 1976-1986 period the complex was found in the entire near-coastal zone with a low frequency of occurrence. In the 1994-2001 period the complex of species had a higher relative occurence, but its distribution was limited to the western near-coastal zone. Its maximum density increased from 40 ind./m^2 in the 1976-1986 period to 700 ind./m^2 in the 1994-2001 period.

Habitat preference
Capitella capitata/minima is found in all sediment types present on the Belgian part of the North Sea. Although this species occurs in very fine to coarse sediments, it tends to prefer fine-grained sediments with a median grain size of 50-250 µm. *Capitella capitata/minima* is almost completely absent in sediments without mud. The maximum relative occurrence (> 60%) is observed in sediments with a mud content of 10-20% whereas *C. capitata/minima* has a relative occurrence of 20 to 30% in sediments with higher mud contents.

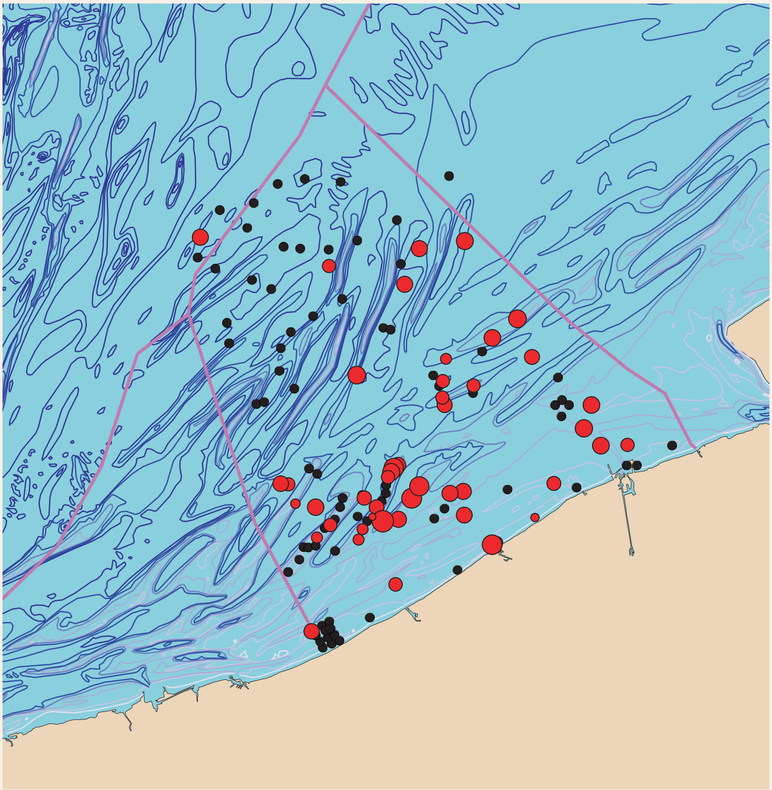
Relative occurrence





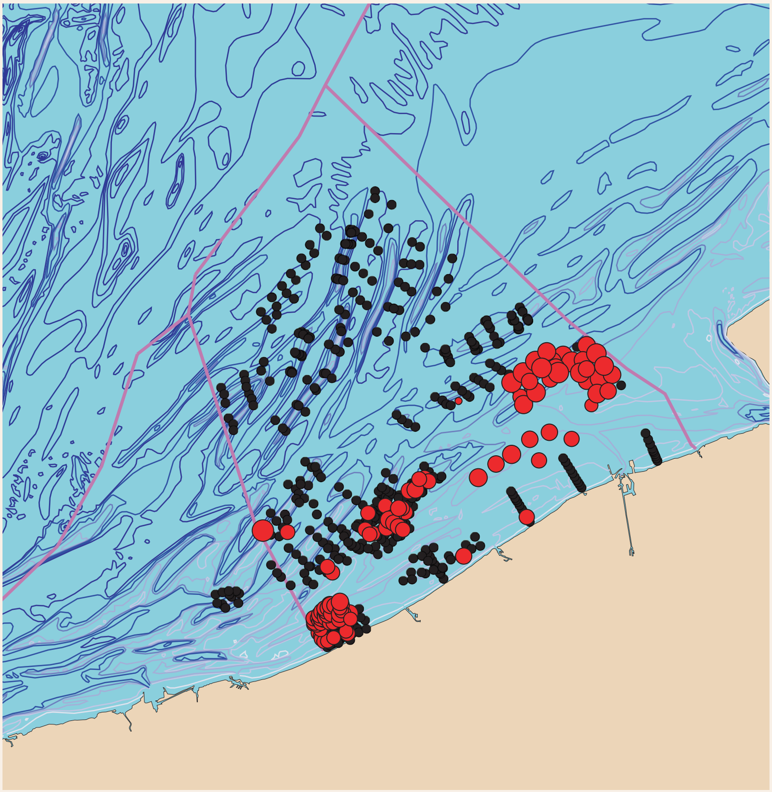
1976 • 1986

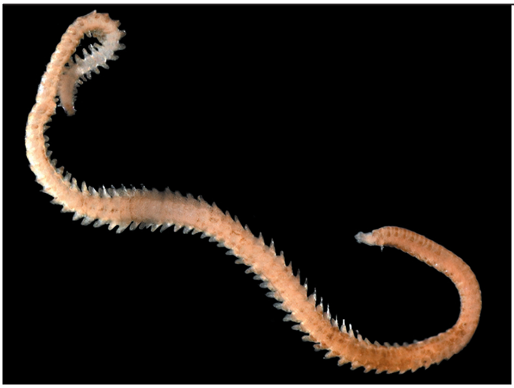
max 136 ind./m²



1994 • 2001

max 567 ind./m²





Eteone longa
(Fabricius, 1780)

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Phyllodocidae
- *Eteone* Savigny, 1818

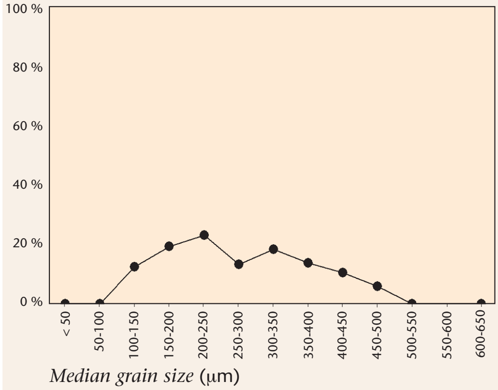
Common names
N groengele wadworm F étéone
E unknown D unknown

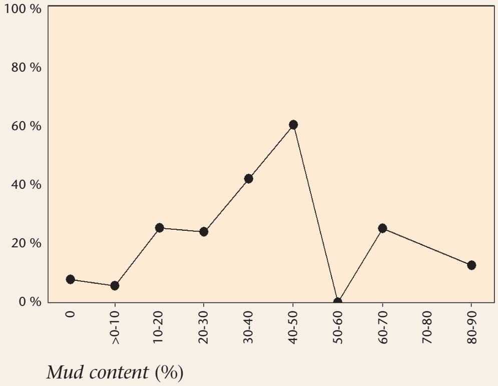
Description
Long, thin and very active worm with approximately 200 identical segments (up to several cms long). The head bears four little antennae. The dorsal half of the parapodia bears a large leaf-like lamella. Its colour ranges from white to light grey with brown patches or brownish-green broad transverse bands. This species is carnivorous and secretes slime upon contact.

Distribution
In the 1976-1986 period *Eteone longa* was distributed across the entire Belgian part of the North Sea but was only observed in relatively low densities (maximum 140 ind./m^2). In the 1994-2001 period a different distribution pattern was noted: the distribution of *E. longa* was mainly limited to the near-coastal zone, with the exception of the eastern coastal zone. In this zone the species was found in densities of maximum 550 ind./m^2.

Habitat preference
Eteone longa is found in sediments with a wide range of median grain sizes: the species is only absent in very fine (< 100 µm) and very coarse sediments (> 500 µm). An optimum (relative occurrence > 20%) is reached with a median grain size of 150 to 250 µm. *Eteone longa* displays a preference (relative occurrence: > 40%) for relatively high mud contents (30 to 50%), but is found in sediments with other mud contents as well.

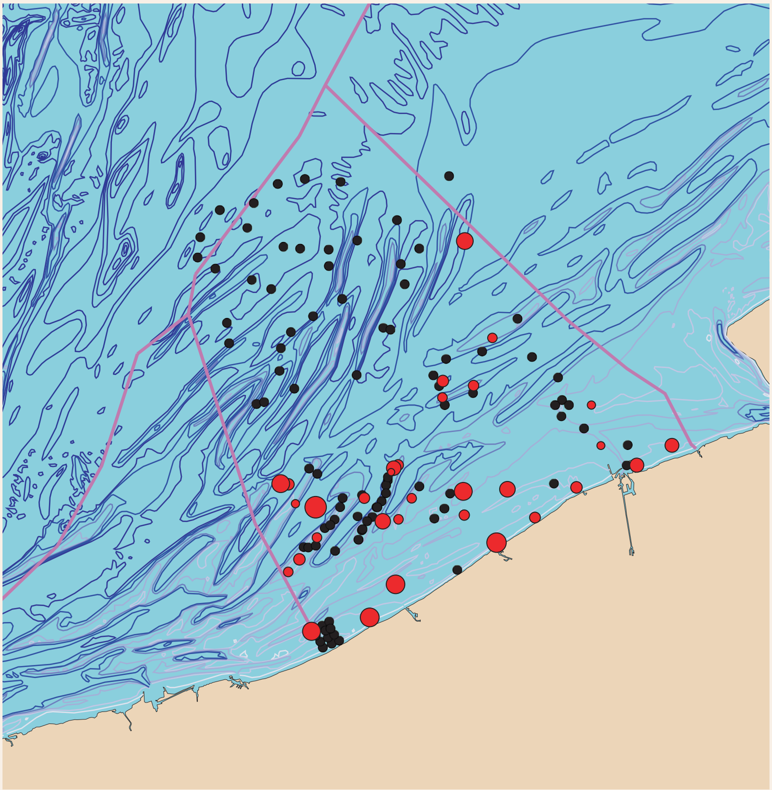
Relative occurrence





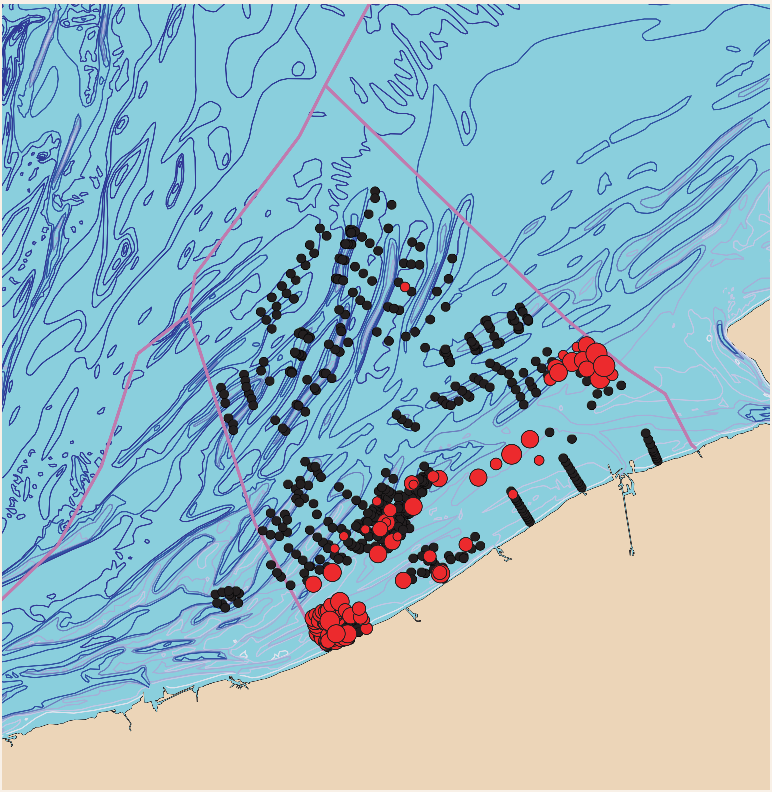
1976 • 1986

max 800 ind./m²



1994 • 2001

max 3489 ind./m²



Eumida sanguinea
(Örsted, 1843)

Taxonomy
Phylum Annelida
Classis Polychaeta
Ordo Phyllodocida
Familia Phyllodocidae
Eumida Malmgren, 1865

Common names
N unknown F unknown
E unknown D unknown

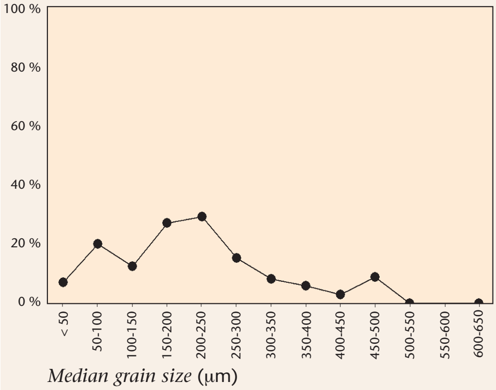
Synonyms
Eulalia sanguinea Örsted, 1843

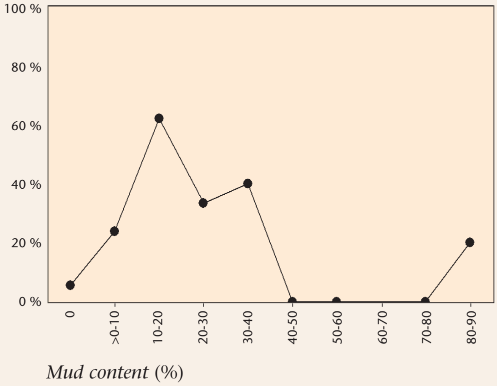
Description
Bristle worm with a rather corpulent, ventrally flattened body up to 60 mm long. The uniform segments feature distinct parapodia on which the dorsal lamellas are clearly visible. The head has two large black eyes and five antennae, one of which in the middle of the head. Four pairs of rather long, thin tentacles. The colour varies from greyish white with brown spots to reddish brown with white transverse bands. *Eumida sanguinea* often lives in association with the sand mason *Lanice conchilega*.

Distribution
Eumida sanguinea mainly occurs in the near-coastal zone. In the 1976-1986 the species had a low frequency of occurrence but was found across the entire near-coastal zone. The density was limited to a maximum of only 800 ind./m^2. In the 1994-2001 period the frequency of occurrence increased, but the species appeared to be absent in the eastern coastal zone. The highest frequency of occurrence and density levels (up to 3,500 ind./m^2) were observed in the western coastal zone and in the southern part of the Zeeland Banks.

Habitat preference
Eumida sanguinea occurs in a wide spectrum of sediment types: the species only avoids sediments with a median grain size > 500 µm or with a mud content > 40%. An optimum is reached in sediments with a median grain size of 150-250 µm and a mud content of 10-40%. The high relative occurrence in sediments with a mud content of 80-90% is considered relatively unreliable in view of the low number of observations for this mud content.

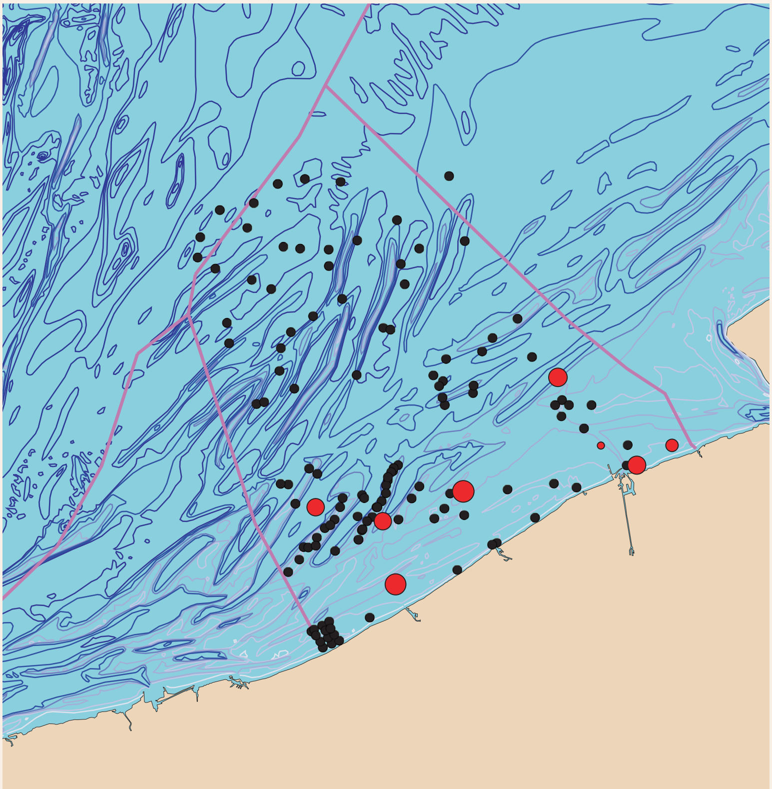
Relative occurrence





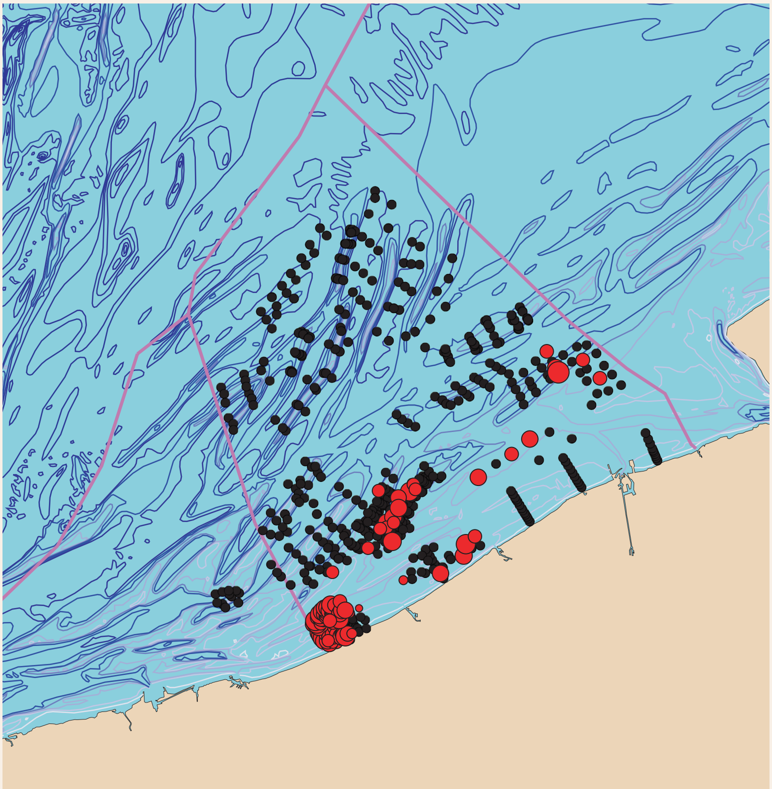
1976 • 1986

max 16 ind./m²



1994 • 2001

max 97 ind./m²



Eunereis longissima

(Johnston, 1840)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Nereidae
- *Eunereis* Malmgren, 1865

Common names

zager néreis
unknown unknown

Synonyms

Nereis longissima Johnston, 1840

Description

The bristle worm *Eunereis longissima* can reach a length of up to 50 cm, although only smaller specimens with a maximum length of 20cm have been found on the Belgian part of the North Sea. The striking head structures with tentacles, palps, antennae and four eyes are characteristic. Living specimens have a red to iridescent dark brown colour.

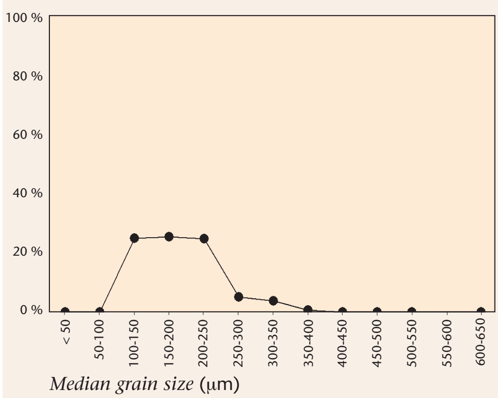
Distribution

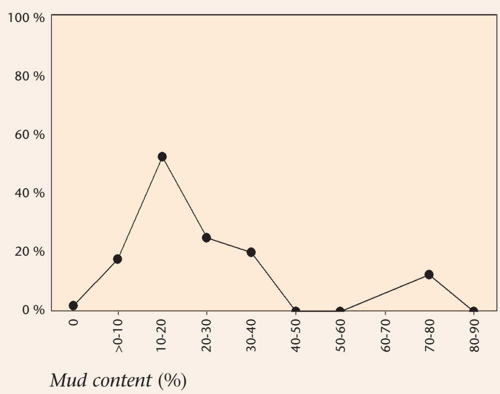
With only eight observations and a maximum density of 16 ind./m^2 *Eunereis longissima* was a rare phenomenon in the entire near-coastal zone in the 1976-1986 period. In the 1994-2001 period the number of observations increased and densities up to 100 ind./m^2 were noted. The species still mainly occurred near the coast, but clearly avoided the eastern coastal zone.

Habitat preference

Eunereis longissima is typically found in sediments with a median grain size of 100 to 250 µm. The species has a broad mud content tolerance but tends to prefer (relative occurrence: > 50%) sediments with a mud content of 10-20%.

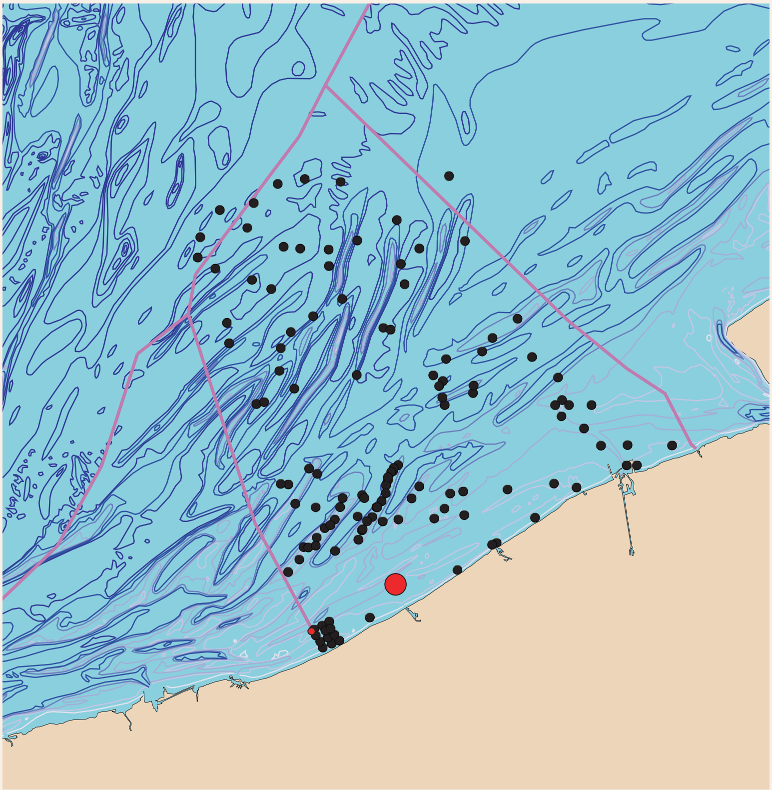
Relative occurrence





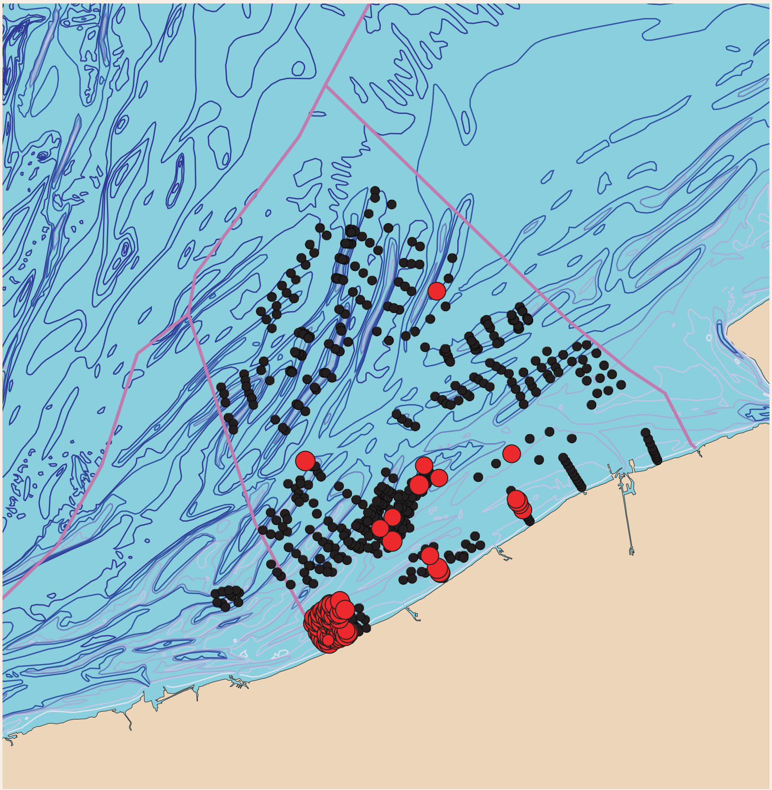
1976 • 1986

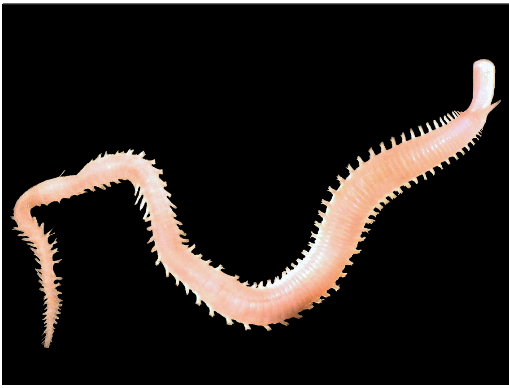
max 4 ind./m^2



1994 • 2001

max 82 ind./m^2





Glycera alba

(O.F. Müller, 1776)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Glyceridae
- *Glycera* Savigny, 1818

Common names

N unknown F glycère
E unknown D unknown

Description

Medium-sized (up to 75 mm long) bristle worm whose body narrows towards both ends. The eversible proboscis has papillae and four jaws. The antennae are very small. Segments are subdivided into rings. Small parapodia with clear gills. Colour: milk white.

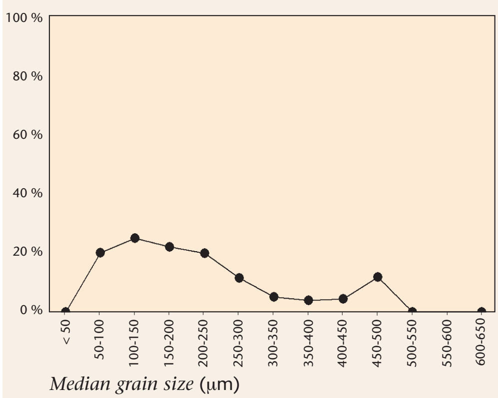
Distribution

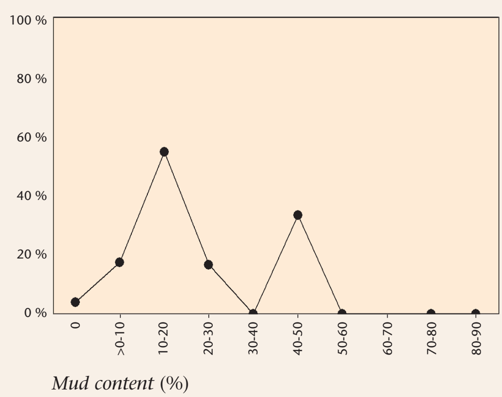
In the 1976-1986 period *Glycera alba* was only found twice (western coastal zone; maximum 4 ind./m^2). In the 1994-2001 period the species was more widely distributed and was mainly found in the western near-coastal zone. *Glycera alba* was observed only sporadically in the open sea zone. In this period the species reached a maximum density of 100 ind./m^2.

Habitat preference

Glycera alba prefers sediments with a median grain size of 50 to 250 µm but is also found in coarser sediments (up to 500 µm). The species furthermore tends to prefer sediments with a mud content of 10-20%. The high relative occurrence in sediments with a mud content of 40-50% is considered unreliable.

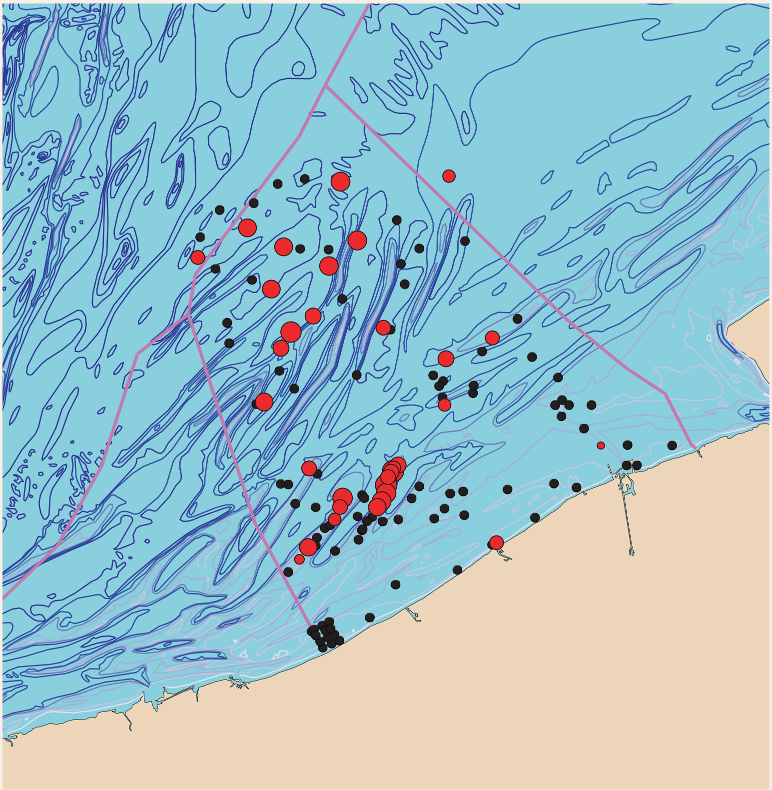
Relative occurrence





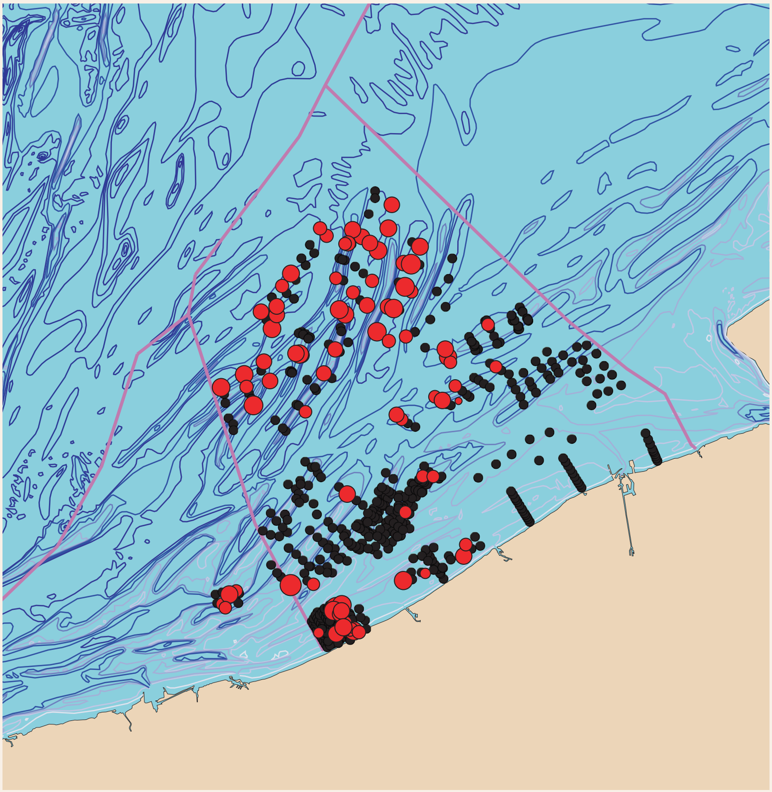
1976 • 1986

max 97 ind./m²



1994 • 2001

max 165 ind./m²



Glycera capitata
Örsted, 1843

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Glyceridae
- *Glycera* Savigny, 1818

Common names
N unknown F glycère
E unknown D unknown

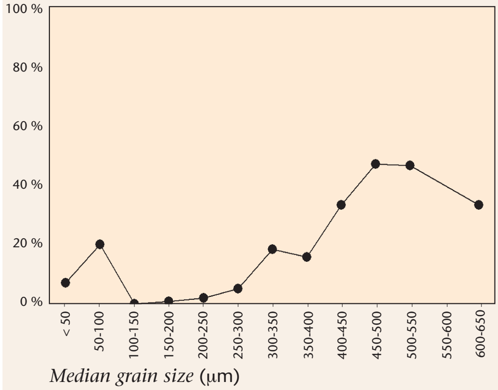
Synonyms
Glycera lapidum Eliason, 1920

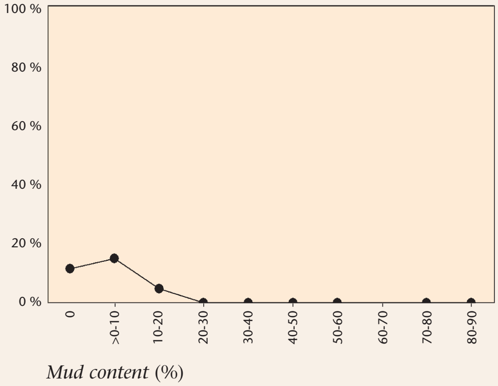
Description
Medium-sized (up to 150 mm long) bristle worm whose body narrows towards both ends. The eversible proboscis has papillae and four jaws. The antennae are very small. Segments are subdivided into rings. Small parapodia without gills. Colour: greyish white.

Distribution
In both periods *G. capitata* was mainly distributed in the open sea zone. The species was nevertheless also observed in the coastal zone (1994-2001: especially the western coastal zone). Its density always remained rather low with a maximum of 170 ind./m^2 (1994-2001 period).

Habitat preference
Glycera capitata is observed in sediments of nearly all median grain sizes, but displays a preference for coarser sediments: a relative occurrence of approximately 40% is reached in sediments with a median grain size > 400 µm. The habitat preference of the species is furthermore characterised by its absence in sediments with a mud content > 20%.

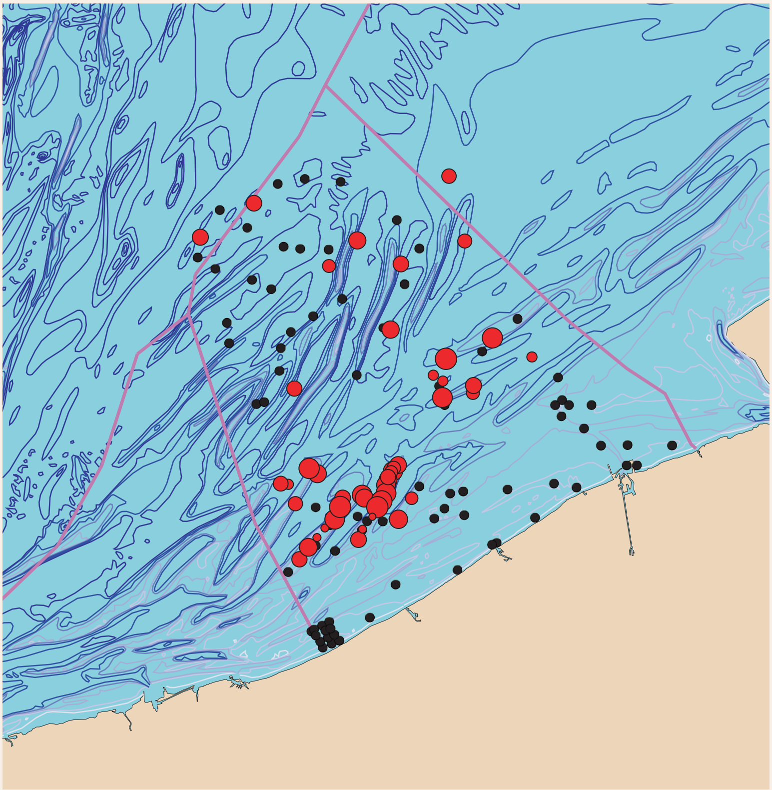
Relative occurrence





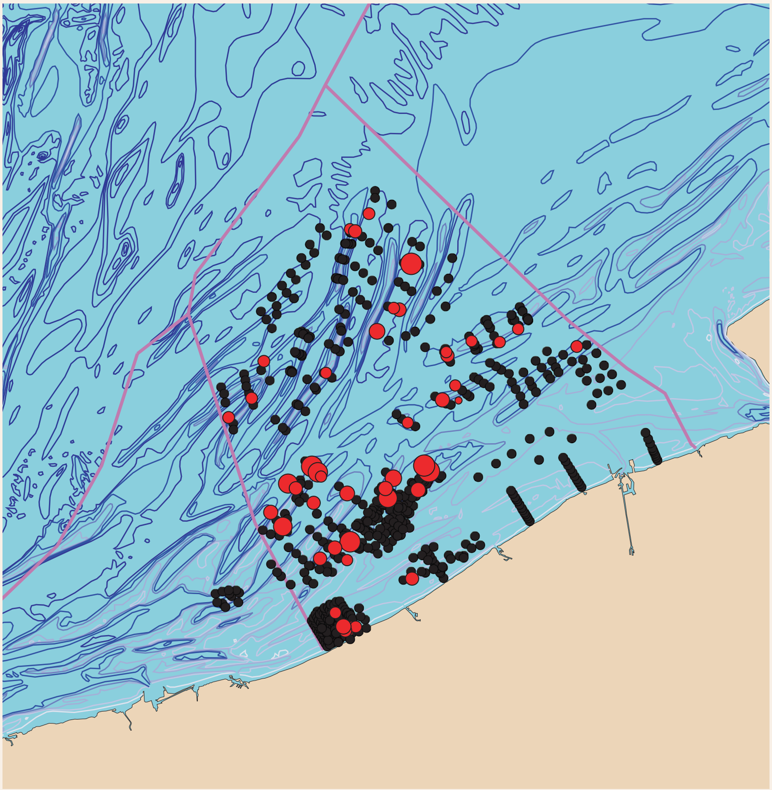
1976 • 1986

max 1567 ind./m²



1994 • 2001

max 1198 ind./m²



Hesionura elongata

(Southern, 1914)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Phyllodocidae
- *Hesionura* Hartmann-Schröder, 1958

Common names

N unknown F unknown

E unknown D unknown

Synonyms

Mystides (*Mesomystides*) *elongata* Southern, 1914

Description

Small bristle worm measuring up to 20 mm long. The head is clearly longer than wide with two pairs of antennae. The first segment is merged with the head; the second segment features 4 long tentacular cirri. The ventral cirri are longer than the parapodia.

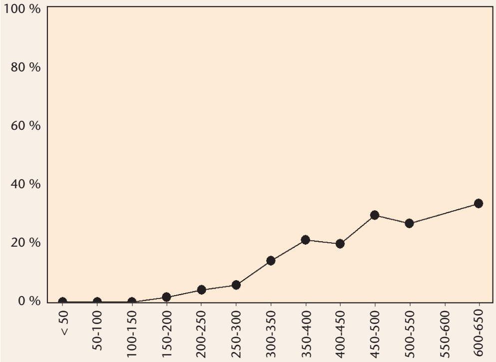
Distribution

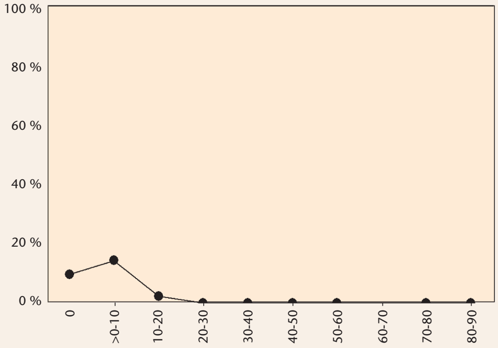
In both periods *Hesionura elongata* was mainly observed in the open sea zone. In the area of the Flemish Banks and the Zeeland Banks the species mainly lives on the tops of the sandbanks. Further off the coast specimens are also found in the gullies between the banks. In comparison to the 1994-2001 period *H. elongata* had a high frequency of occurrence outside the near-coastal zone in the 1976-1986 period. This is probably mainly due to the difference in sampling technique: in the 1994-2001 period samples were sieved alive, as a result of which small bristle worms such as *H. elongata* had the opportunity to actively slip through the meshes of the sieve. In both periods a maximum density of 1,200 to 1,600 ind./m^2 was reached.

Habitat preference

Hesionura elongata typically occurs in coarse-grained sediments: the maximum relative occurrence (> 30%) is observed in the coarsest sediments on the Belgian part of the North Sea (median grain size 600-650 µm). The mud content of the sediments is 20% maximally: the optimum is reached in sediments with a mud content ranging between 0 and 10%.

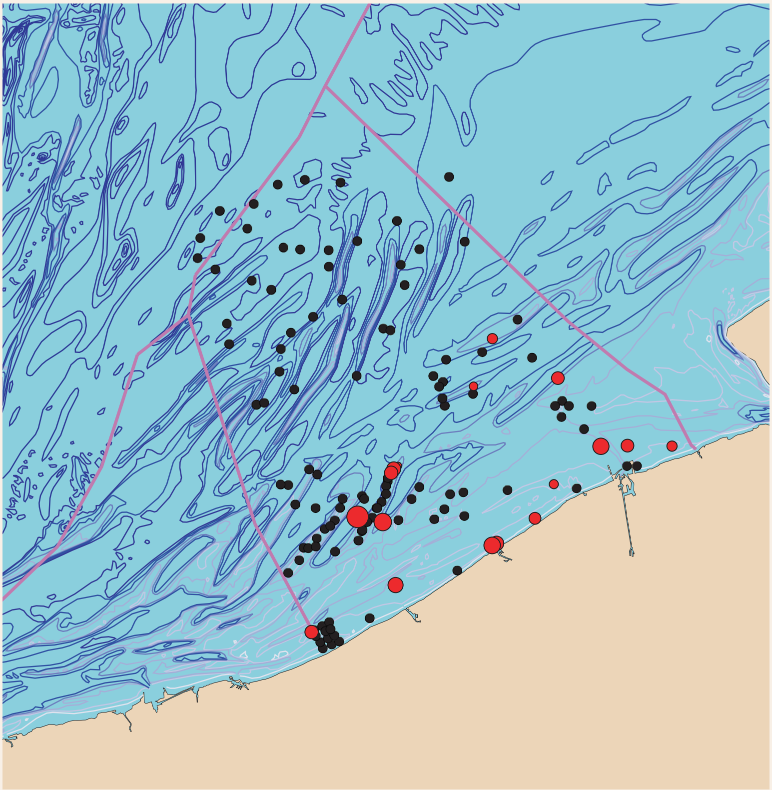
Relative occurrence





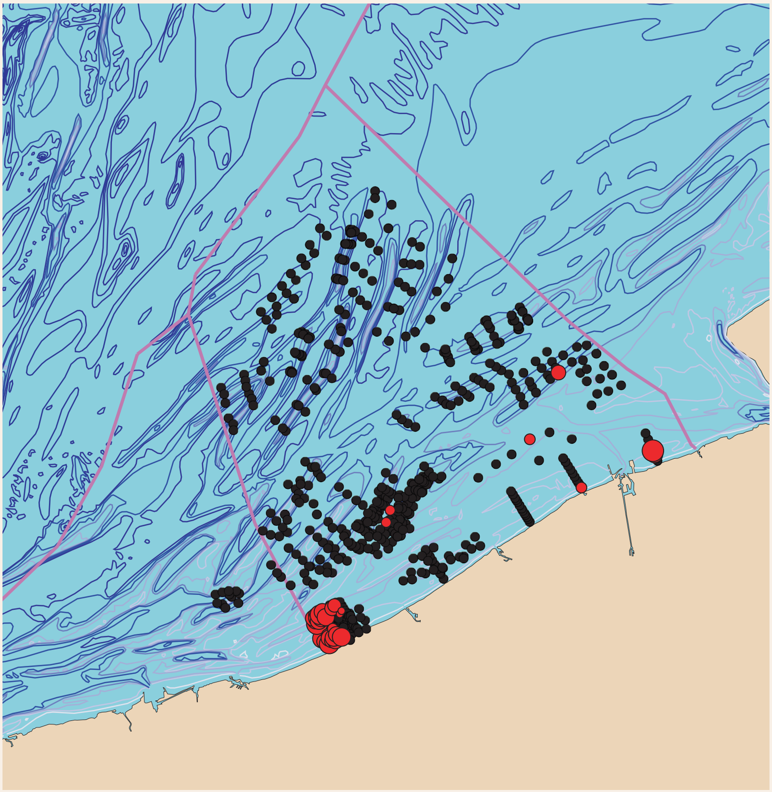
1976 • 1986

max 141 ind./m^2



1994 • 2001

max 438 ind./m^2



Heteromastus filiformis
(de Claparède, 1864)

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Capitellida
- Familia Capitellidae
- *Heteromastus* Eisig, 1887

Common names
N draadworm F unknown
E unknown D Kotpillenwurm

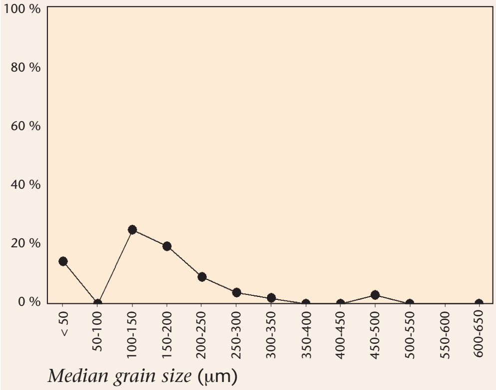
Synonyms
Capitella filiformis (Claparède, 1864)

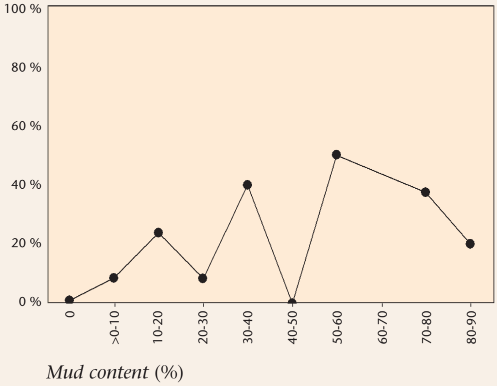
Description
This bristle worm has a thin (1 mm) and relatively long body (100 mm). Two regions can be distinguished across the body: an anterior end with twelve bristle-covered segments and a posterior end with segments with thickened parapodial grooves. The anterior end is coloured red, the posterior end reddish green or yellow.

Distribution
In both sampling periods the distribution area of *Heteromastus filiformis* was mainly limited to the coastal zone. The highest numbers were observed here as well (up to maximum 450 ind./m^2). Contrary to the 1994-2001 period, the species had a higher frequency of occurrence in the eastern coastal zone in the 1976-1986 period. The density levels for this species at other locations (Flemish Banks and Zeeland Banks) were rather low.

Habitat preference
Heteromastus filiformis has a clear preference for fine sediments. The species has a high relative occurrence (> 20%) in sediments with a median grain size of 100-200 µm. In addition, the species tends to prefer sediments with high mud contents: although the relative occurrence follows an erratic pattern, the species occurs more frequently as the mud content increases.

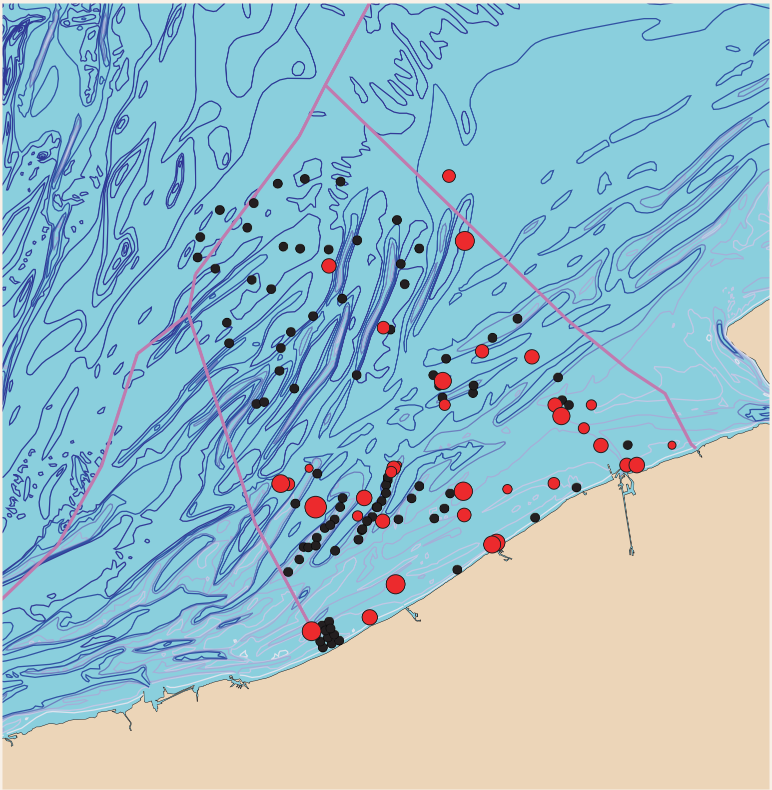
Relative occurrence





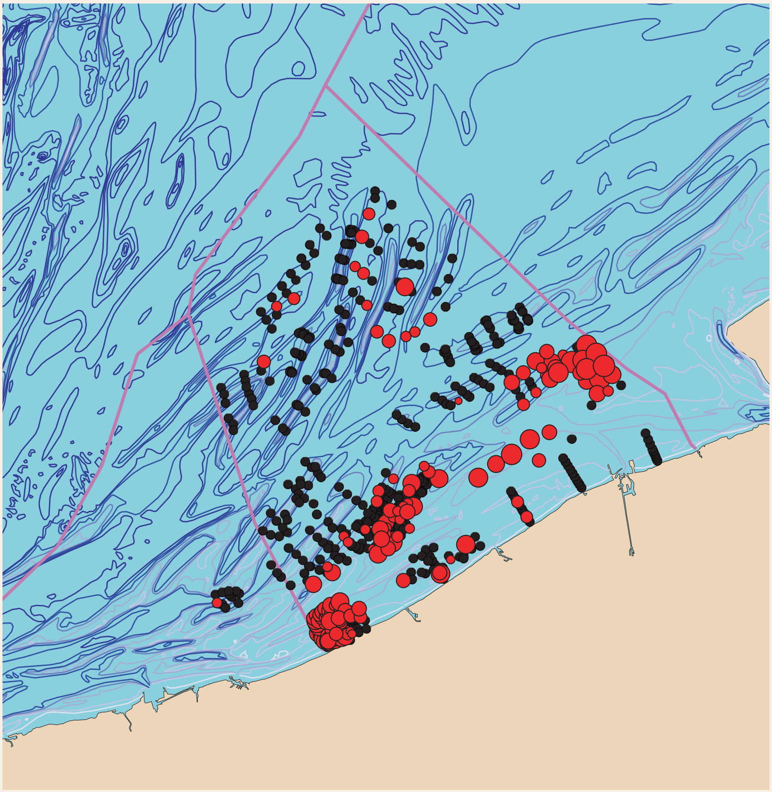
1976 • 1986

max 2106 ind./m²



1994 • 2001

max 9327 ind./m²



Lanice conchilega
(Pallas, 1766)

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Terebellida
- Familia Terebellidae
- *Lanice* Malmgren, 1866

Common names
N schelpkokerworm, zandkokerworm F lanice,macaroni
E sand mason D Muschelsammlerin, Bäumchenröhrenwurm

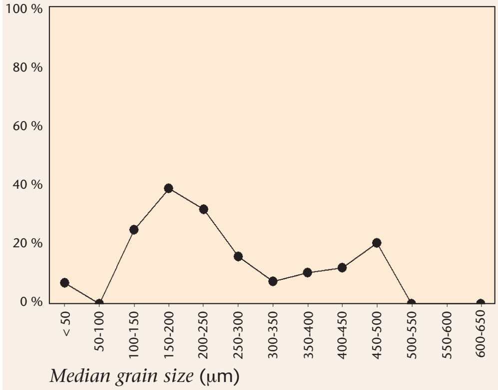
Synonyms
Nereis conchilega Pallas, 1766

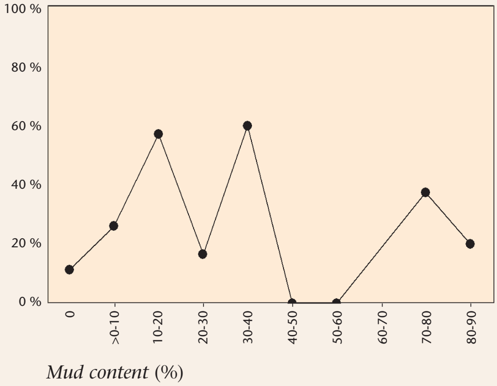
Description
A tube-living bristle worm whose body consists of two parts: a swollen anterior end with a reduced head and specially formed segments and a narrowed posterior end. The head has numerous active feeding tentacles. Three pairs of bright-red gills are present on the first three segments behind the head. Measures up to 300 mm long. The tube consists of medium-sized to large sand grains with a characteristic fan shape at the top. Several tubes together can form so-called 'sand reefs'.

Distribution
Lanice conchilega is widely distributed on the Belgian part of the North Sea. However, the frequency of occurrence was the highest in the near-coastal zone in both periods. Whereas the species occurred along the entire coast in the 1976-1986 period, *Lanice conchilega* appeared to be practically absent in the eastern coastal zone in the 1994-2001 period. In both periods densities up to 1,000s ind./m^2 were observed with a maximum density of about 10,000 ind./m^2 in the 1994-2001 period.

Habitat preference
Lanice conchilega is found in various sediments but displays a preference for fine to medium-grained sediments (100 to 500 µm) with a relatively high mud content (10 to 40%).

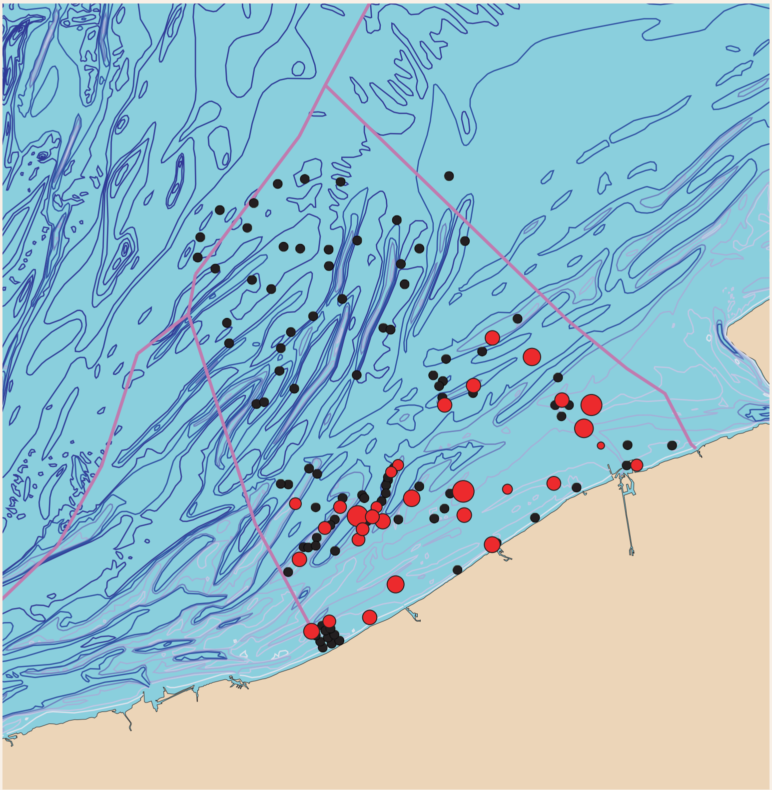
Relative occurrence





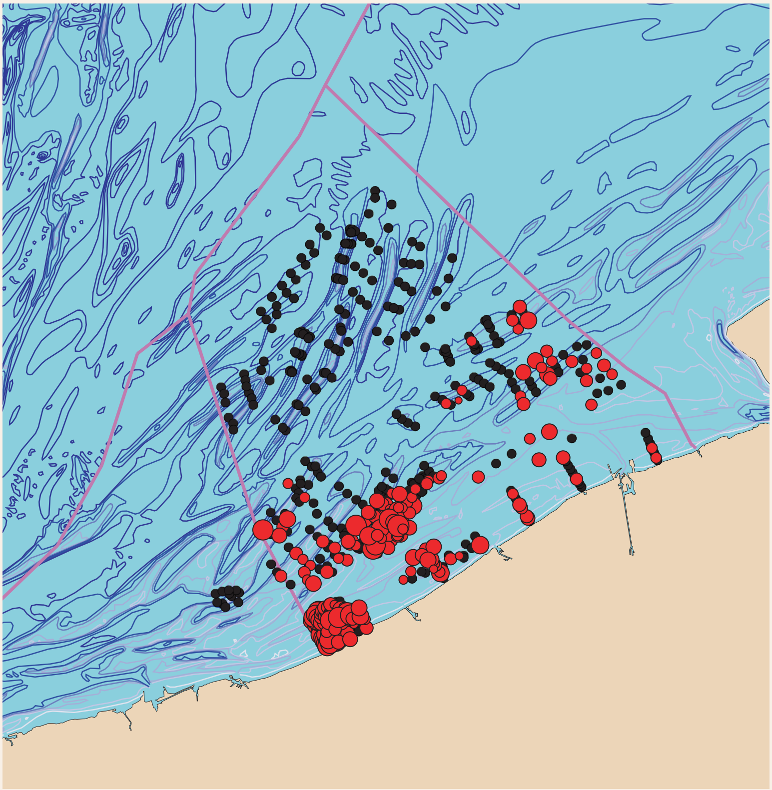
1976 • 1986

max 211 ind./m^2



1994 • 2001

max 8950 ind./m^2



Magelona johnstoni

Licher & Mackie, 2000

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Spionida
- Familia Magelonidae
- *Magelona* Müller, 1858

Common names

N unknown F magélone
E unknown D unknown

Description

A digging bristle worm with an oval, flattened head bearing two long palps covered with numerous papillae. The long filiform body (up to 170 mm) can be separated into two different regions, each characterised by short parapodia. The anterior region is coloured pale pink, the posterior region greenish grey with white patches.

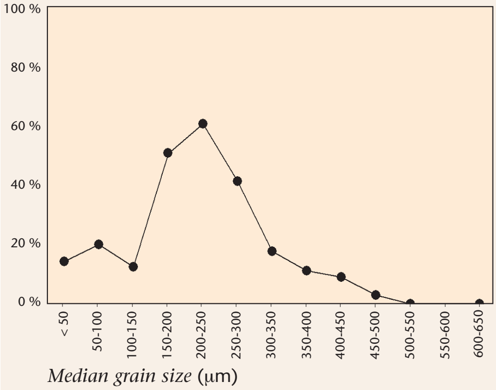
Distribution

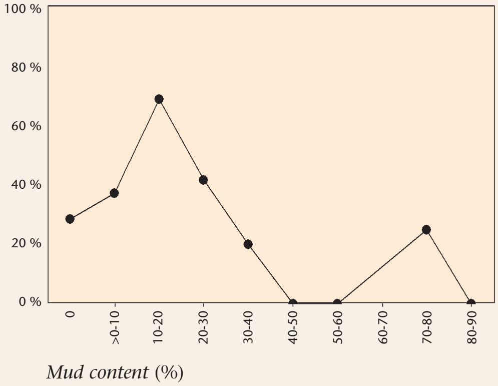
The distribution of *Magelona johnstoni* was in both periods limited to the near-coastal zone, where the species was characterised by a rather uniform distribution and a high relative occurrence. Whereas *M. johnstoni* was found in maximum densities of about 200 ind./m^2 in the 1976-1984 period, higher densities were found in the 1994-2001 period (up to approximately 9,000 ind./m^2)

Habitat preference

Although *Magelona johnstoni* is only absent in coarse-grained sediments the species displays a clear preference for finer sediments (150 to 300 µm), where the species reaches a relative occurrence of > 40%. A similar spectrum of occurrence is found with regard to the mud content; *Magelona johnstoni* reaches the highest relative occurrence in sediments with a mud content of 10-20%.

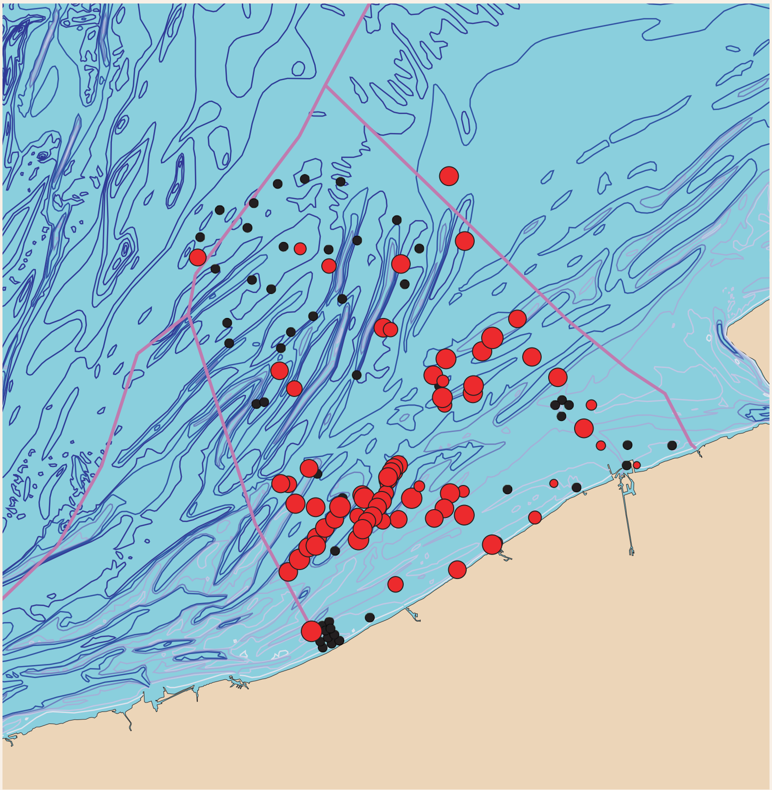
Relative occurrence





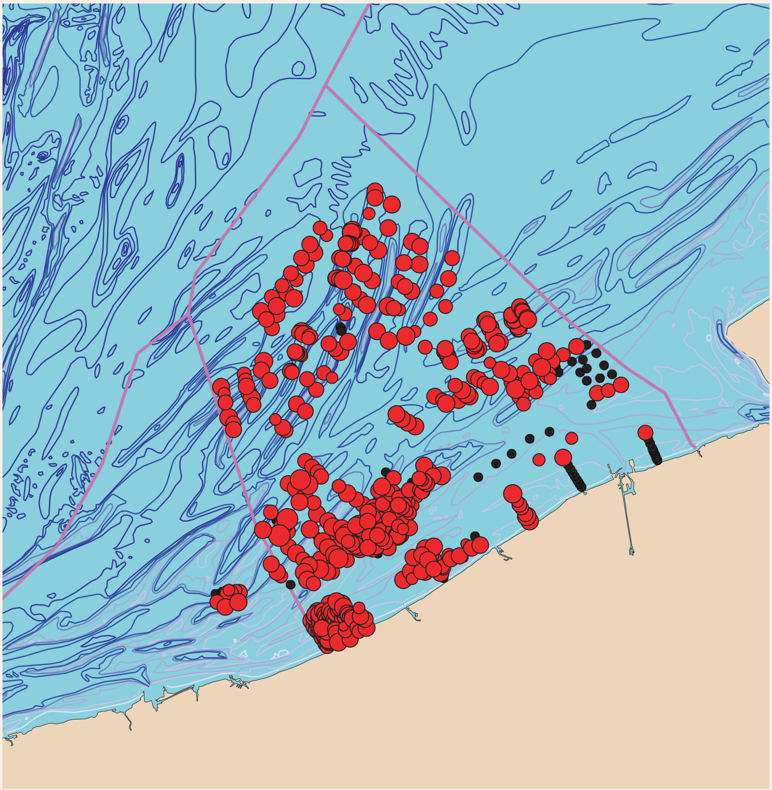
1976 • 1986

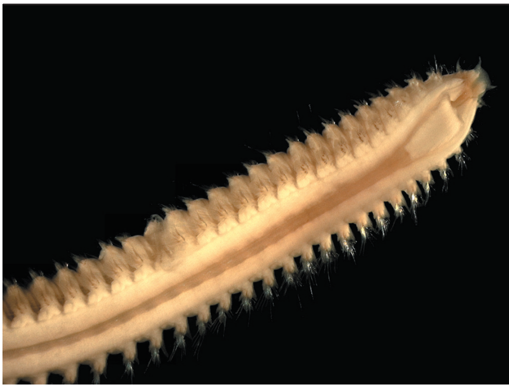
● max 97 ind./m²



1994 • 2001

● max 975 ind./m²





Nephtys cirrosa

Ehlers, 1868

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Nephtyidae
- *Nephtys* Cuvier in Audoin & Milne Edwards, 1833

Common names

N zandzager F nephtys, carput
E white catworm D unknown

Description

Medium-sized (up to 100 mm) free-living bristle worms with a flattened body. The small head bears an eversible proboscis with papillae, horny jaws and four short antennae. The species distinguishes itself from other Nephtys species by typical parapodial flaps and a branchial cirrus that, on the last parapodia, is as long as the gill.

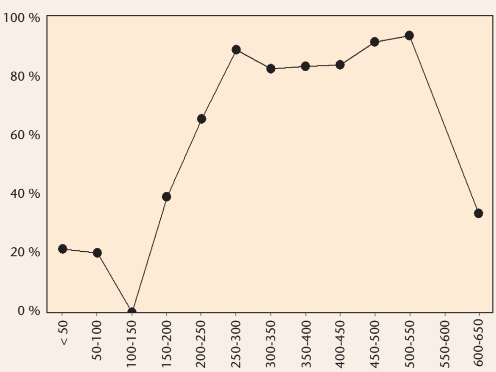
Distribution

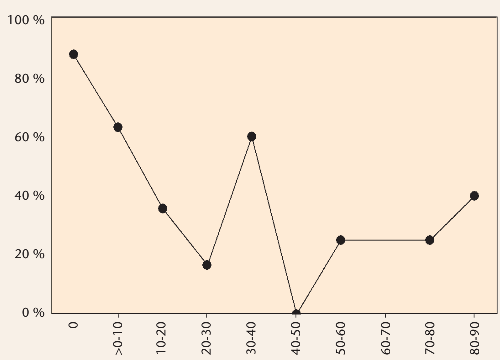
In both periods *Nephtys cirrosa* was widely spread on the Belgian part of the North Sea, where the species was observed from the coastal zone to the open sea in rather large quantities and with a high frequency of occurrence. Maximum density of *N. cirrosa* in the 1976-1986 period was 100 ind./m^2 whereas densities up to 1,000 ind./m^2 were recorded in the 1994-2001 period.

Habitat preference

Nephtys cirrosa is found in sediments with a median grain size of 250 to 550 µm and reaches a very high relative occurrence (> 80%). However, *N. cirrosa* can also be found in finer and coarser sediments. The species is observed in mud-poor sediments as well as in mud-rich sediments, but nevertheless displays a slight preference for low mud content levels (< 10%).

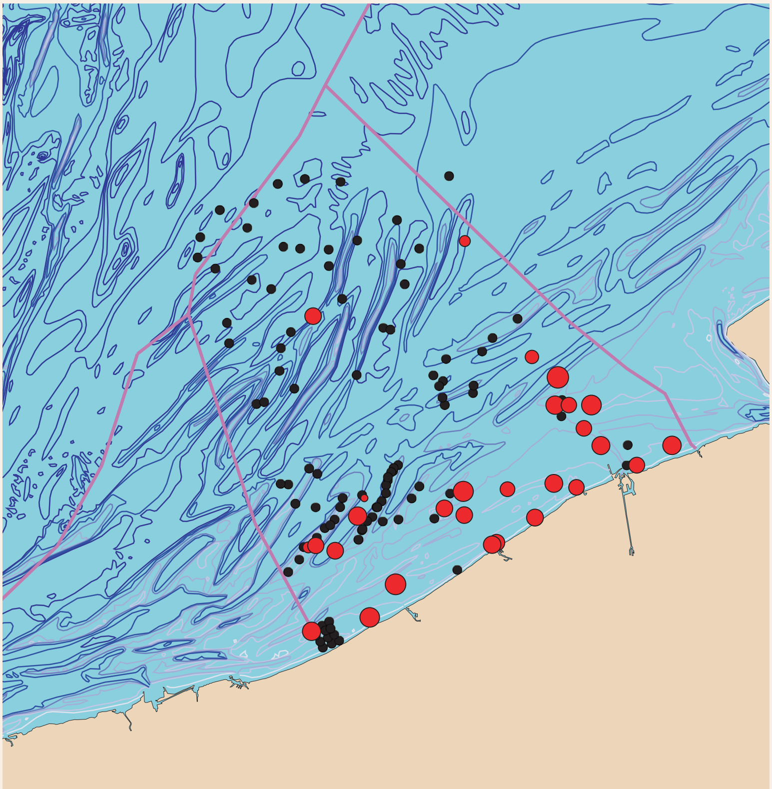
Relative occurrence





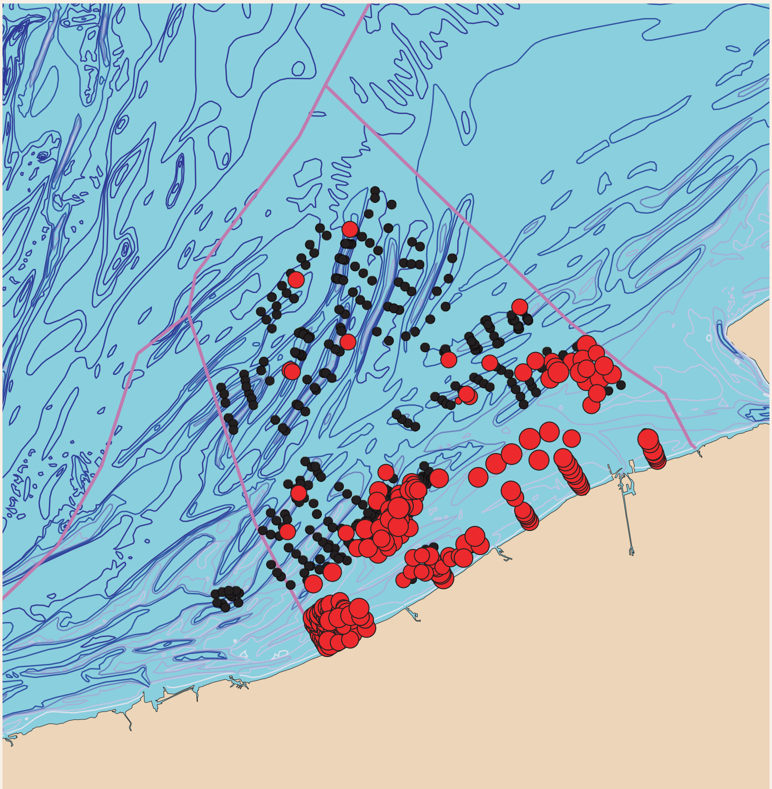
1976 • 1986

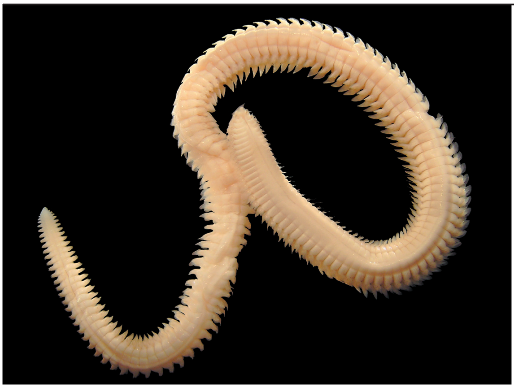
max 83 ind./m²



1994 • 2001

max 311 ind./m²





Nephtys hombergii
Savigny

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Nephtyidae
- *Nephtys* Cuvier in Audoin & Milne Edwards, 1833

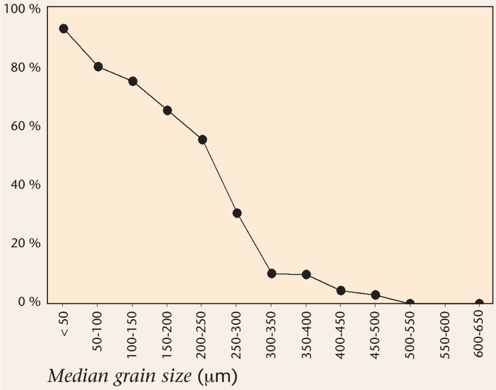
Common names
N zandzager F nephtys, carput
E catworm D Opalwurm

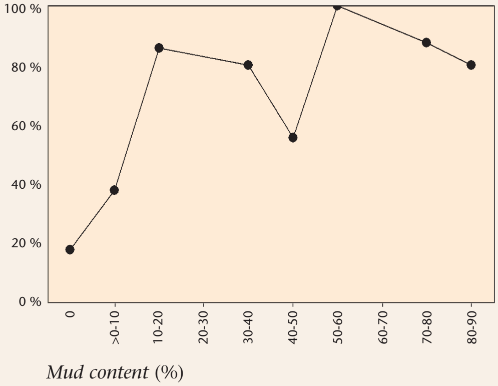
Description
Large (up to 200 mm) robust free-living bristle worms with a flattened body. The small head features an eversible proboscis with papillae, horny jaws and four short antennae. The dorsal parapodial flaps have a clearly visible papilla-like projection. It is pink to flesh-coloured; the gills are red.

Distribution
Although *Nephtys hombergii* can be found across the entire Belgian part of the North Sea, the species chiefly occurs in the near-coastal zone. In the 1976-1986 period the densities did not exceed 100 ind./m^2 whereas densities of more than 300 ind./m^2 were observed in the 1994-2001 period.

Habitat preference
Nephtys hombergii prefers fine sediments: in sediments with a median grain size less than 50 µm the species reaches a relative occurrence of > 90%. The higher the median grain size, the lower the relative occurrence. *Nephtys hombergii* is no longer found in sediments with a median grain size exceeding 500 µm. Although *N. hombergii* can be found in sediments with both high and low mud content, the general trend is that the relative occurrence increases as the mud content increases.

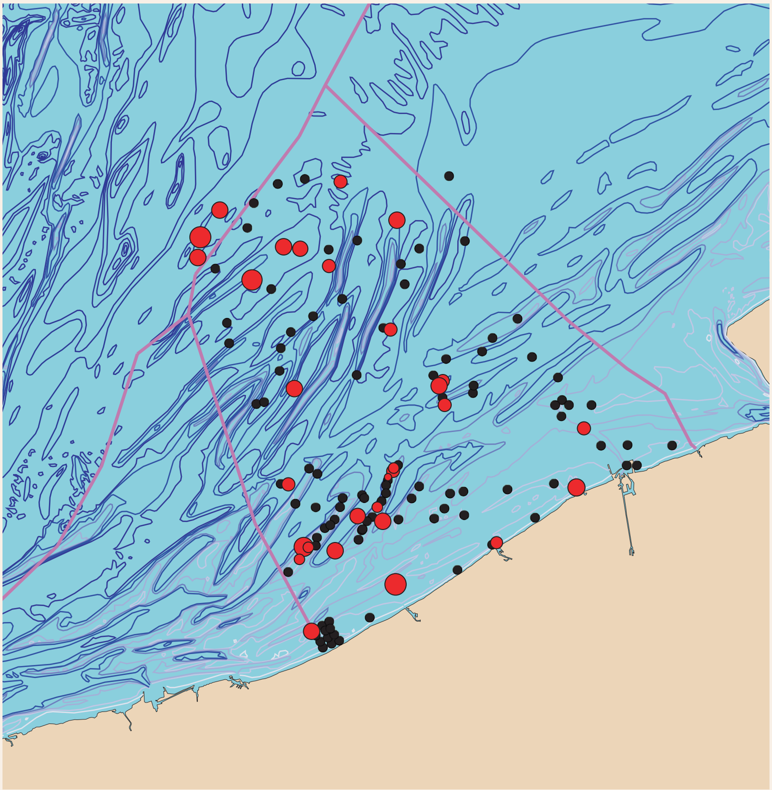
Relative occurrence





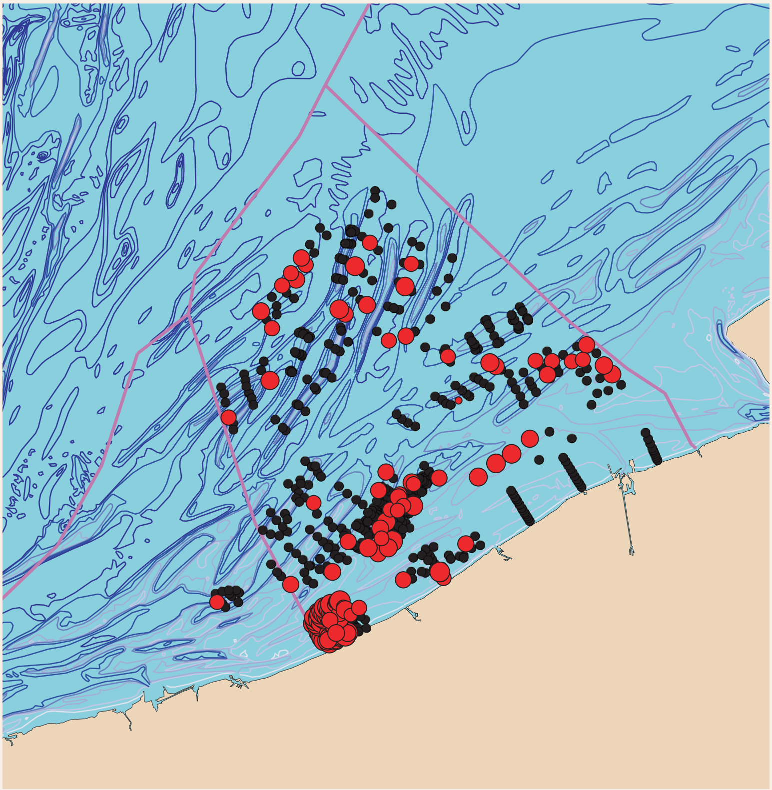
1976 • 1986

● max 85 ind./m²



1994 • 2001

● max 584 ind./m²



Notomastus latericeus

M. Sars, 1850

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Capitellida
- Familia Capitellidae
- *Notomastus* Sars, 1850

Common names

N unknown F unknown
E unknown D unknown

Synonyms

Notomastus rubicundus (Keferstein, 1862)

Description

Simple bristle worm without distinct appendages. The body is relatively long (up to 300 mm) and is separated into a relatively thick, cylindrical anterior end coloured purple to dark red and a thinner bright red or yellowish posterior end. The head is short and conical. The species lives in a spiralled burrow.

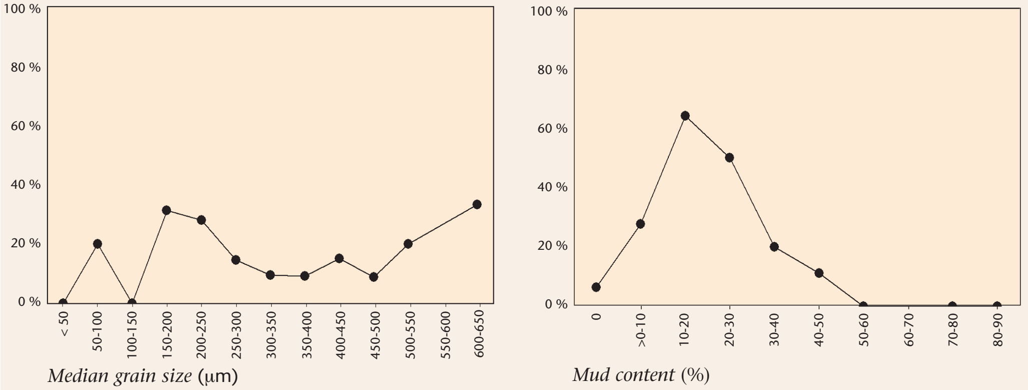
Distribution

Notomastus latericeus has a relatively low frequency of occurrence, but is found across the entire Belgian part of the North Sea. The species is almost completely (1976-1986 period) or even completely absent (1994-2001 period) in the eastern coastal zone only. In the 1976-1986 period densities remained below 100 ind./m^2 whereas densities up to approximately 600 ind./m^2 were recorded in the 1994-2001 period.

Habitat preference

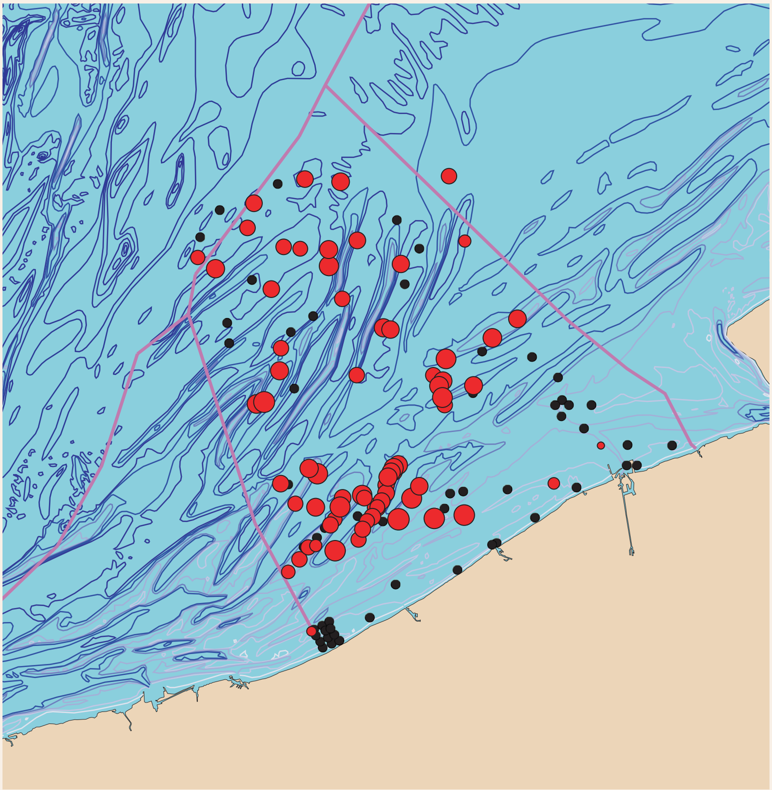
Notomastus latericeus has no clear preference for a specific median grain size: the habitat preference appears to be mainly determined by the mud content. Sediments with a mud content of 0 to 50% are suitable for *N. latericeus*, but the species displays a preference for sediments with a mud content of 10-30% (relative occurrence: > 50%).

Relative occurrence



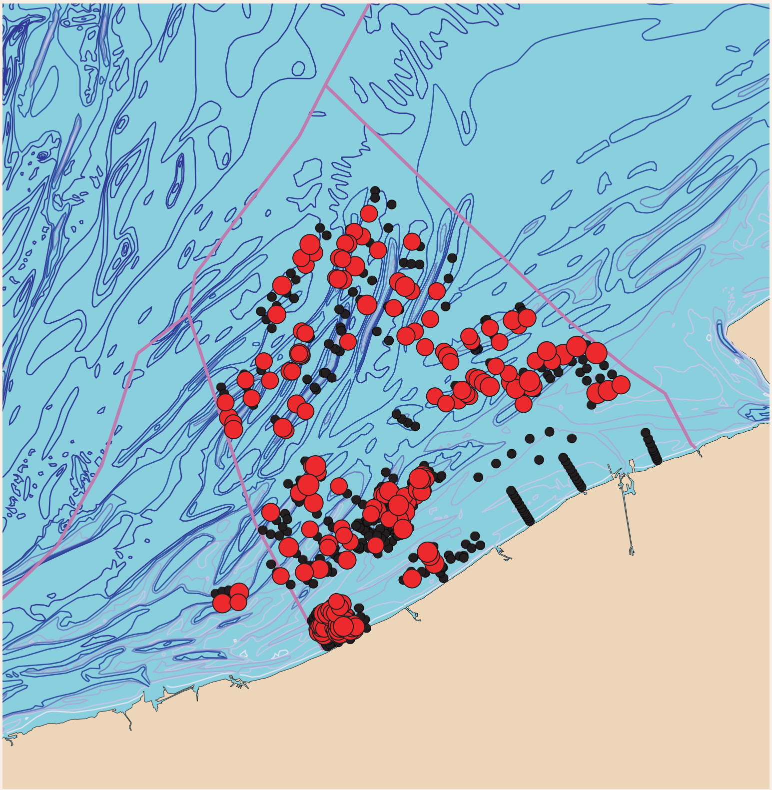
1976 • 1986

● max 656 ind./m²



1994 • 2001

● max 158 ind./m²



Ophelia limacina

(Rathke, 1843)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Opheliida
- Familia Opheliidae
- *Ophelia* Savigny, 1818

Common names

N unknown F ophélie
E unknown D unknown

Description

Bristle worm with a short, thick fusiform body up to 55 mm long. The anterior end is cylindrical; the posterior end is characterised by a ventral groove. The head is a simple smooth cone without appendages, but does have groups of little bristles. The parapodia are in general reduced and bear finger-like gills on the hind part of the body.

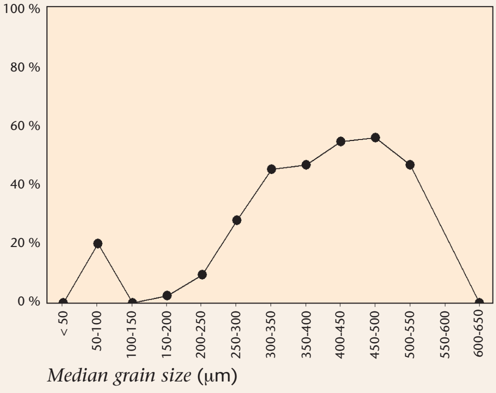
Distribution

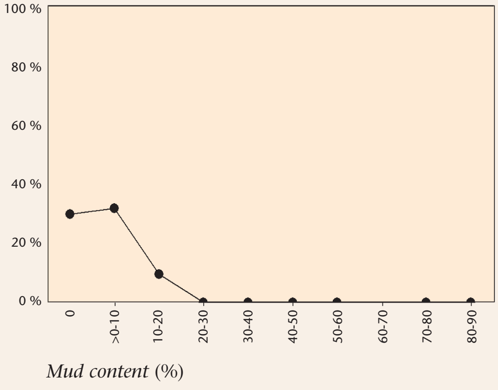
Ophelia limacina is found on almost the entire Belgian part of the North Sea with a high frequency of occurrence. The distribution of the species is only (very) limited in the coastal zone (1976-1986 period) or in the eastern coastal zone (1994-2001 period). The maximum density of *O. limacina* is > 600 ind./m^2 in the 1976-1986 period whereas this amount fell to a maximum of about 150 ind./m^2 in the 1994-2001 period.

Habitat preference

Ophelia limacina has a clear preference for coarse sediments: a high relative occurrence (> 40%) is reached in sediments with a median grain size of 300 to 550 µm. However, the species is absent in very coarse sediments (> 600 µm). *Ophelia limacina* tends to prefer sediments with low mud contents (optimum: 0 to 10%). The species does not occur in sediments with a mud content exceeding 20%.

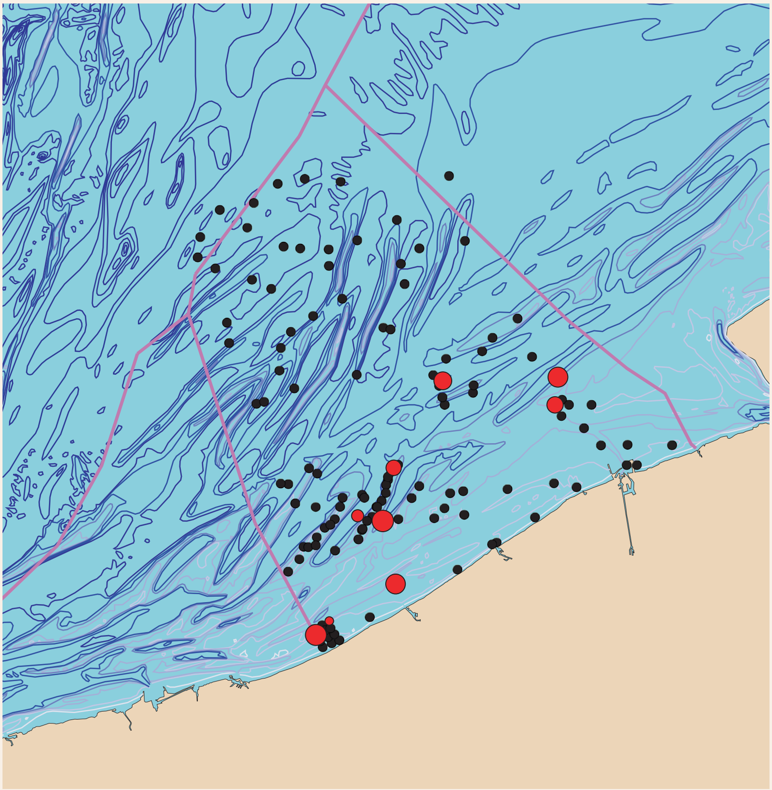
Relative occurrence





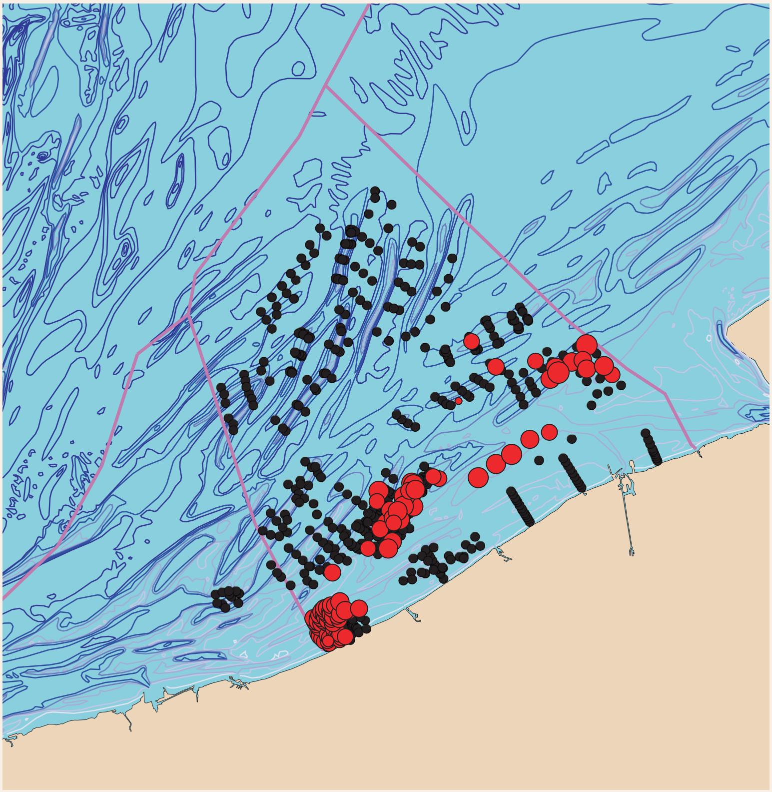
1976 • 1986

max 15 ind./m²



1994 • 2001

max 506 ind./m²



Owenia fusiformis

Delle Chiaje, 1841

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Oweniida
- Familia Oweniidae
- *Owenia* Delle Chiaje, 1841

Common names

N unknown F unknown

E unknown D spindelförmige Owenie

Description

Tube-living bristle worm with a cylindrical body up to 100 mm long. The head features a crown of six short, branched and membraneous gills. The segments number 30 and differ in length. The flexible tube of cemented sand grains and shell fragments is longer than the worm itself. The worm is able to withdraw from the end protruding from the sediment surface, which subsequently bends down.

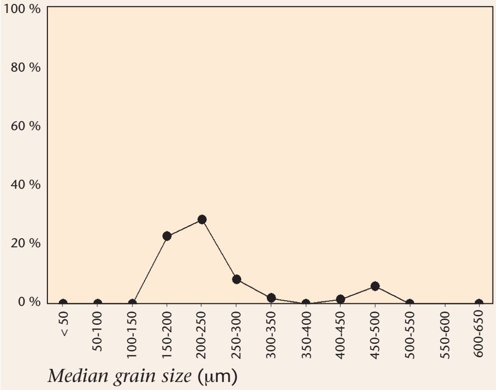
Distribution

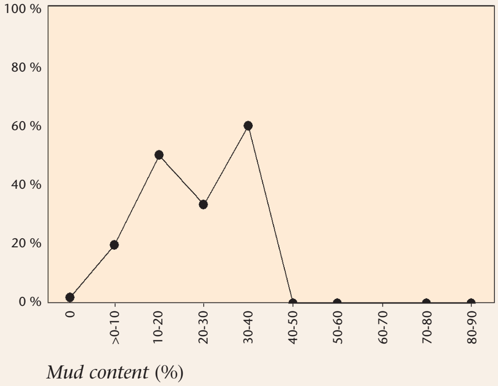
Owenia fusiformis has a limited distribution on the Belgian part of the North Sea: in both periods the species was only observed in the near-coastal zone with the exception of eastern coastal zone. Whereas *O. fusiformis* was only found in low densities in the 1976-1986 period (maximum 15 ind./m^2), densities up to 500 ind./m^2 were recorded in the 1994-2001 period.

Habitat preference

Although *Owenia fusiformis* can be found in fine to coarse sediments (150 to 500 µm) the species only reaches a high relative occurrence in the finer sediments. Sediment has to contain mud to be suitable for *O. fusiformis*. The highest relative occurrence is reached in sediments with a mud content of 10 to 40%. *Owenia fusiformis* does not occur in sediments with a mud content exceeding 40%.

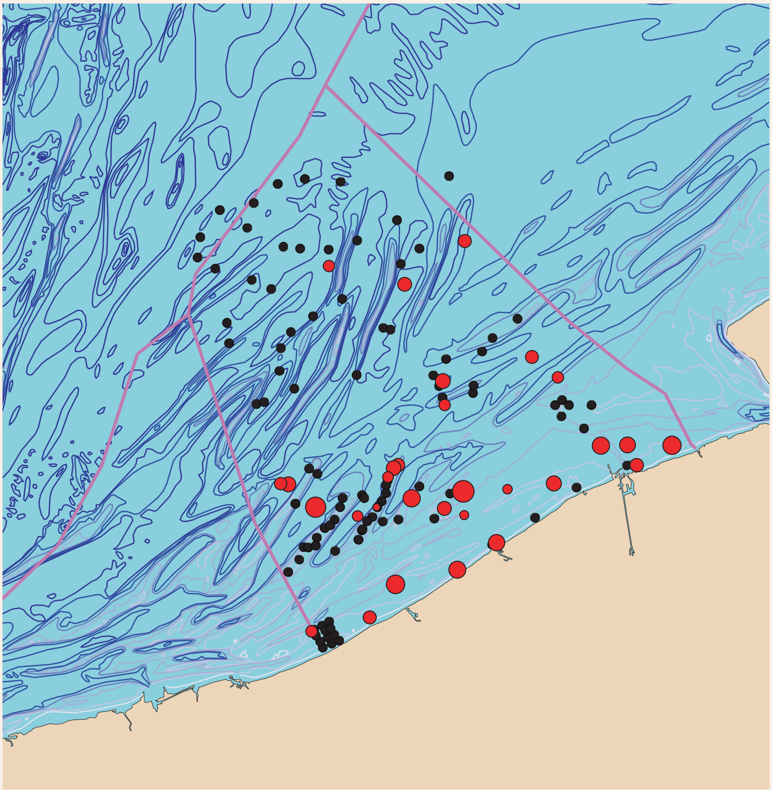
Relative occurrence





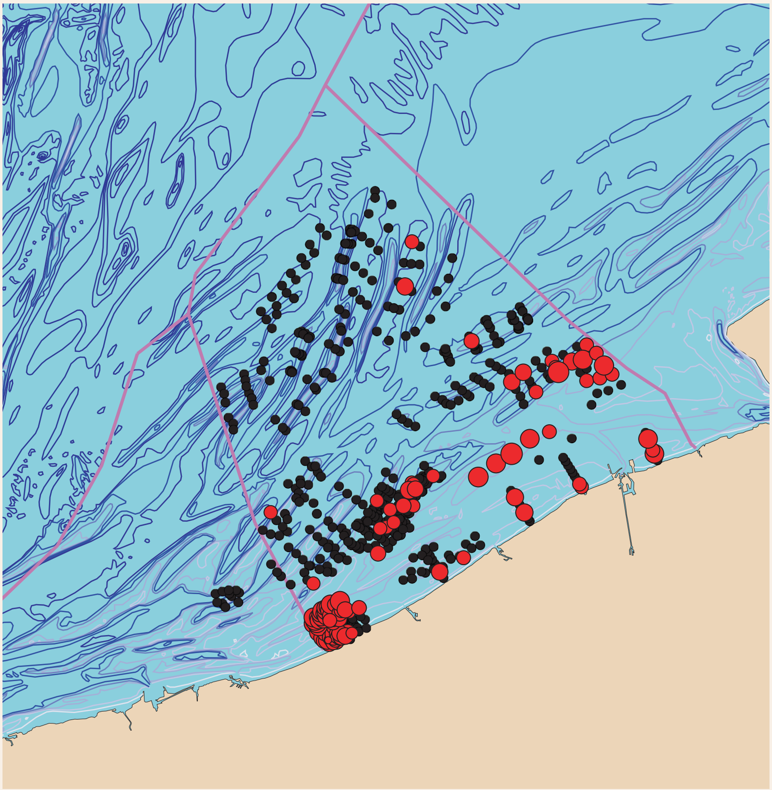
1976 • 1986

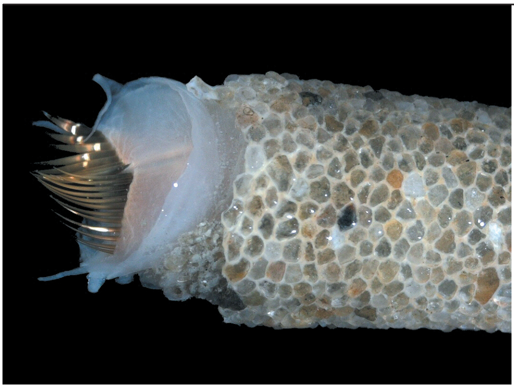
max 1075 ind./m²



1994 • 2001

max 350 ind./m²





Pectinaria koreni

(Malmgren, 1866)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Terebellida
- Familia Pectinariidae
- *Pectinaria* Savigny, 1818

Common names

N goudkammetje, kamkielworm F pectinaire, queue de pipe
E trumpet worm D Köcherwurm

Synonyms

Lagis koreni Malmgren, 1866

Description

Short, thick, tube-living bristle worm up to 50 mm long. The head has a special form and is covered at the top by golden bristles (digging function) and tentacle membranes and is furthermore characterised by two pairs of carmine gills. The tube is constructed of medium-sized sand grains and is buried in the sediment with the worm upside down.

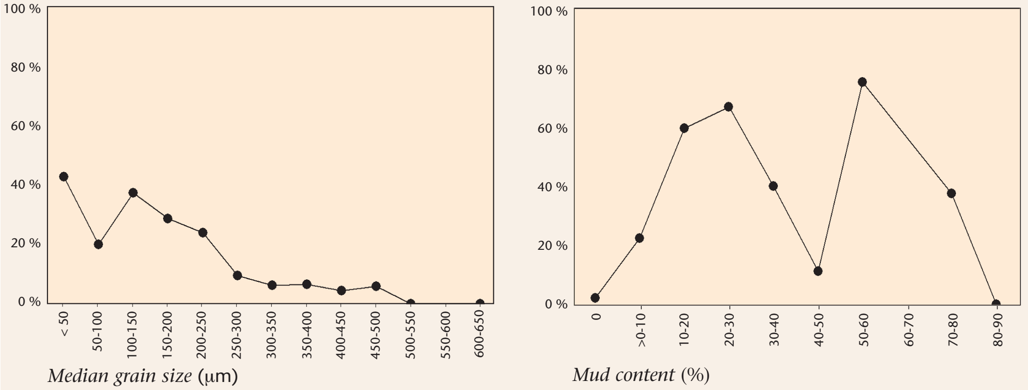
Distribution

Pectinaria koreni is widely spread in the Belgian part of the North Sea in both periods. A higher frequency of occurrence was nevertheless observed in the near-coastal zone, especially in the 1994-2001 period. In both periods high densities of *P. koreni* were observed (1976-1986 period: maximum 1,100 ind./m^2; 1994-2001 period: maximum 350 ind./m^2).

Habitat preference

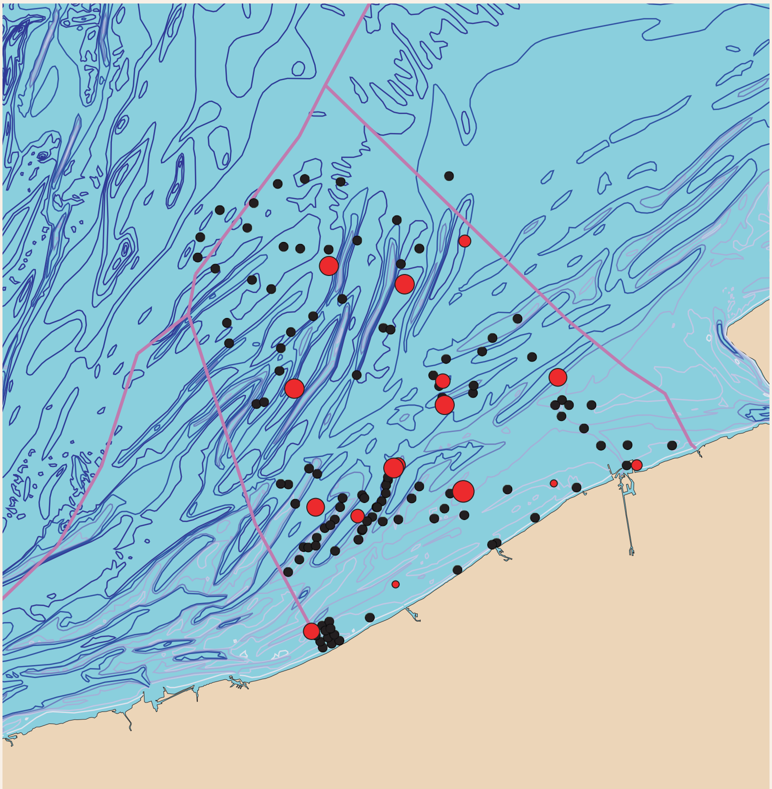
Pectinaria koreni displays a clear preference for fine sediments: the finer the sediment, the higher the relative occurrence (maximum > 40%). The species is nevertheless also found in sediments with a median grain size up to 500 µm. Although the species occurs in sediments with strongly varying mud contents, *P. koreni* is not found in sediments characterised by high mud contents or by absence of mud.

Relative occurrence



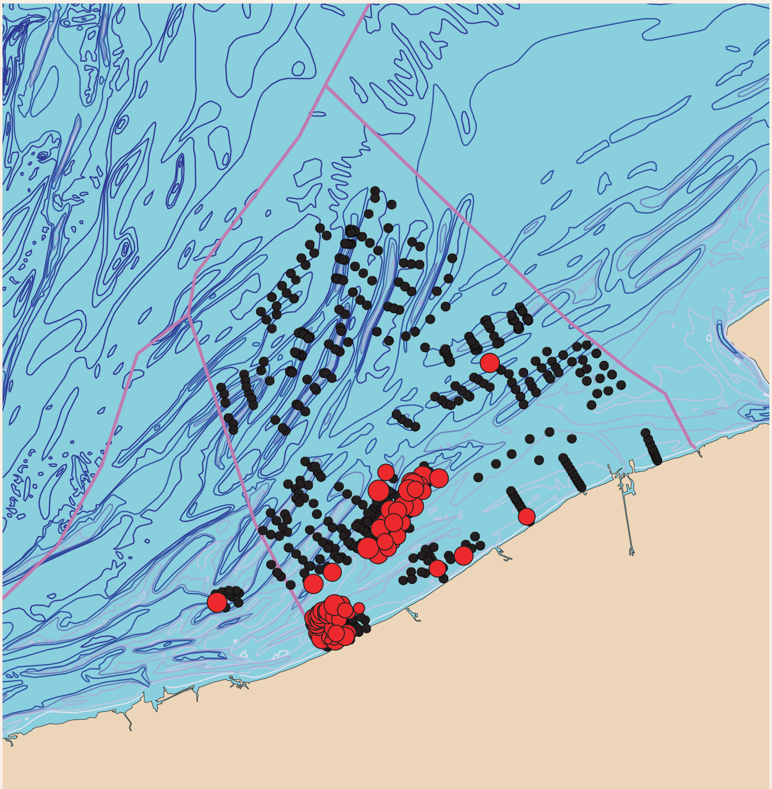
1976 • 1986

max 45 ind./m²



1994 • 2001

max 108 ind./m²



Pholoe minuta

(Fabricius, 1780)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Sigalionidae
- *Pholoe* Johnston, 1839

Common names

unknown unknown
unknown unknown

Synonyms

Aphrodita minuta Fabricius, 1780

Description

A small bristle worm, usually not larger than 10 mm. The body is flat, elongated and covered with soft scales (elytra) on the dorsal side. The head has four small eyes and one median antenna. Its colour ranges from colourless, flesh colour, greenish to black; the elytra are brownish speckled.

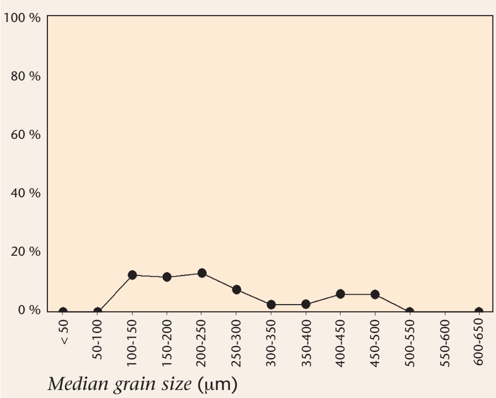
Distribution

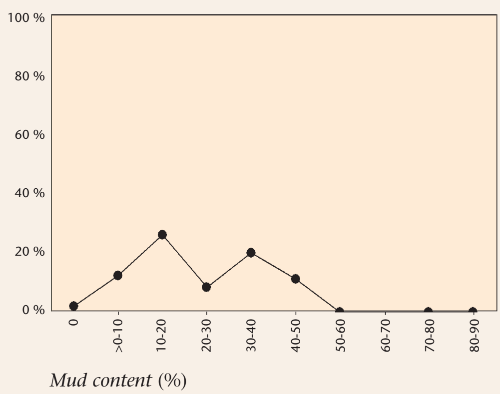
In the 1976-1986 period *Pholoe minuta* was found across the entire Belgian part of the North Sea with a low frequency of occurrence. In the 1994-2001 period this wide distribution was limited to especially the western near-coastal zone, which was characterised by a relatively high frequency of occurrence. The density of *P. minuta* during both periods was relatively low (maximum 100 ind./m^2).

Habitat preference

Pholoe minuta is found in sediments with a median grain size ranging from 100 to 500 µm, but displays a slight preference for fine-grained sediments (100 to 250 µm). However, the relative occurrence of the species remains low at all times (< 20%). With regard to the mud content the *P. minuta* displays a clear preference for sediments with a mud content up to 50%.

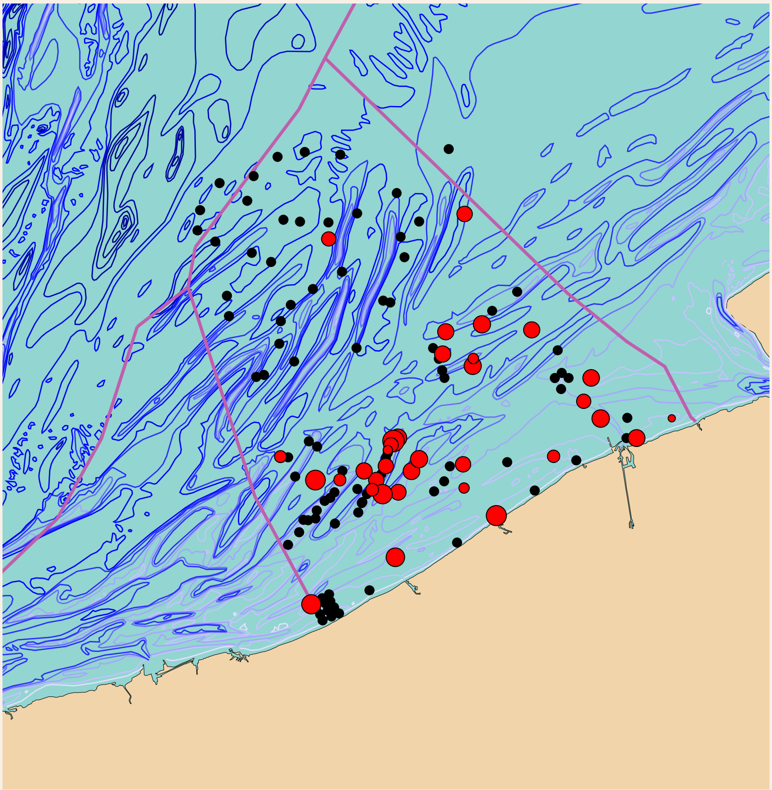
Relative occurrence





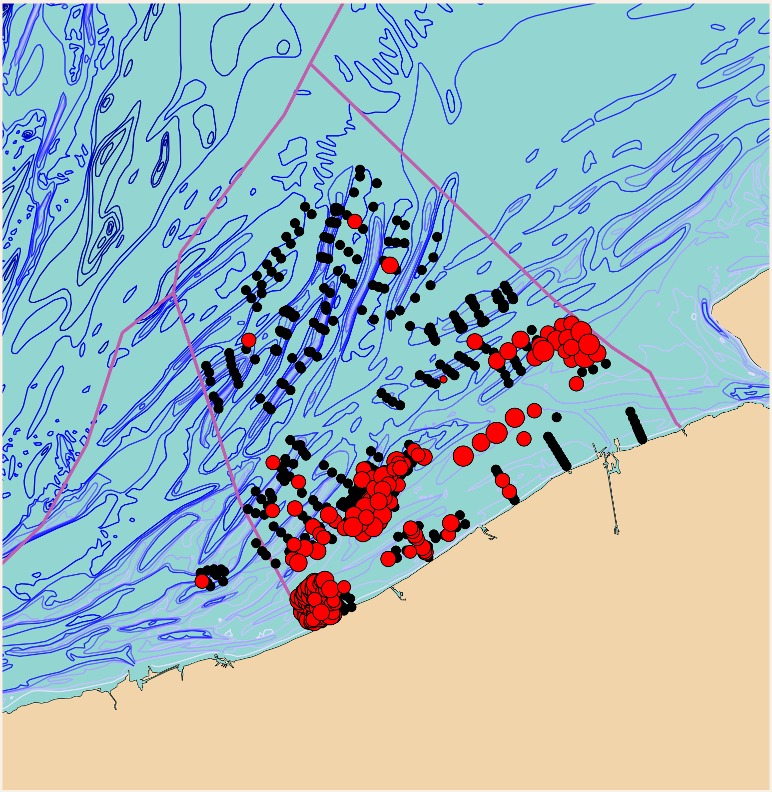
1976 • 1986

max 68 ind./m²



1994 • 2001

max 1508 ind./m²



Phyllodoce mucosa
Örsted, 1843

Phyllodoce maculata
(Linnaeus, 1767)

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Phyllodocidae
- *Phyllodoce* Savigny, 1818

Common names
N gestippelde dieseltreinworm F unknown
E unknown D gefleckter Blattwurm

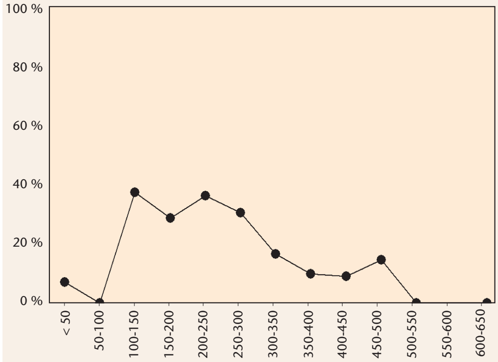
Synonyms
Anaitides mucosa Örsted, 1843
Anaitides maculata (Linnaeus, non de Saint-Joseph)

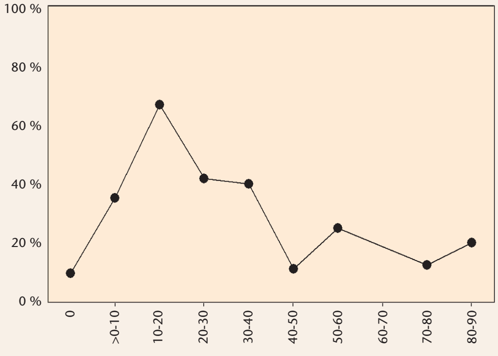
Description
Free-living, very active bristle worm with parapodia whose dorsal cirri are remarkably large and leaf-like (resembling paddles). Heart-shaped head with two eyes and four antennae. Eversible unarmed proboscis covered with rows of large and/or small papillae. Colour ranges from white to yellowish with transverse dark brown bands or patches.

Distribution
In the 1976-1986 period *Phyllodoce mucosa/maculata* was widely distributed in the entire near-coastal zone and reached a maximum density of 70 ind./m^2. The species showed a similar distribution pattern in the 1994-2001 period. However, *P. mucosa/maculata* was absent near the eastern coastal zone and higher densities (up to 1,500 ind./m^2) were reached in the latter period.

Habitat preference
Phyllodoce mucosa/maculata is found in sediments with a wide variety of grain sizes (maximum 500 µm), but displays a preference for sediments with a median grain size between 100 and 300 µm (relative occurrence > 30%). A similar pattern is observed with regard to the mud content preference: *Phyllodoce mucosa/maculata* is found in sediments with strongly varying mud contents, but prefers sediments with a mud content up to 40% (relative occurrence: minimum 40%)

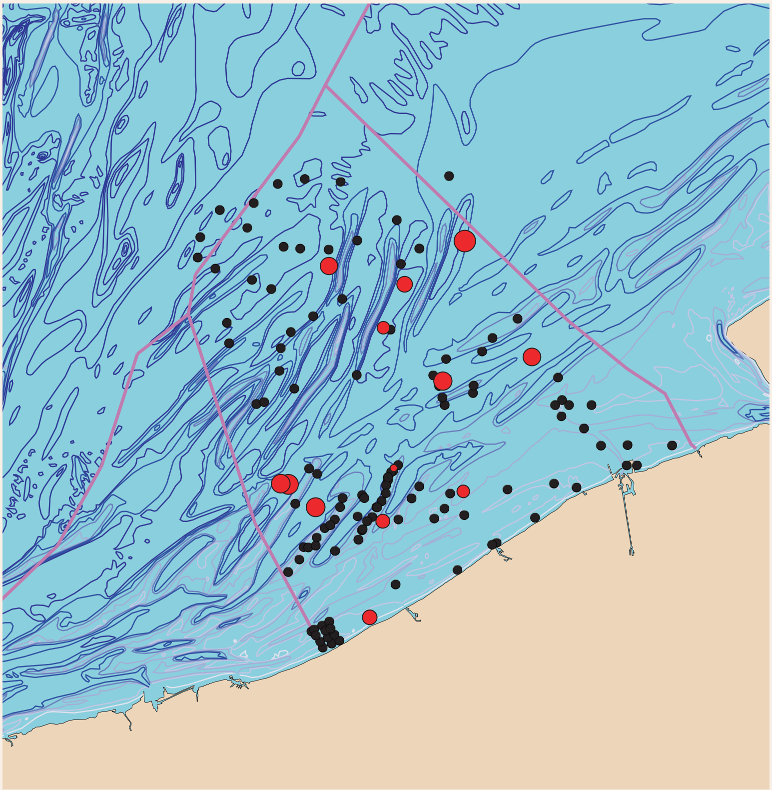
Relative occurrence





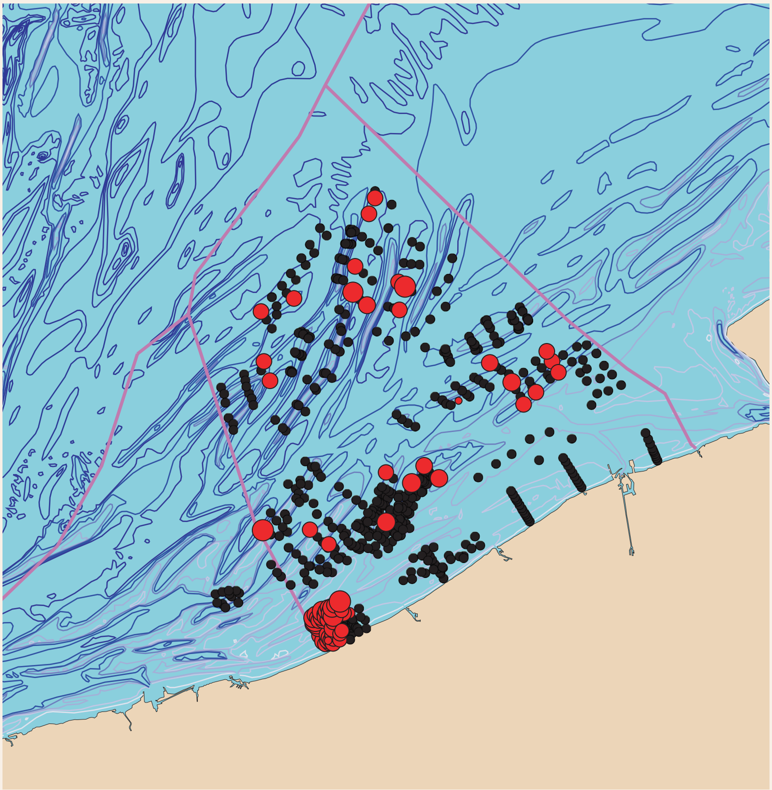
1976 • 1986

● max 155 ind./m²



1994 • 2001

● max 302 ind./m²



Poecilochaetus serpens

Allen, 1904

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Spionida
- Familia Poecilochaetidae
- *Poecilochaetus* Claparède, 1875

Common names

unknown unknown
unknown unknown

Description

An elongated, cylindrical body up to 55mm long with a small, spherical head surrounded by long tentacles. The first segments are directed forward and bear long hair-like bristles. The shape of the parapodial flaps depends on their location on the body. The colour ranges from red (anterior end) over dark green to black with white patches (posterior end). Digs U-shaped burrows.

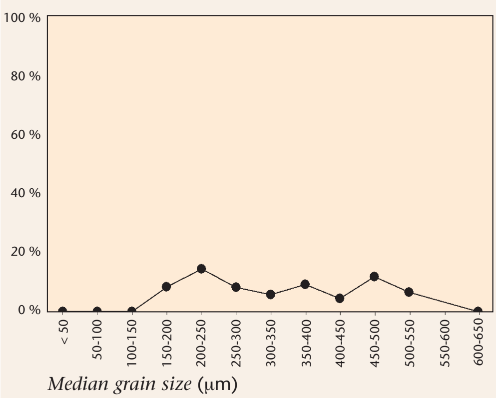
Distribution

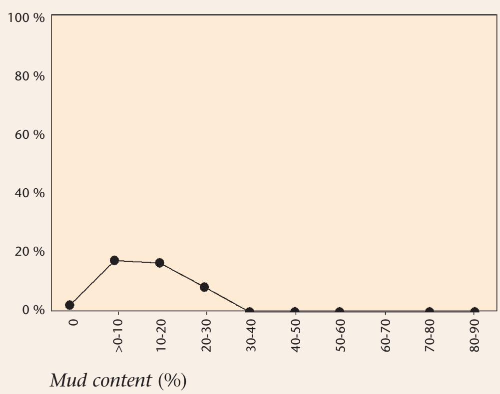
Poecilochaetus serpens was in both periods found across the Flemish, Zeeland and Hinder Banks as well as across the western coastal zone. However, the relative frequency of occurrence in both periods was low. *Poecilochaetus serpens* reached densities up to 300 ind./m² (1994-2001 period).

Habitat preference

Poecilochaetus serpens is found in sediments with a median grain size between 150 and 550 µm. The species does not tend to have a clear preference and never reaches a relative occurrence exceeding 20%. Contrary to the median grain size, the mud content does play a decisive role in the habitat preference: *Poecilochaetus serpens* prefers sediments with low mud contents (maximum 30%).

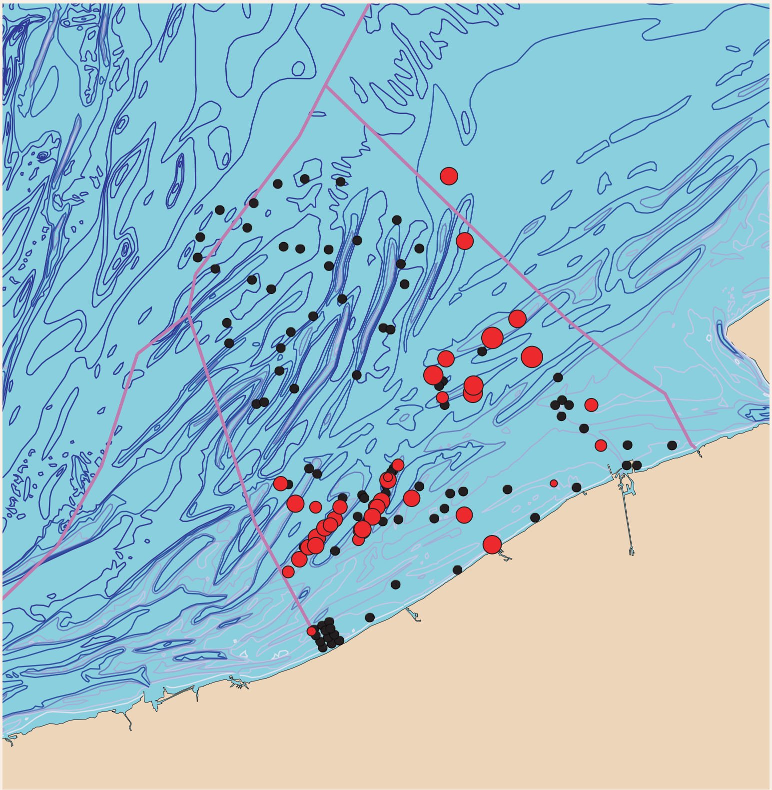
Relative occurrence





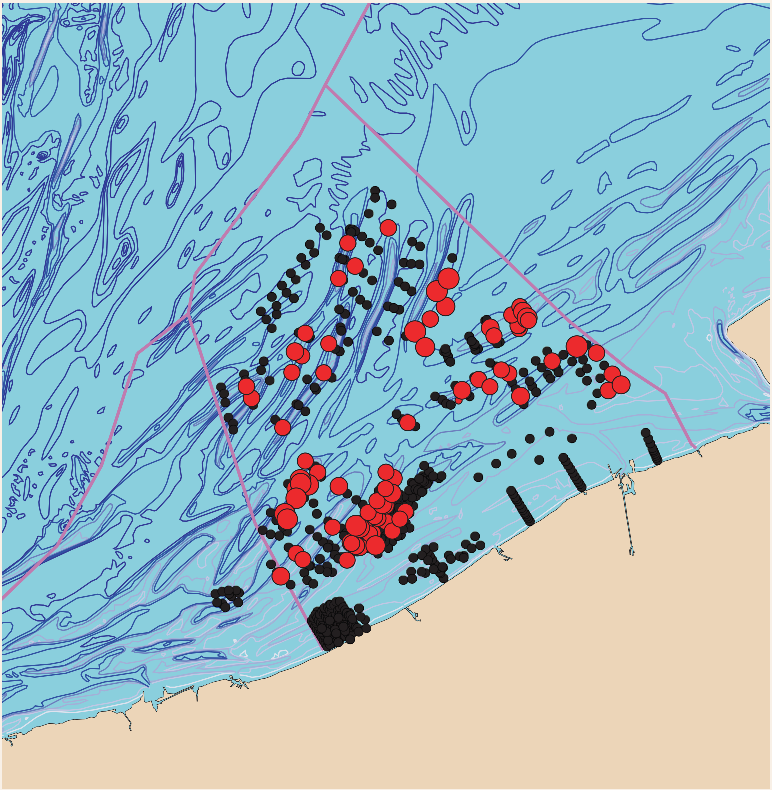
1976 • 1986

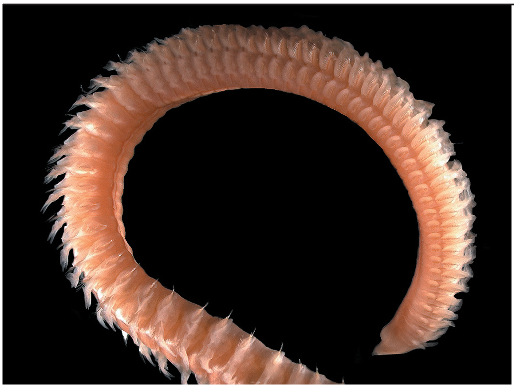
● max 51 ind./m²



1994 • 2001

● max 146 ind./m²





Scolelepis bonnieri
(Mesnil, 1896)

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Spionida
- Familia Spionidae
- *Scolelepis* Blainville, 1828

Common names
N unknown F nérine
E unknown D unknown

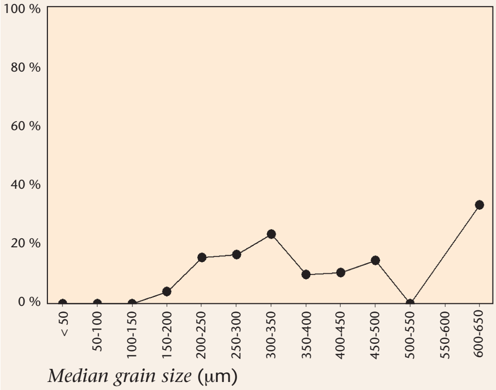
Synonyms
Nerine bonnieri Mesnil, 1896

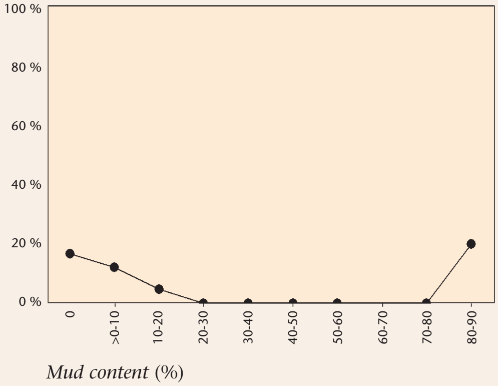
Description
A bristle worm with a cylindrical body measuring up to 60 mm long. The head is acuminate and bears two long palps. The parapodial flaps are prominently present and are dorsally fused with the gills of each segment. The worm is coloured pink.

Distribution
In the 1976-1986 period *Scolelepis bonnieri* was mainly found in the area of the Flemish and Zeeland Banks whereas the species had a broader distribution in the 1994-2001 period (all sandbank systems except the Coastal Banks). However, the species never reached high densities (maximum 150 ind./m^2).

Habitat preference
The habitat preference of *Scolelepis bonnieri* is positively correlated with the median grain size: the coarser the sediment, the larger the chance of finding *S. bonnieri*. However, this chance never exceeds 30%. The species furthermore prefers sediments with low mud contents: the higher the mud content, the smaller the chance to find *S. bonnieri* (maximum 20%).

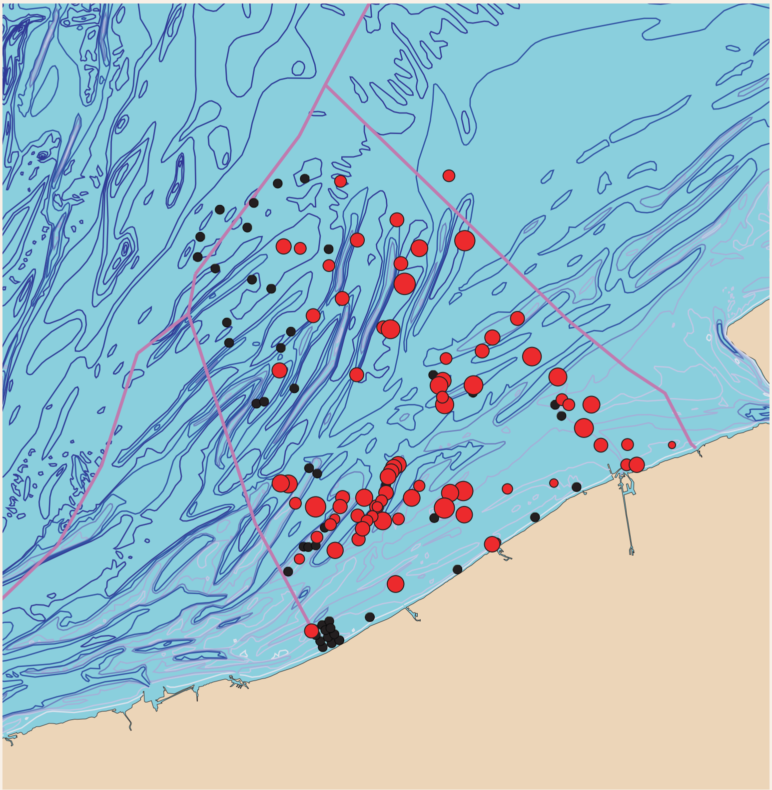
Relative occurrence





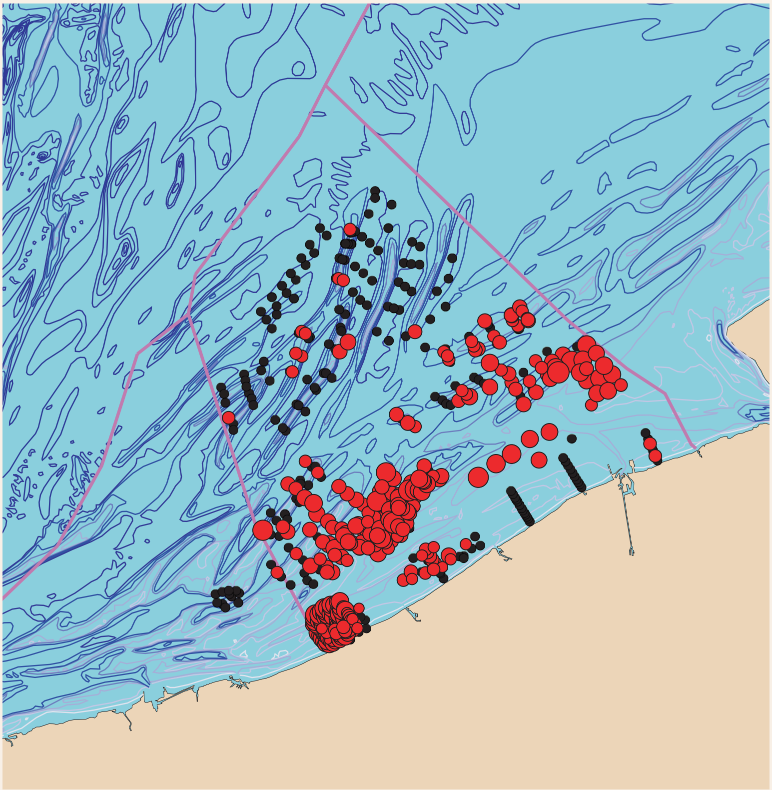
1976 • 1986

max 2115 ind./m²



1994 • 2001

max 5087 ind./m²



Scoloplos armiger

(O.F. Müller, 1776))

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Orbiniida
- Familia Orbiniidae
- *Scoloplos* Blainville, 1828

Common names

N wapenworm F unknown
E unknown D bewehrter Pfahlwurm, Kiemenringelwurm

Description

Bristle worm measuring up to 120 mm long. The head part is pointed without any visible appendages. The rest of the body consists of numerous segments and can be subdivided into two regions; the central region (segment 12-22) is flattened whereas the posterior region is long and semicylindrical. Gills are present from segment 9 onwards. Colour: orange to deep red.

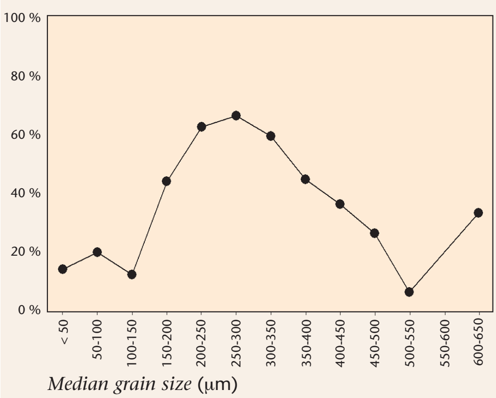
Distribution

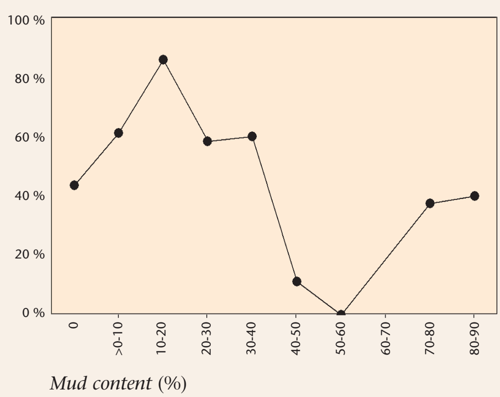
Scoloplos armiger is a widely spread species that was only found scarcely in the eastern coastal zone (1994-2001 period). In the same period the species was mainly distributed near the western coastal zone, the Flemish and Zeeland Banks, where the species reached a very high distribution frequency. The distribution frequency on the Zeeland Banks was remarkably lower. High densities were recorded in both periods: up to 5,000 ind./m^2 (1994-2001 period).

Habitat preference

Scoloplos armiger is found in all sediment types but prefers sediments with a median grain size of 200 to 350 µm that are enriched with mud (mud content up to 40%). The relative occurrence of the species in such sediments exceeds 50%.

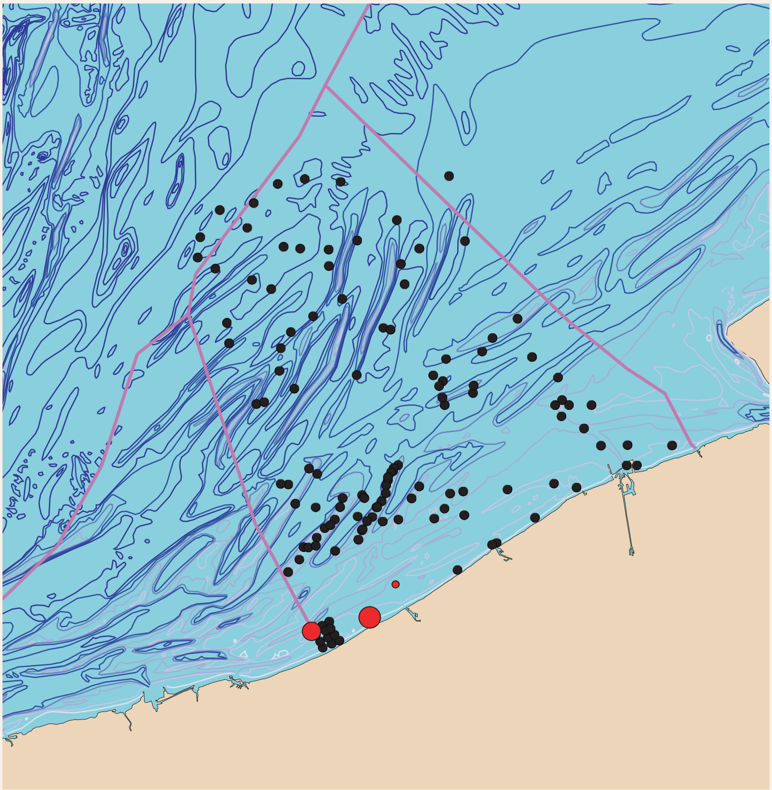
Relative occurrence





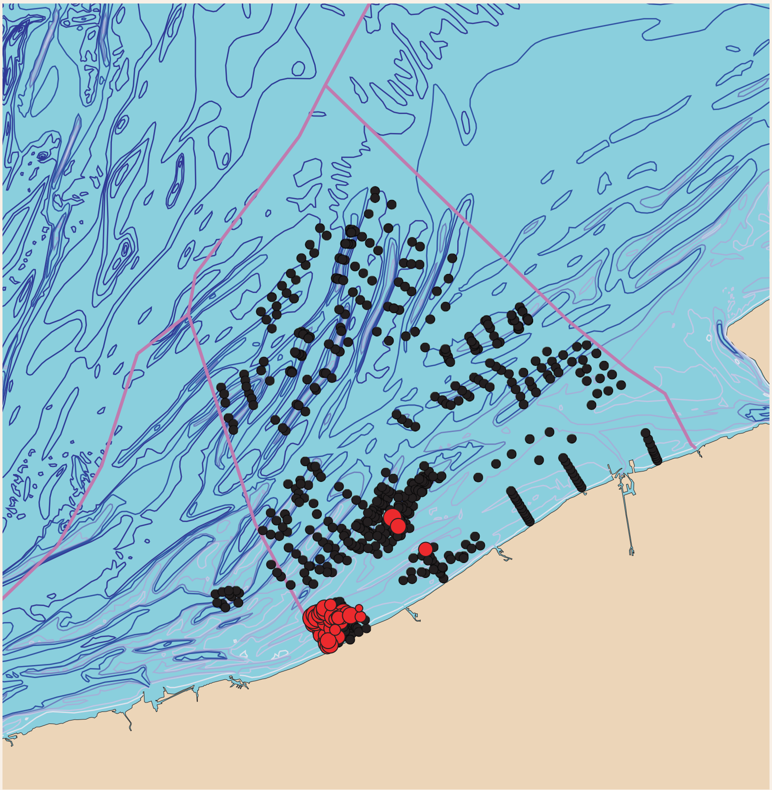
1976 • 1986

max 19 ind./m²



1994 • 2001

max 175 ind./m²



Sigalion mathildae

Audouin & Milne Edwards in Cuvier, 1830

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Sigalionidae
- *Sigalion* Audouin & Milne Edwards, 1832

Common names

N unknown F unknown
E unknown D unknown

Description

A bristle worm with a sturdy, elongate body with numerous segments and a maximum length of 150 mm. The worm is dorsally covered with soft scales (elytra) whose outer edges feature a characteristic fringe consisting of pinnate papillae. The head bears three minute antennae (two lateral ones and one in the middle) and two pairs of small eyes.

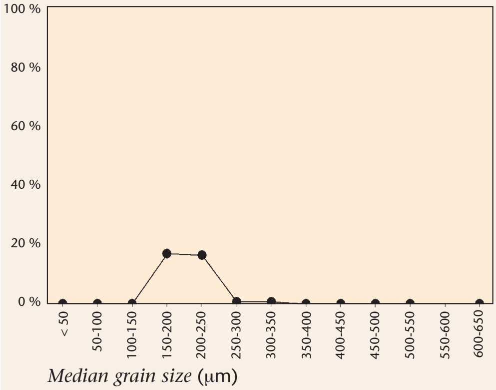
Distribution

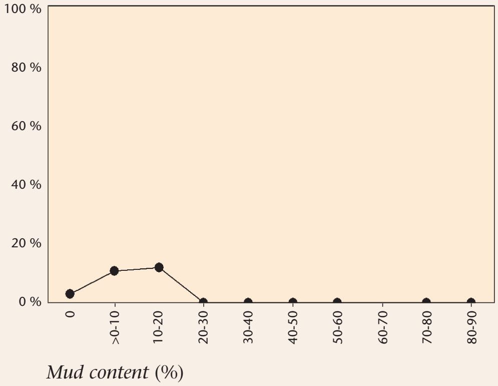
The distribution of *Sigalion mathildae* was in both periods more or less limited to the western coastal zone, where densities up to 20 (1976-1986 period) and 200 ind./m² (1994-2001 period) were observed.

Habitat preference

Sigalion mathildae prefers a very specifically defined sediment type characterised by fine-grained sediments (median grain size 150 to 250 µm) and the presence of a low mud content (maximum 20%).

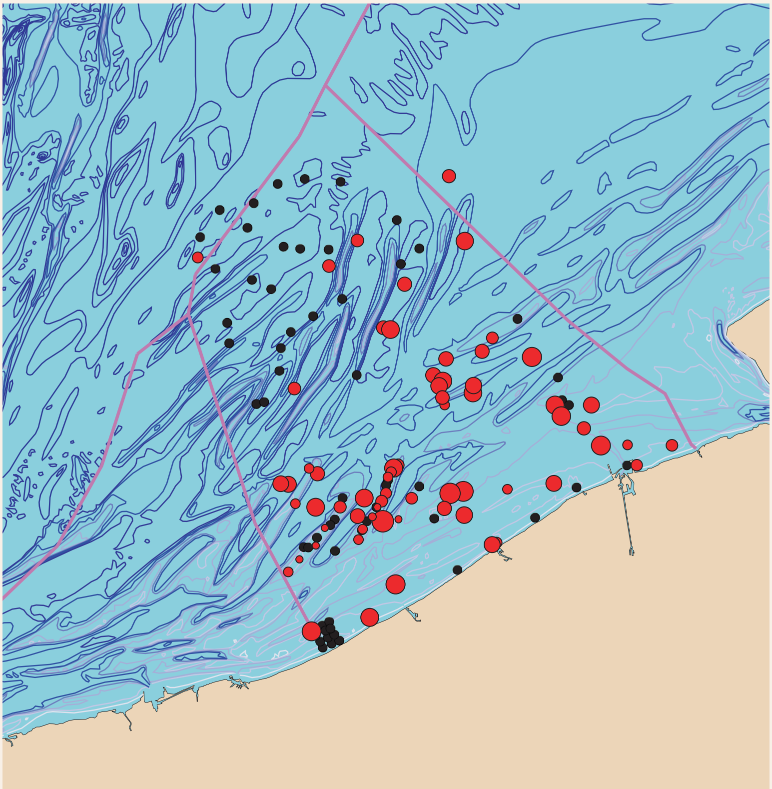
Relative occurrence





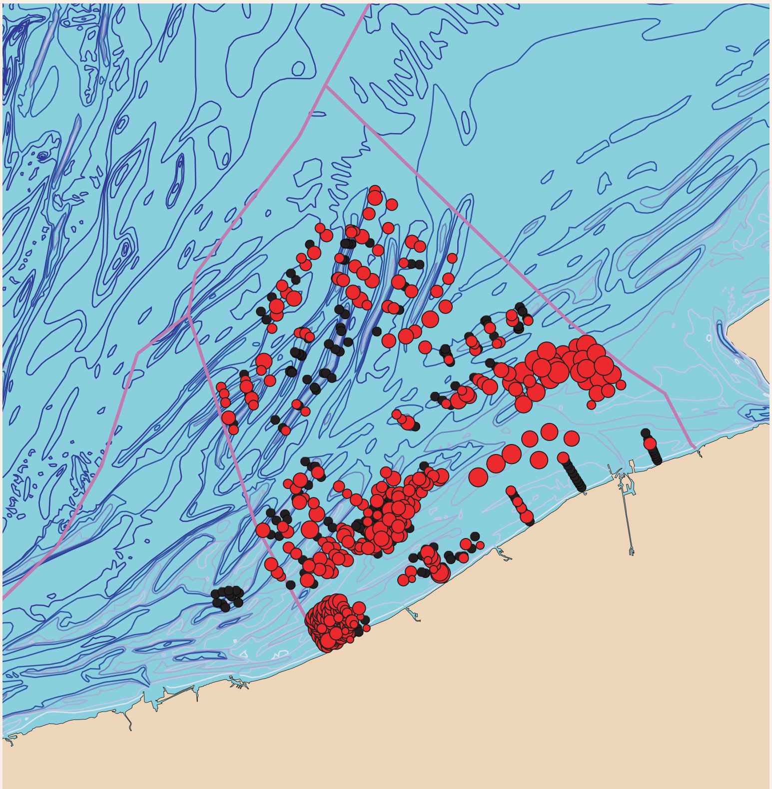
1976 • 1986

max 1500 ind./m²



1994 • 2001

max 11793 ind./m²



Spiophanes bombyx
(Claparède, 1870)

Taxonomy
Phylum Annelida
- Classis Polychaeta
- Ordo Spionida
- Familia Spionidae
- *Spiophanes* Grube, 1860

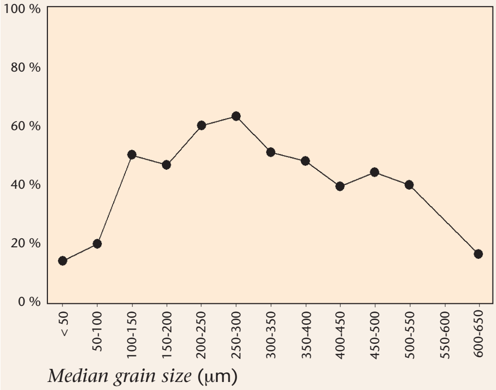
Common names
N unknown F unknown
E bee spionid D unknown

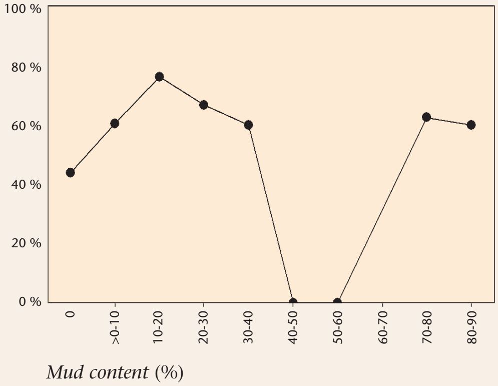
Description
Thin and fragile bristle worm up to 60 mm long. Head features two striking horns at the front and one pointed horn at the back. Its palps are substantial but relatively short. Four eyes, no gills. The species constructs solid tubes consisting of sand grains. The colour of the anterior end is bright pink and becomes dark red to greenish brown towards the posterior end.

Distribution
Spiophanes bombyx is widely spread across the Belgian part of the North Sea (BPNS) and reaches a high frequency of occurrence in all areas. A low distribution frequency was only observed in the eastern coastal zone in the 1994-2001 period. In addition to its wide distribution pattern *S. bombyx* was mainly found in high densities (1976-1986 period: up to 1,500 ind./m^2; 1994-2001 period: up to 12,000 ind./m^2). In short, *S. bombyx* is one of the most common species on the BPNS.

Habitat preference
Spiophanes bombyx reaches a high relative occurrence in almost all sediment types. A relative occurrence of > 40% is reached in sediments with a median grain size of 100 to 550 µm and with a mud content of 0 to 90%.

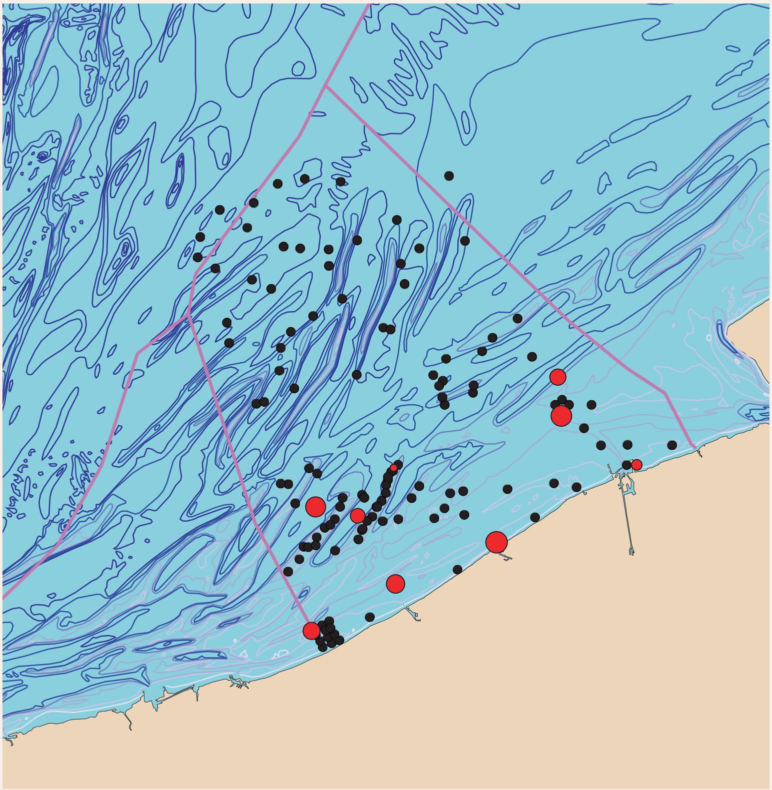
Relative occurrence





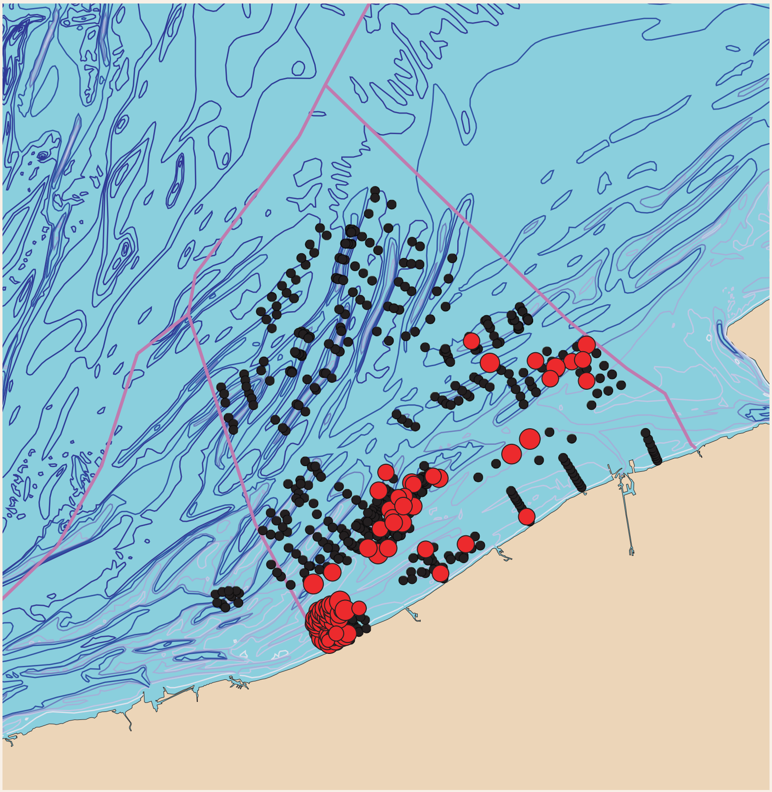
1976 • 1986

max 12 ind./m²



1994 • 2001

max 243 ind./m²



Sthenelais boa

(Johnston, 1883)

Taxonomy

Phylum Annelida
- Classis Polychaeta
- Ordo Phyllodocida
- Familia Sigalionidae
- *Sthenelais* Kinberg, 1855

Common names

N unknown F sthénélais
E unknown D unknown

Synonyms

Fimbriosthenelais minor Pettibone, 1971

Description

The dorsal side is covered with overlapping scales (elytra). The shape of the elytra varies from round, reniform to cordiform depending on the body part. They are usually covered with papillae. The body is long (up to 200 mm) and has numerous segments; dorsal side is convex, ventral side is flattened. The dorsal side has a light grey, yellowish or brownish colour with red to black transverse bands.

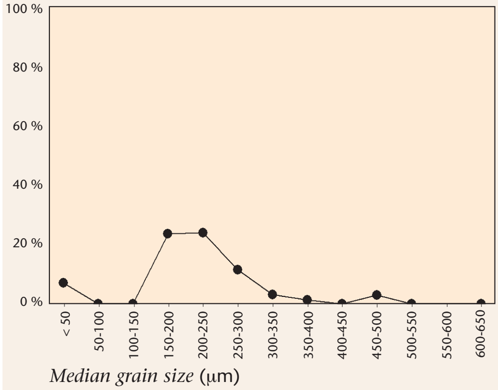
Distribution

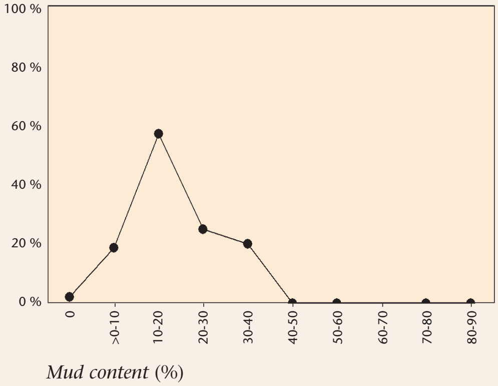
Sthenelais boa has a limited distribution on the Belgian part of the North Sea: in both periods the species was only observed in the near-coastal zone, with the exception of the eastern coastal zone. Whereas S. boa was only found in low densities in the 1976-1986 period (maximum 12 ind./m^2) densities up to 250 ind./m^2 were recorded in the 1994-2001 period.

Habitat preference

Sthenelais boa prefers fine-grained sediments with a median grain size of 150 to 250 µm. The species is nevertheless also found in finer and coarser sediments (up to 500 µm). Preference is given to sediments that are to some extent enriched with mud (maximum 40%). The highest relative occurrence (60%) is reached in sediments with a mud content of 10-20%.

Relative occurrence





CRUSTACEA OR CRUSTACEANS

Abludomelita obtusata

Atylus swammerdami

Bathyporeia elegans

Bathyporeia guilliamsoniana

Diastylis rathkei

Gastrosaccus spinifer

Leucothoe incisa

Pariambus typicus

Pontocrates altamarinus

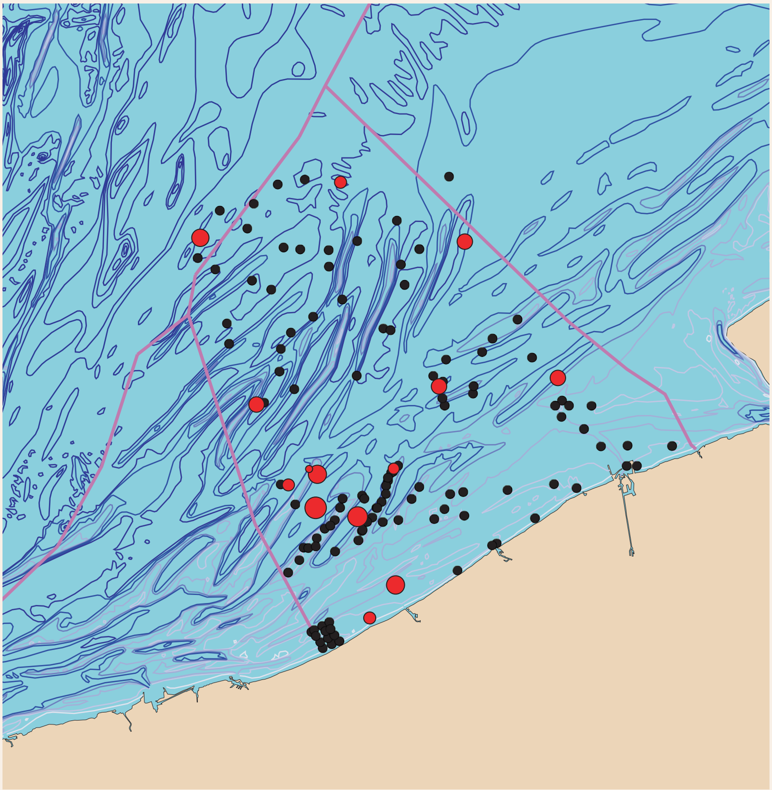
Thia scutellata • thumbnail crab

Urothoe brevicornis

Urothoe poseidonis

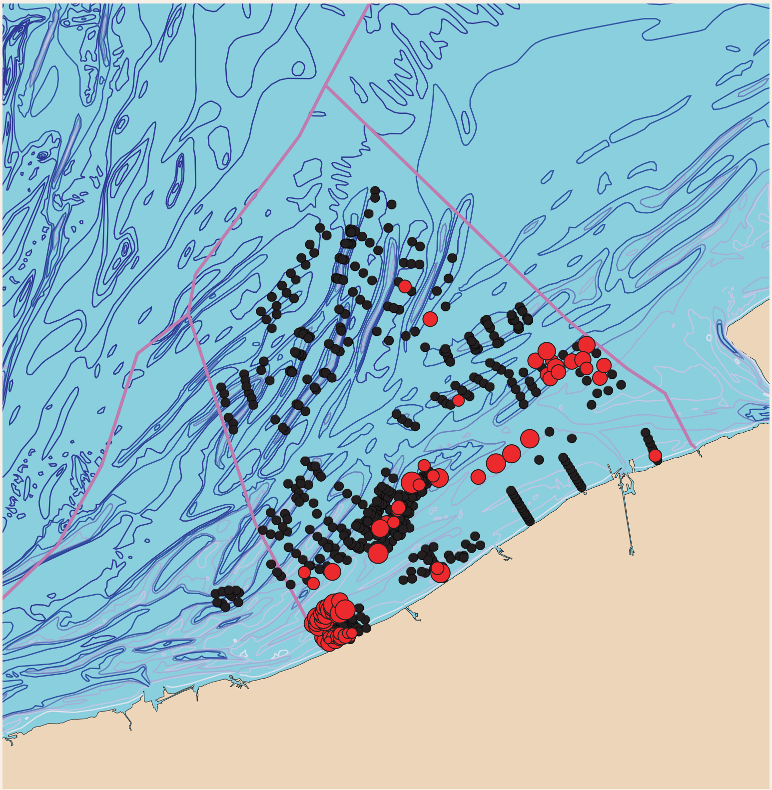
1976 • 1986

max 133 ind./m²



1994 • 2001

max 536 ind./m²



Abludomelita obtusata

(Montagu, 1830)

Taxonomy

Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Melitidae
- *Abludomelita* Karaman, 1981

Common names

unknown unknown
unknown unknown

Synonyms

Melita obtusata (Montagu, 1813)

Description

A slender amphipod up to 9 mm long. The second pair of claws is remarkably well developed in the males. No rostrum. Brownish colour.

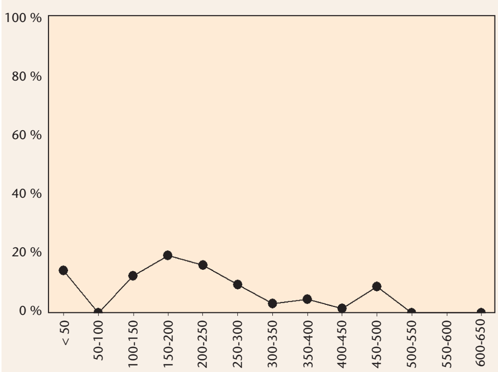
Distribution

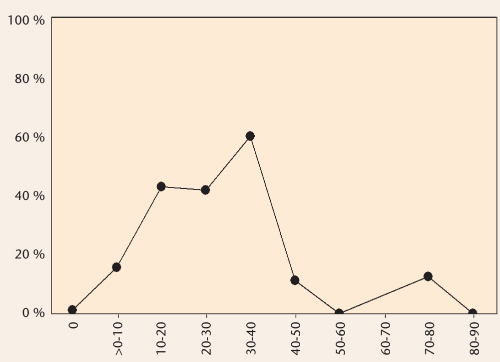
Because of the very low distribution frequency it is not possible to deduce a clear distribution pattern of *Abludomelita obtusata* for the 1976-1986 period. In the 1994-2001 period, however, the species was mainly found in the near-coastal zone, with the exception of the eastern coastal zone. The species had a relatively high distribution frequency in this period. The density also increased considerably: from a maximum of 150 ind./m^2 in the 1976-1986 period to a maximum of 550 ind./m^2 in the 1994-2001 period.

Habitat preference

Abludomelita obtusata has no clear preference for a specific grain size: the species is found in sediments with a median grain size up to 500 µm. However, a clear preference can be seen with regard to the mud content. *Abludomelita obtusata* reaches a relative occurrence of over 40% in sediments with a mud content of 10 to 40%. The species is nevertheless also observed in sediments with higher or lower mud contents.

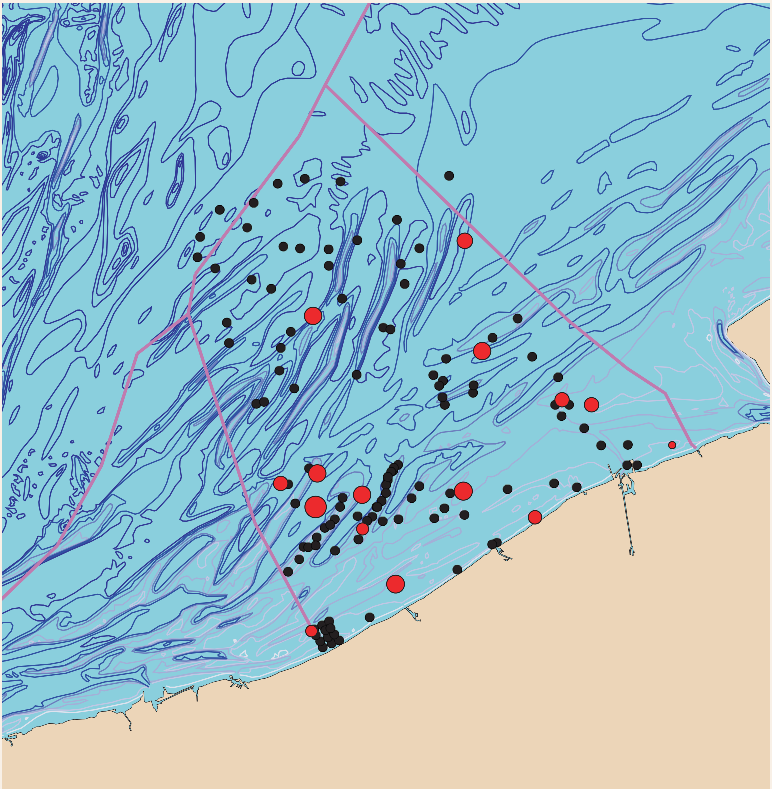
Relative occurrence





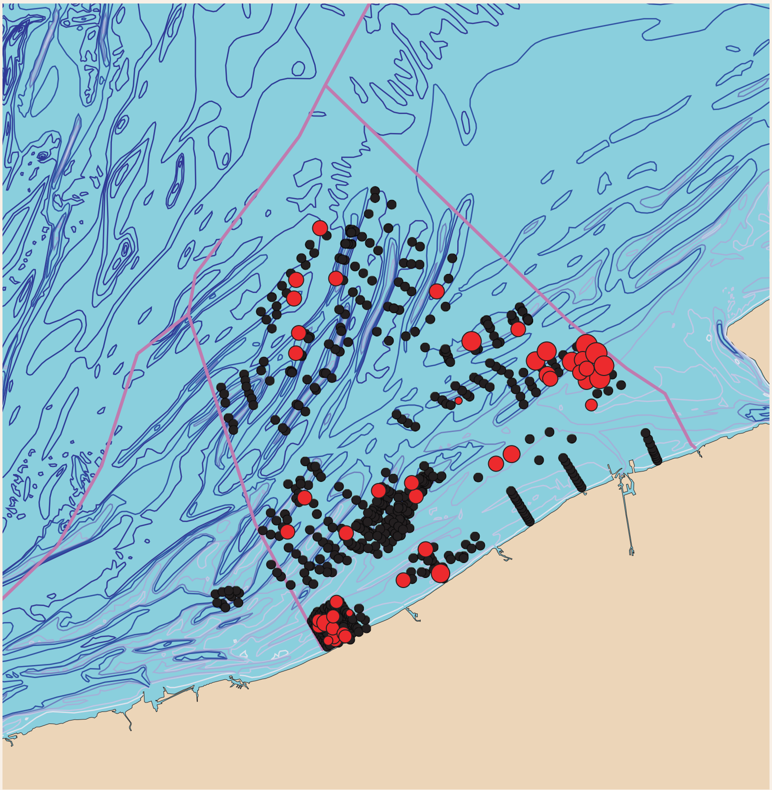
1976 • 1986

max 61 ind./m²



1994 • 2001

max 165 ind./m²



Atylus swammerdami
(Milne Edwards, 1830)

Taxonomy
Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Dexaminidae
- *Atylus* Leach, 1815

Common names
N unknown F unknown
E unknown D unknown

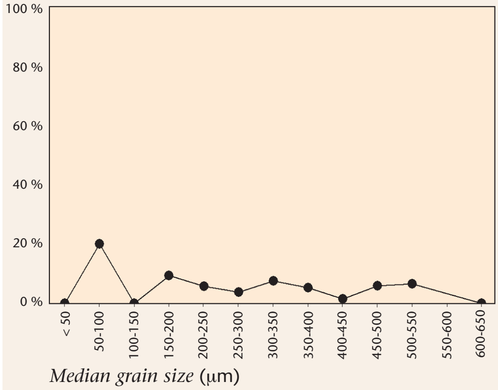
Synonyms
Nototropis swammerdami

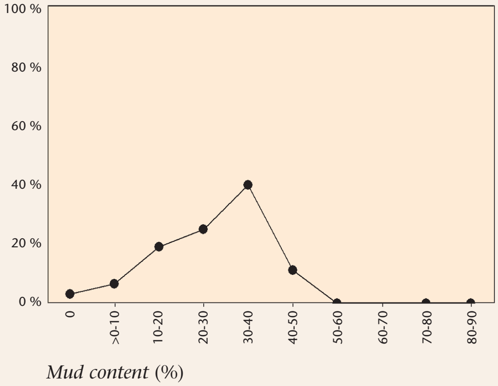
Description
These amphipods are highly flattened at the sides and measure up to 10 mm long. The species has a whitish colour with brown patches. The head has a small curved rostrum and slender antennae of equal size. Eyes are large and reniform.

Distribution
In the 1976-1986 period *Atylus swammerdami* was observed across the entire Belgian part of the North Sea with a low distribution frequency and in low densities (up to 60 ind./m^2). A similar distribution pattern was also found in the 1994-2001 period. The most remarkable difference was the high distribution frequency near the southern Zeeland Banks. This is where the highest densities were observed (up to 170 ind./m^2).

Habitat preference
Atylus swammerdami displays no clear preference for sediments with a specific grain size: the species is found in sediments with median grain sizes up to 550 µm with a low relative occurrence. However, a clear preference can be seen with regard to the mud content. *Atylus swammerdami* reaches a relative occurrence of over 40% in sediments with a mud content of 30-40%. The species is nevertheless also found in sediments with lower or higher mud contents (up to 50%).

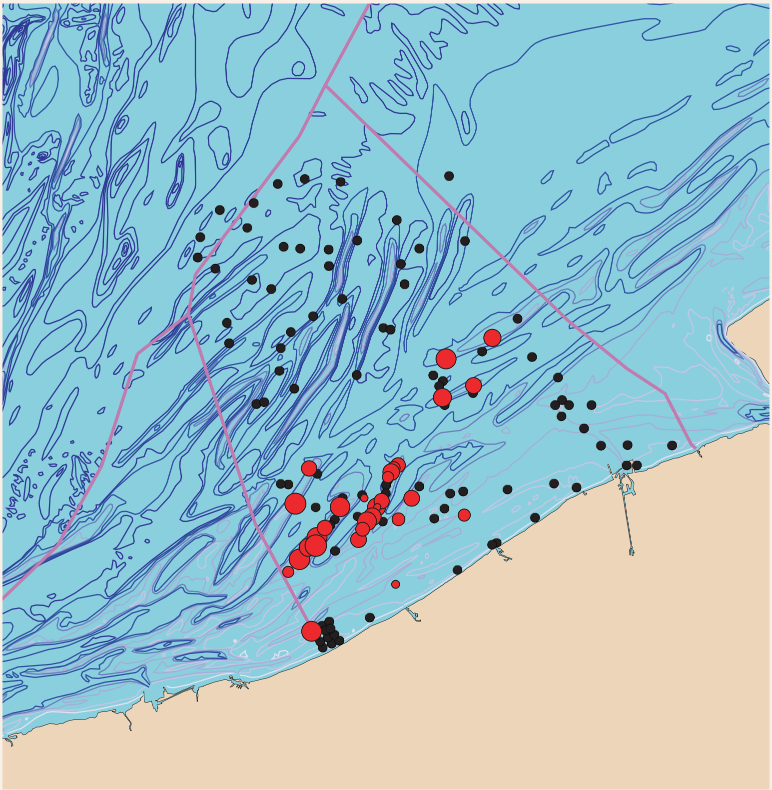
Relative occurrence





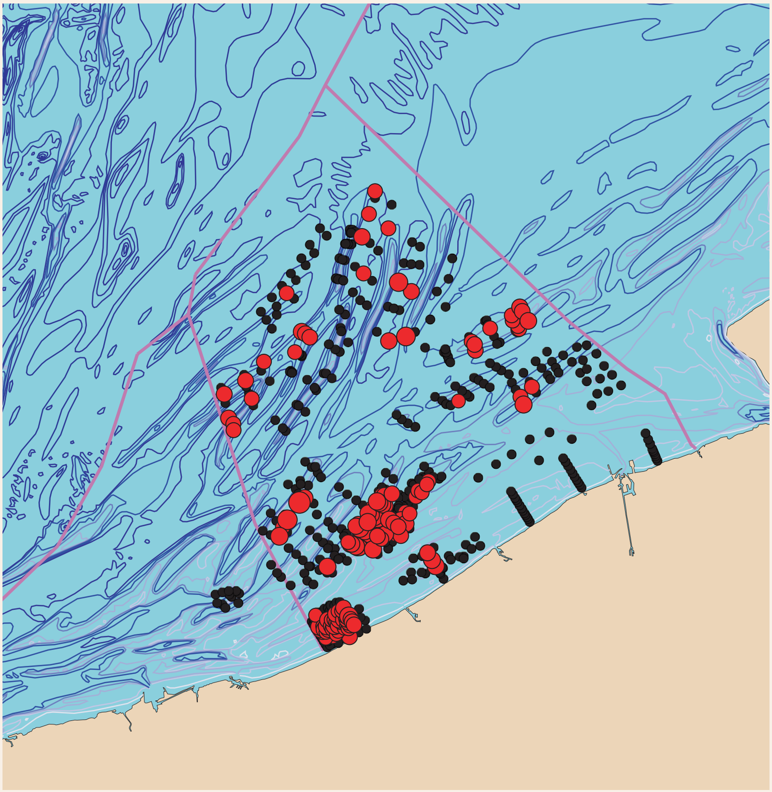
1976 • 1986

max 90 ind./m²



1994 • 2001

max 2358 ind./m²



Bathyporeia elegans
(Watkin, 1938)

Taxonomy
Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Pontoporeiidae
- *Bathyporeia* Lindström, 1855

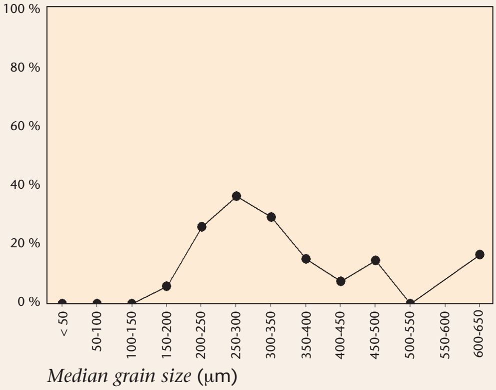
Common names
N unknown F unknown
E unknown D unknown

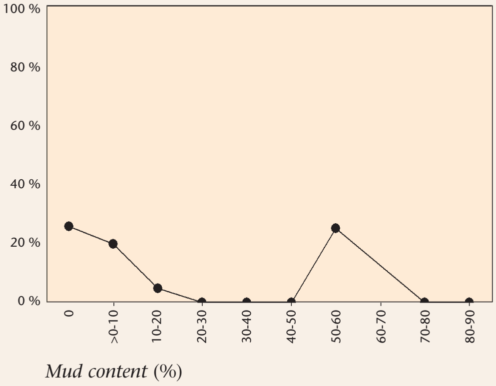
Description
Amphipod with laterally flattened body, rather slender and elongate. Up to 6 mm long. Head without rostrum but with clearly discernible eyes. The upper antennae seem to be standing on an outgrowth of the head. Usually not pigmented.

Distribution
In the 1976-1986 period *Bathyporeia elegans* was only observed near the western coastal zone, the Flemish and the Zeeland Banks. In this period the species reaches a maximum density of 90 ind./m^2. The distribution pattern is extended in the 1994-2001 period with different observations in the area of the Hinder Banks. Maximum densities amounted to 2,500 ind./m^2.

Habitat preference
Bathyporeia elegans is mainly found in medium to coarse-grained sediments (median grain size > 150 µm) with a low mud content (chiefly < 20%). The optimal sediment type has a median grain size of 200 to 350 µm (relative occurrence: > 30%) and a mud content of maximum 10% (relative occurrence: > 20%).

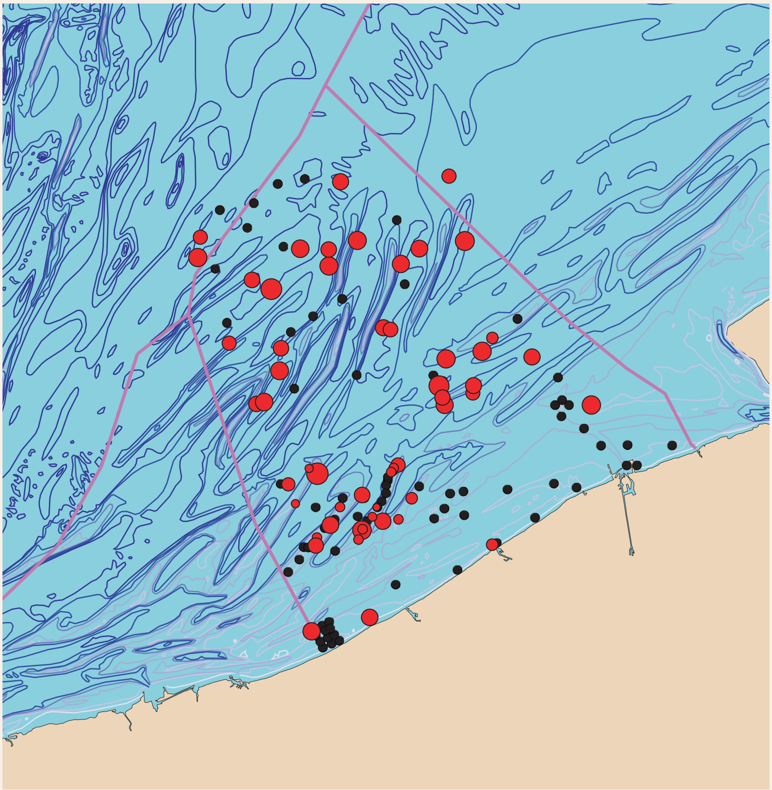
Relative occurrence





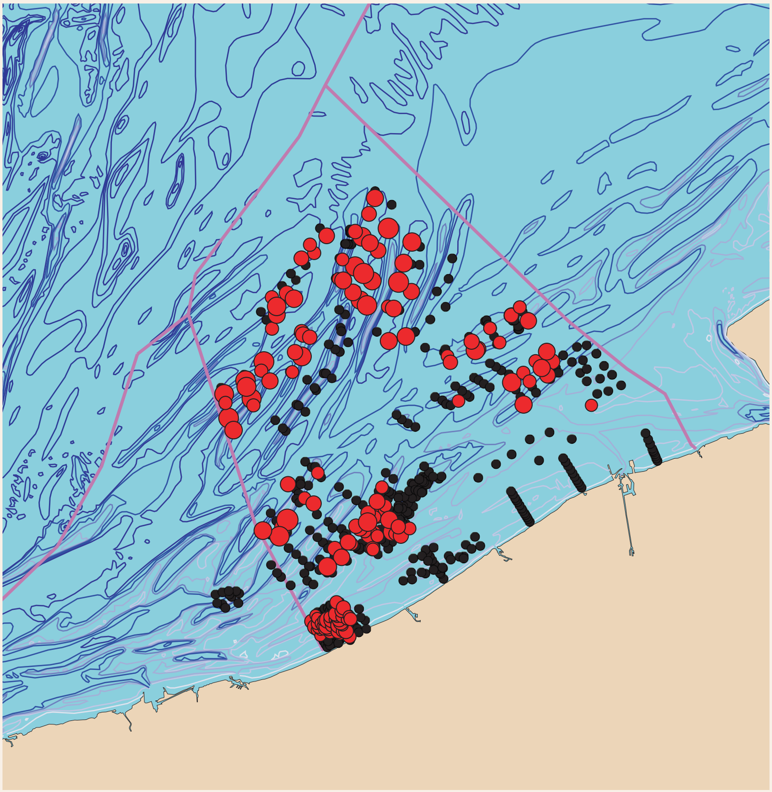
1976 • 1986

max 760 ind./m^2



1994 • 2001

max 808 ind./m^2



Bathyporeia guilliamsoniana
Bate, 1856

Taxonomy
Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Pontoporeiidae
- *Bathyporeia* Lindström, 1855

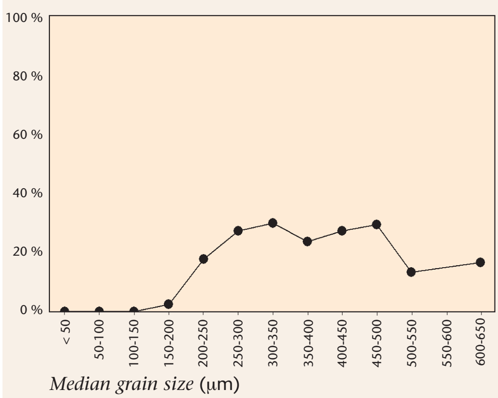
Common names
N unknown F unknown
E unknown D unknown

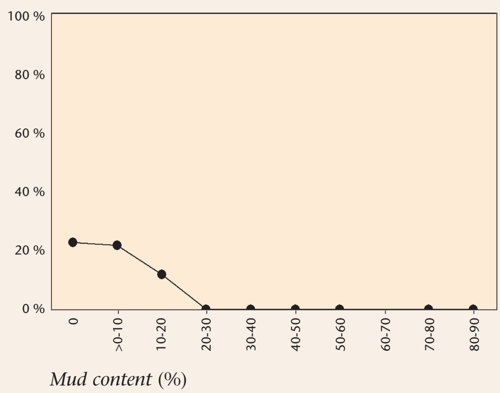
Description
Largest species of the *Bathyporeia* genus measuring up to 8 mm long. Robust and laterally flattened body. Head without rostrum but with clearly discernible eyes. The upper antennae seem to be standing on an outgrowth of the head.

Distribution
Bathyporeia guilliamsoniana was found in both periods across the entire Belgian part of the North Sea, with the exception of the eastern coastal zone. In both periods the species reached a maximum density of approximately 800 ind./m^2.

Habitat preference
Bathyporeia guilliamsoniana prefers coarse sediments with a median grain size > 200 µm (relative occurrence > 20%). The species further avoids sediments with high mud contents (maximum 20%) and reaches its maximum relative occurrence (± 20%) in sediments with a mud content not exceeding 10%.

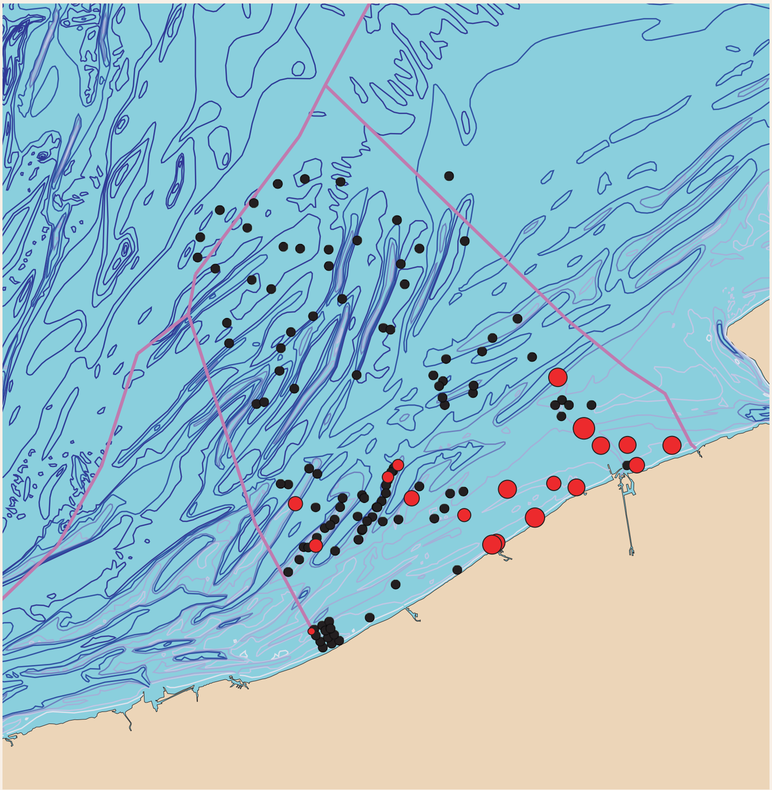
Relative occurrence





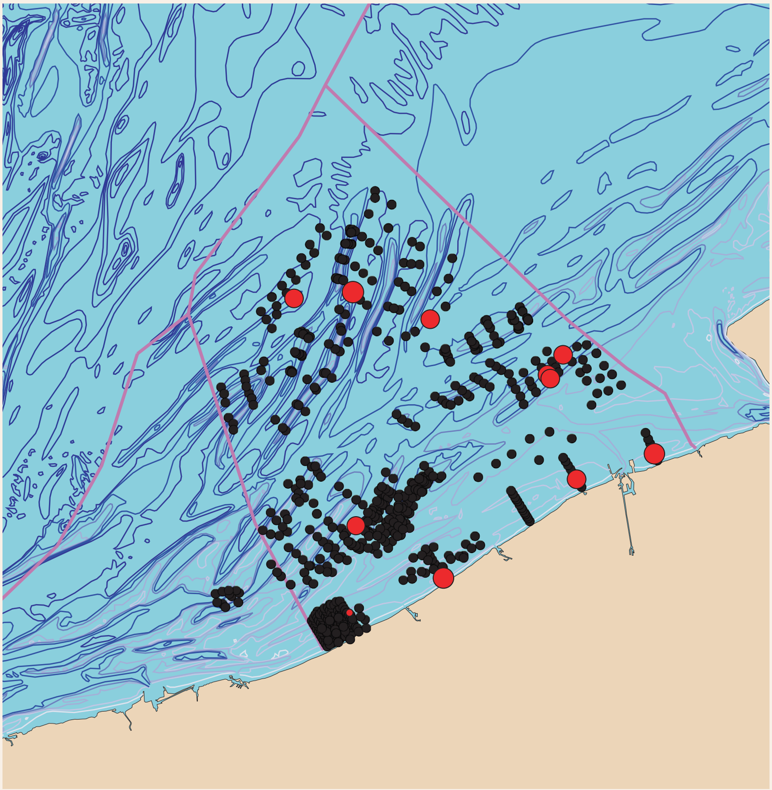
1976 • 1986

max 66 ind./m²



1994 • 2001

max 29 ind./m²



Diastylis rathkei
(Krøyer, 1841)

Taxonomy
Phylum Arthropoda
- Classis Malacostraca
- Ordo Cumacea
- Familia Diastylidae
- *Diastylis* Say, 1818

Common names
N unknown F unknown
E unknown D unknown

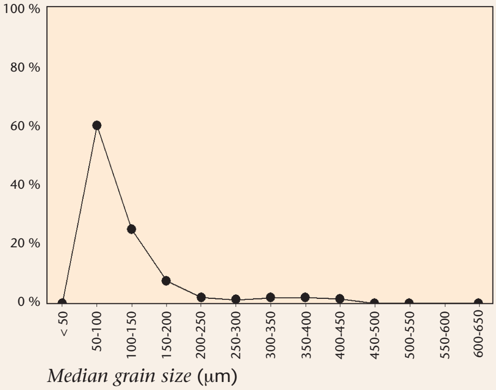
Synonyms
Cuma rathkii Krøyer, 1841

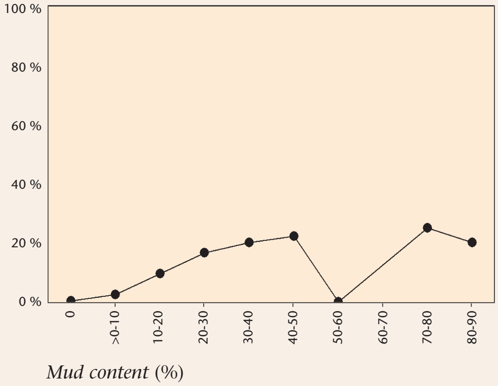
Description
Cumaceans with a thickened head-thorax part and a slender abdomen. Up to 9 mm long.

Distribution
In the 1976-1986 period *Diastylis rathkei* was mainly found in the eastern coastal zone. In this area the species reached a high distribution frequency and its maximum densities (70 ind./m^2). In the 1994-2001 period the species was also found outside this area near the Hinder Banks, but its distribution frequency decreased and its maximum density dropped to 30 ind./m^2.

Habitat preference
Diastylis rathkei has a clear preference for fine-grained sediments as the relative occurrence exceeds 60% in sediments with a median grain size of 50-100 µm. Although the species occurs in sediments with both high and low mud contents, *D. rathkei* reaches a maximum relative occurrence (> 20%) in sediments with a mud content exceeding 20%.

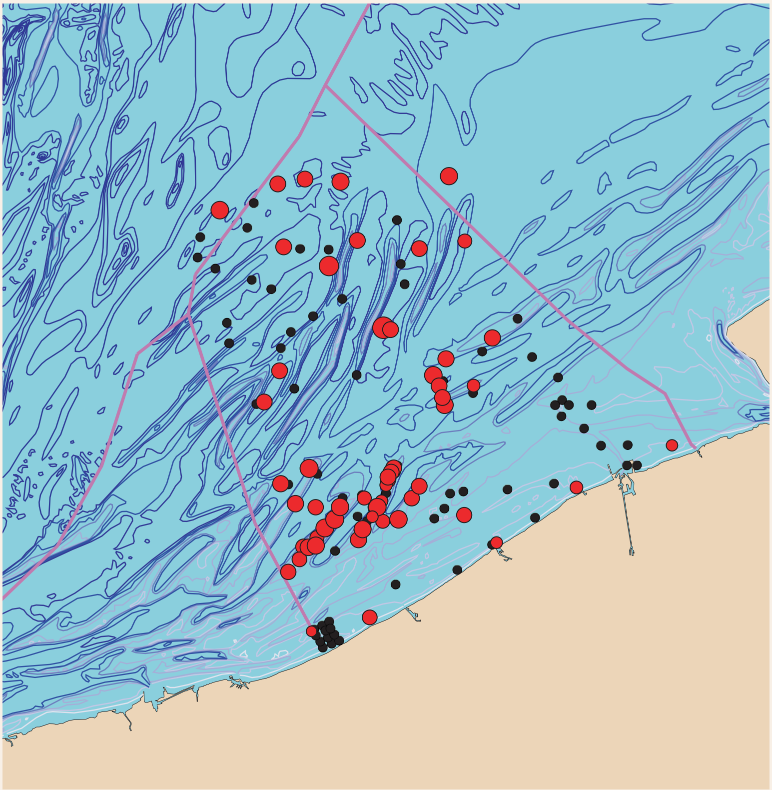
Relative occurrence





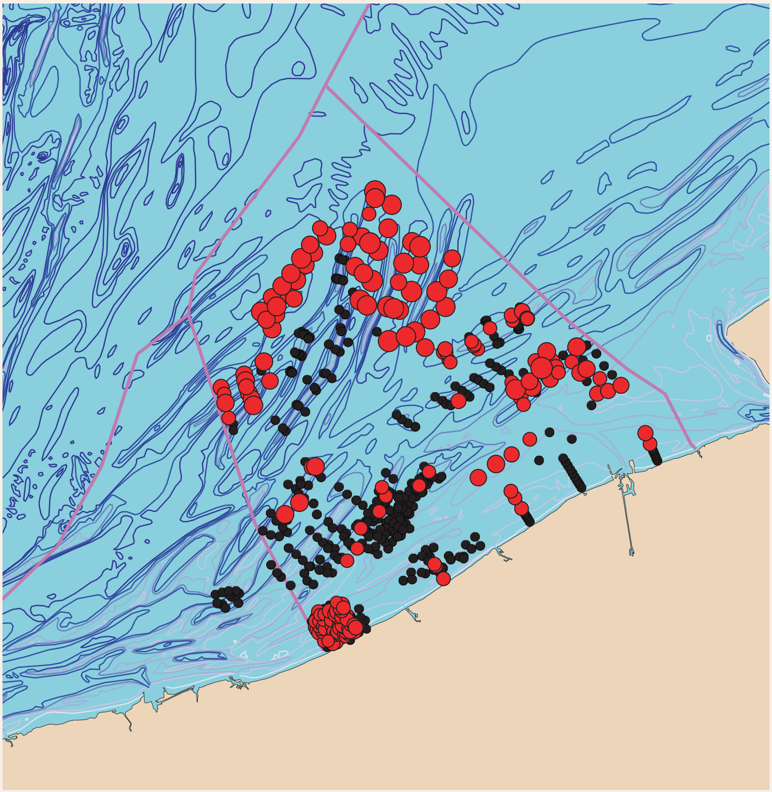
1976 • 1986

max 129 ind./m^2



1994 • 2001

max 955 ind./m^2



Gastrosaccus spinifer

(Goës, 1864)

Taxonomy

Phylum Arthropoda
- Classis Malacostraca
- Ordo Mysida
- Familia Mysidae
- *Gastrosaccus* Norman, 1868

Common names

unknown unknown

unknown unknown

Description

Gastrosaccus spinifer is an opossum shrimp; these are small, shrimp-like creatures with pinnate legs, a transparent body, remarkable eyes and a broad tail fan. Whereas most opossum shrimps spend their lives swimming freely in the water column, *Gastrosaccus spinifer* spends a major part of that time buried in the sediment. Consequently, the species is usually associated with the macrobenthos. *Gastrosaccus spinifer* can reach a length of 21 mm and is characterised by a narrowing of the fifth abdomen segment with a dorsal finger-like 'spine' on top.

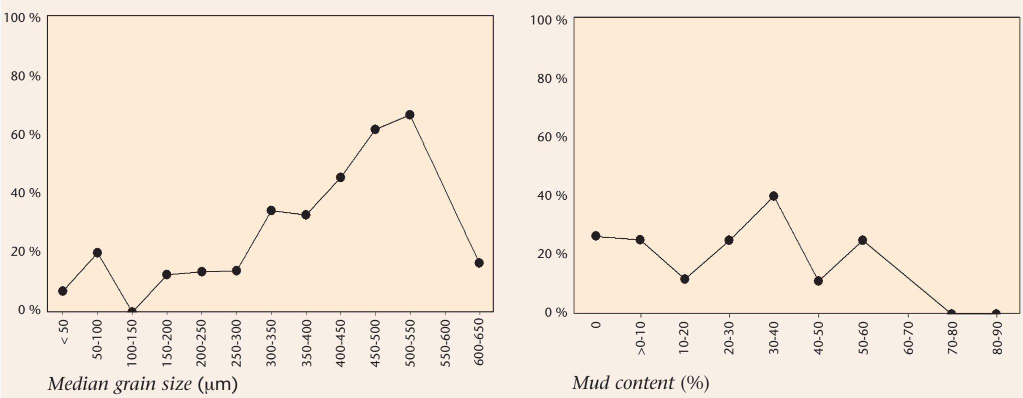
Distribution

In both periods *Gastrosaccus spinifer* was found distributed across the entire Belgian part of the North Sea with a relatively high distribution frequency. The maximum density amounted to 130 ind./m^2 in the 1976-1986 period and to 1,000 ind./m^2 in the 1994-2001 period.

Habitat preference

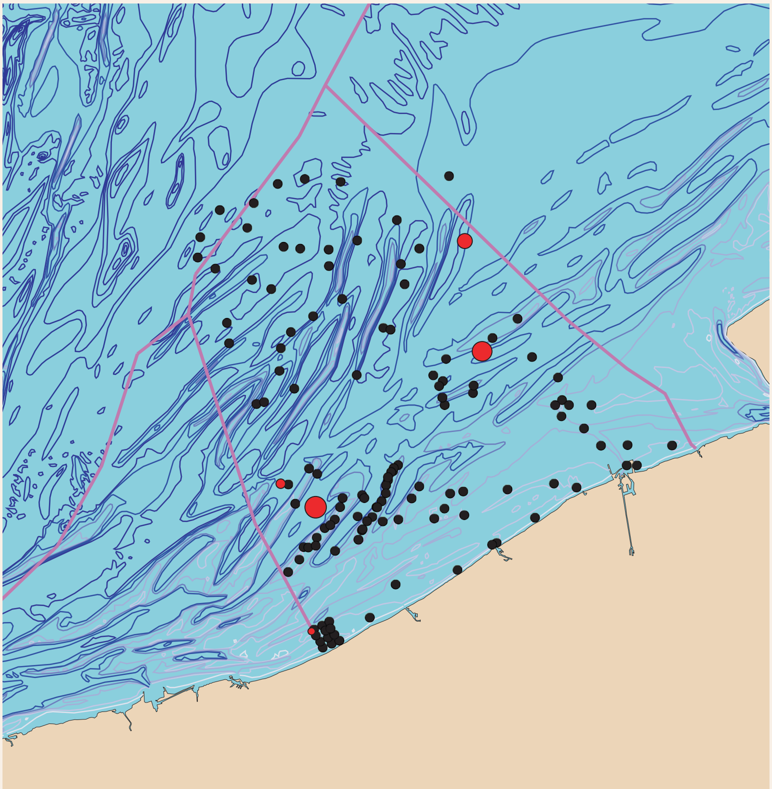
Gastrosaccus spinifer is found in a wide range of sediment types. In general, the relative occurrence increases in proportion to the median grain size of the sediment up to a maximum relative occurrence of over 60%, which is reached when the median grain size is 450 to 550 µm. *Gastrosaccus spinifer* does not display an absolute preference for sediments with a specific mud level. However, the species is absent in sediments with a mud content exceeding 70%.

Relative occurrence



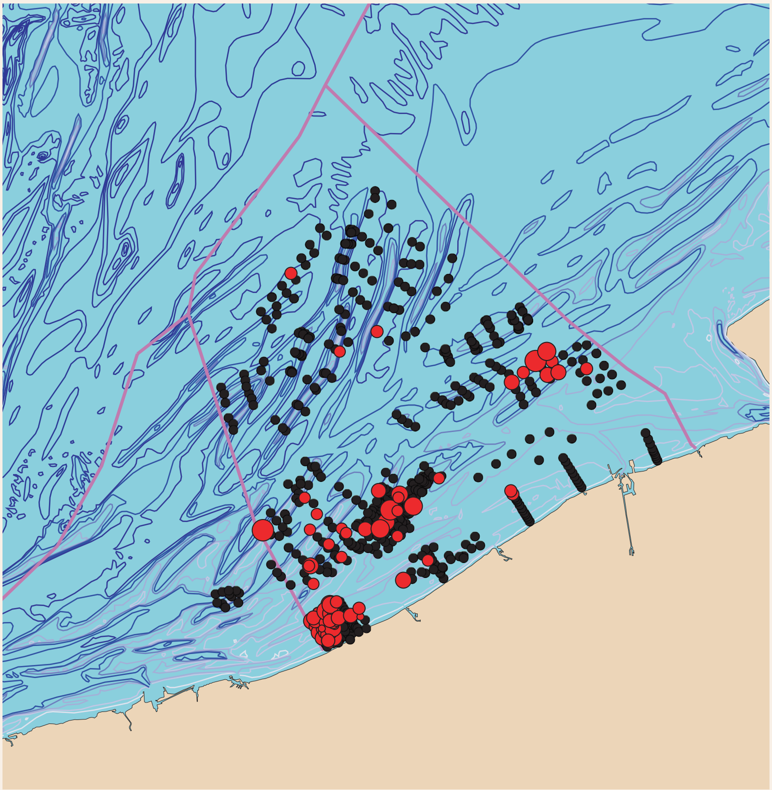
1976 • 1986

max 60 ind./m²



1994 • 2001

max 158 ind./m²



Leucothoe incisa

(Robertson, 1892)

Taxonomy

Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Leucothoidae
- *Leucothoe* Leach, 1814

Common names

unknown unknown

unknown unknown

Description

An amphipod with a slender body coloured green or beige; up to 7 mm long and intensely red eyes. The species is characterised by two antennae of equal length and by large claws (first two pairs of legs).

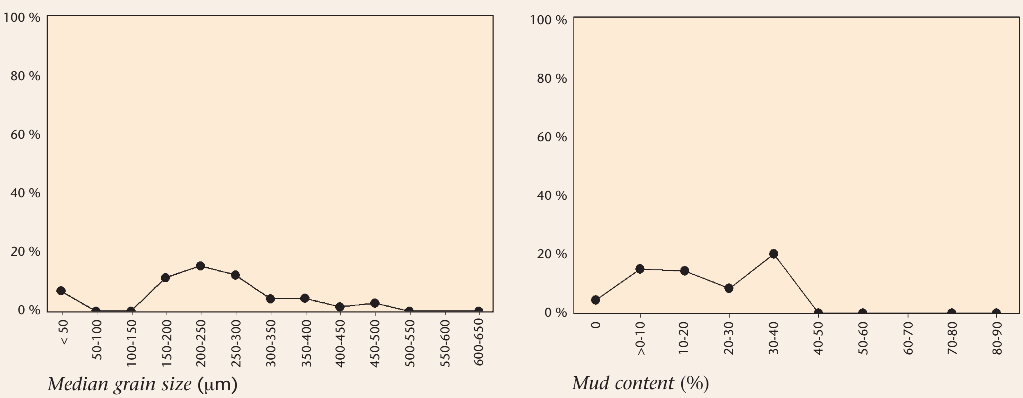
Distribution

In the 1976-1986 period *Leucothoe incisa* was only observed five times (maximum 60 ind./m^2), which made it impossible to deduce a distribution patterns. In the 1994-2001 period the species had a wider distribution in the near-coastal zone, with the exception of the eastern coastal zone. The species occurred in densities up to 160 ind./m^2.

Habitat preference

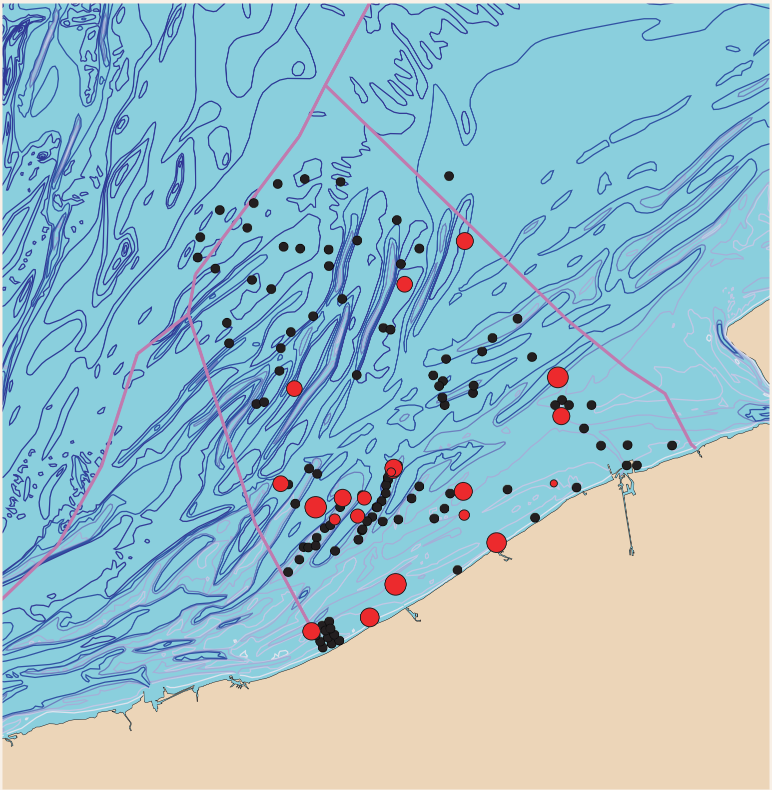
Leucothoe incisa is found in sediments with different grain sizes, but displays a slight preference (relative occurrence: maximum 20%) for fine-grained sediments (median grain size 150 to 300 µm). The species furthermore prefers sediments with a mud content not exceeding 40%.

Relative occurrence



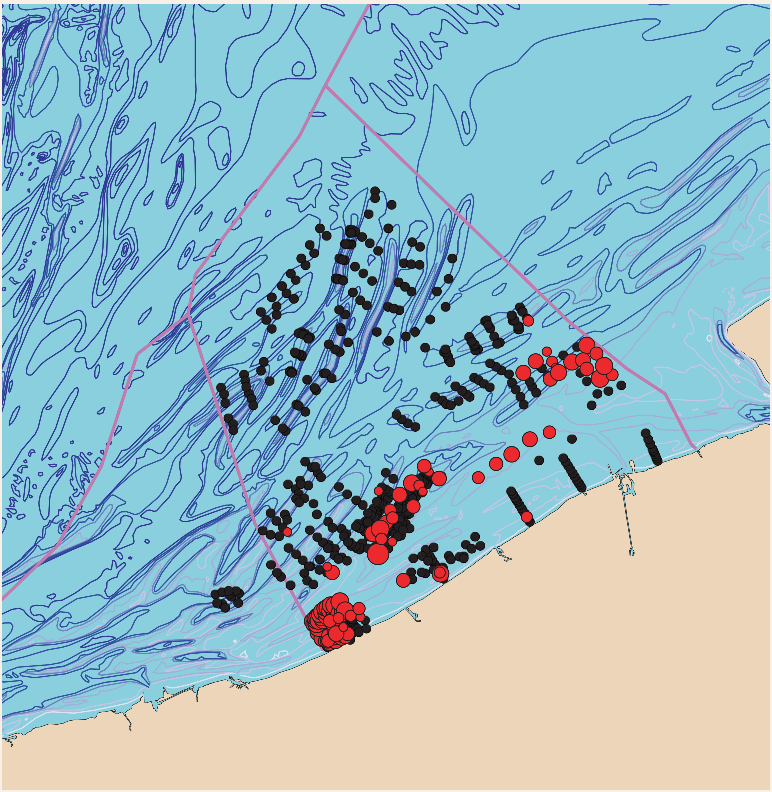
1976 • 1986

max 219 ind./m²



1994 • 2001

max 15058 ind./m²



Pariambus typicus

(Krøyer)

Taxonomy

Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Caprellidae
- *Pariambus*

Common names

N hongerlijder F crevette squelette, caprelle, chevrette
E unknown D unknown

Synonyms

Podalirius typicus

Description

Ghost shrimps are characterised by a slender, cylindrical body with less appendages than other amphipods. The males are large and slender whereas the females are stockier. Up to 7 mm long, elongate and transparent body clearly separated into segments. Central segments have rudimentary legs.

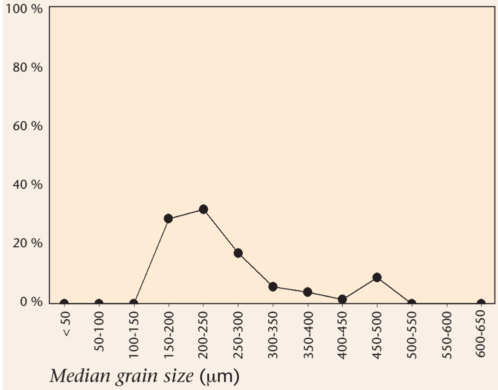
Distribution

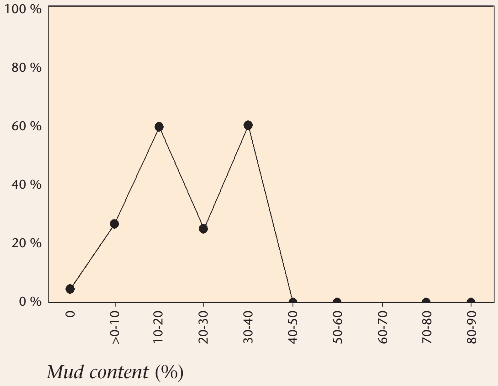
In the 1976-1986 period *Pariambus typicus* was found across the entire Belgian part of the North Sea with a low distribution frequency. In the 1994-2001 period the distribution frequency increased but the distribution was limited to the near-coastal zone, with the exception of the eastern costal zone. The density levels increased as well: from a maximum of 220 ind./m^2 in the 1976-1986 period to a maximum of 15,000 ind./m^2 in the 1994-2001 period.

Habitat preference

Pariambus typicus is observed in fine to coarse-grained sediments (median grain size 100 to 500 µm) with a maximum mud content of 40%. Preference is given to sediments with a median grain size of 150 to 250 µm (relative occurrence: > 30%) and a mud content of 10 to 40% (relative occurrence: up to 60%).

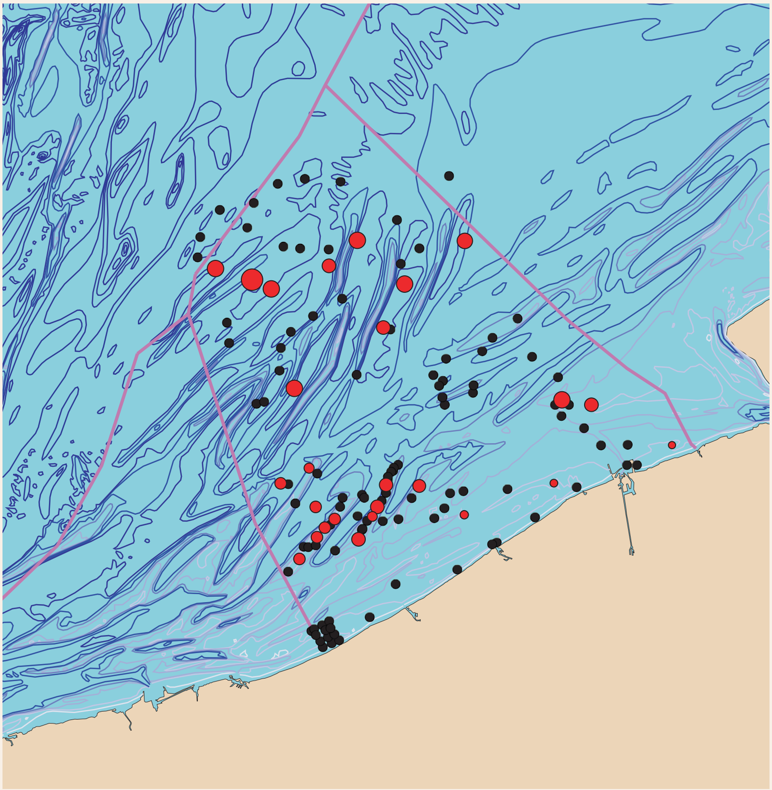
Relative occurrence





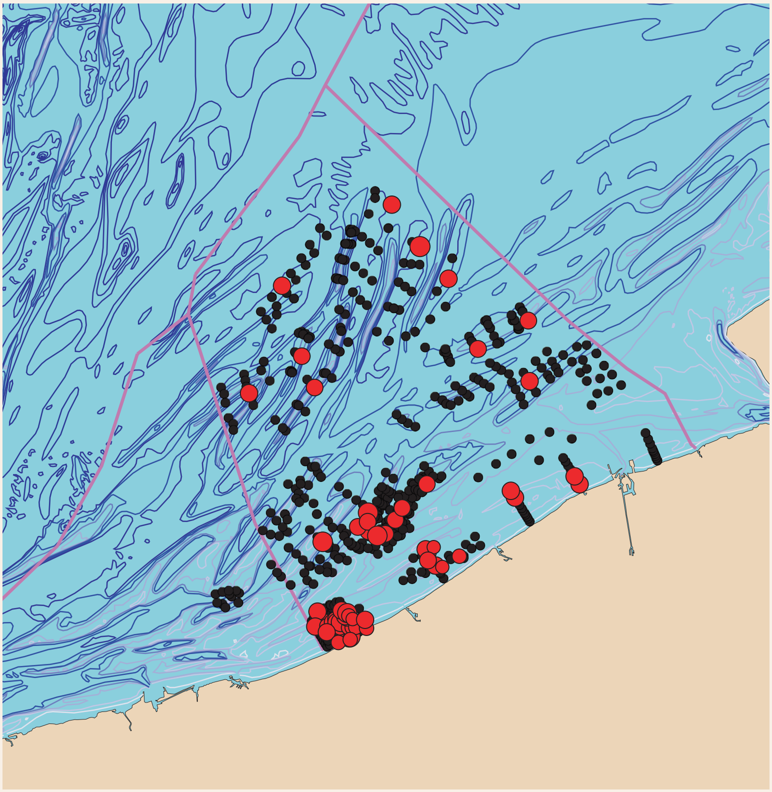
1976 • 1986

max 126 ind./m²



1994 • 2001

max 29 ind./m²



Pontocrates altamarinus
(Bate & Westwood, 1862)

Taxonomy
Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Oedicerotidae
- *Pontocrates* Boeck, 1871

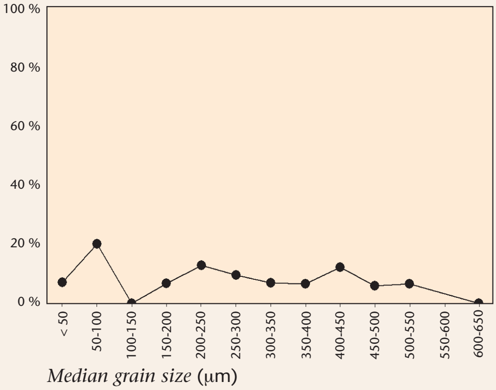
Common names
N unknown F unknown
E unknown D unknown

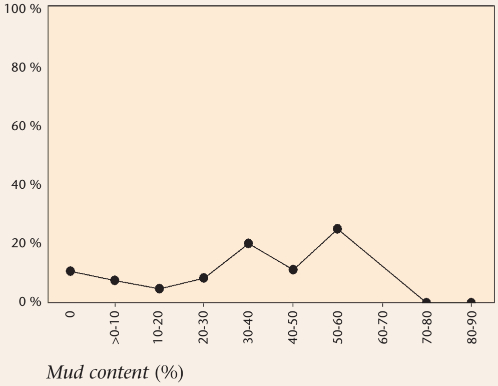
Description
Amphipod with relatively robust body up to 7 mm long. The eyes are very large and round. Its colour varies between white and yellow with clear brown patches. The head has a short, pointed rostrum arched downwards.

Distribution
In the 1976-1986 period *Pontocrates altamarinus* was found to occur across the entire Belgian part of the North Sea, with the exception of the coastal zone. This distribution pattern was extended by observations in the coastal zone in the 1994-2001 period. In both periods *P. altamarinus* had a low distribution frequency and relatively low densities (1976-1986 period: maximum 130 ind./m^2; 1994-2001 period: maximum 30 ind./m^2).

Habitat preference
Pontocrates altamarinus appears in different sediment types but always with a relatively low occurrence (< 30%). A clear preference for a certain sediment type cannot be identified.

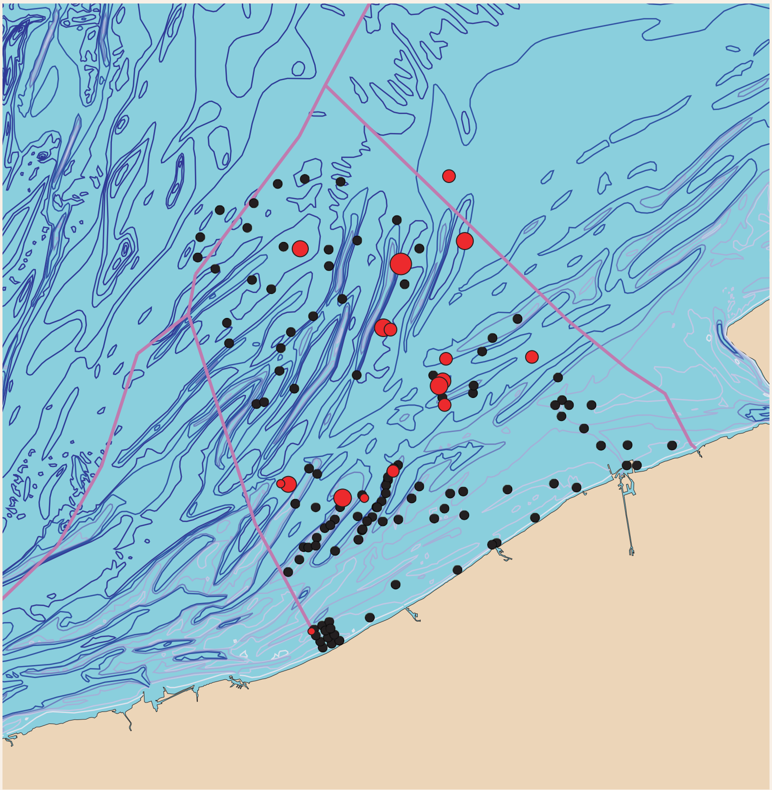
Relative occurrence





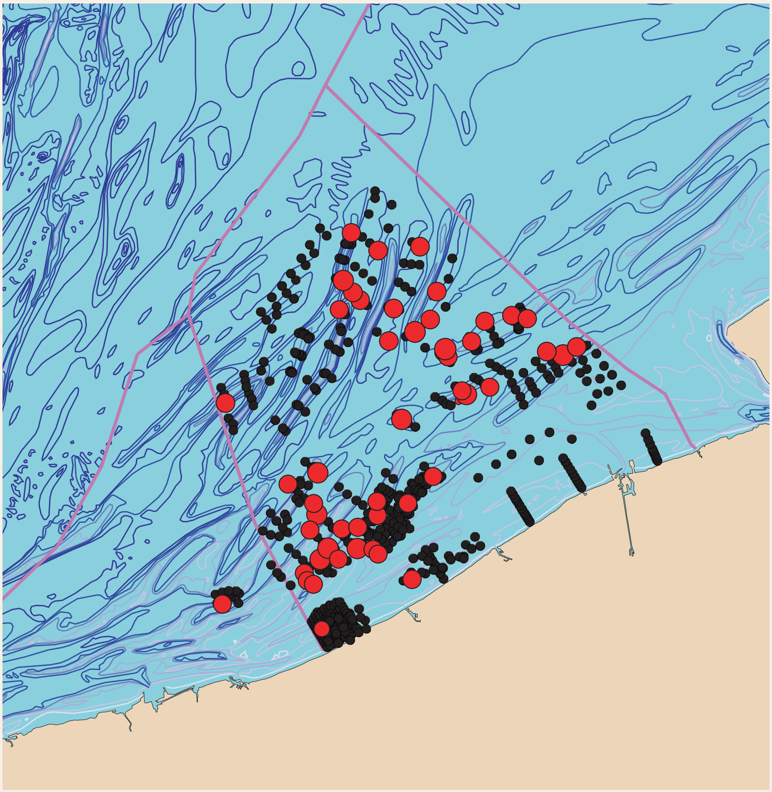
1976 • 1986

max 29 ind./m²



1994 • 2001

max 25 ind./m²



Thia scutellata
(Fabricius, 1973)

Taxonomy
Phylum Arthropoda
- Classis Malacostraca
- Ordo Decapoda
- Familia Atelecyclidae
- *Thia* Leach, 1814

Common names
N nagelkrab, polystkrab, teennagel F crabe écusson
E polished crab D unknown

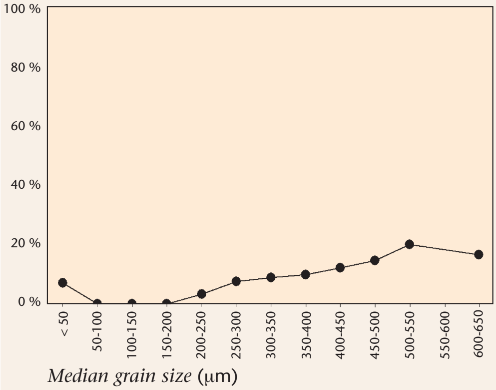
Synonyms
Cancer residuus Herbst, 1799
Thia Blainvillii Risso, 1822
Thia polita Leach, 1815
Thia residua Stebbing, 1893
Thia residuus Stebbing, 1893

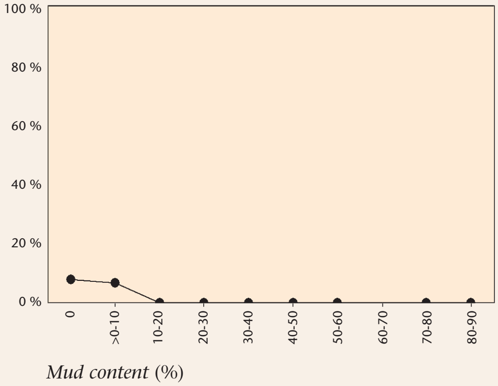
Description
Small, flat crab with a cordiform carapax notched around the edge with a dense fringe of long hairs. Up to 20 mm long.

Distribution
In both periods *Thia scutellata* was found on the Belgian part of the North Sea with a low distribution frequency and in low densities (maximum 30 ind./m^2). The species was mainly observed outside the coastal zone.

Habitat preference
Thia scutellata prefers coarse-grained sediments with a low mud content (maximum 10%). The coarser the sediment, the larger the chance of finding this particular species. However, the relative occurrence never exceeds 25%.

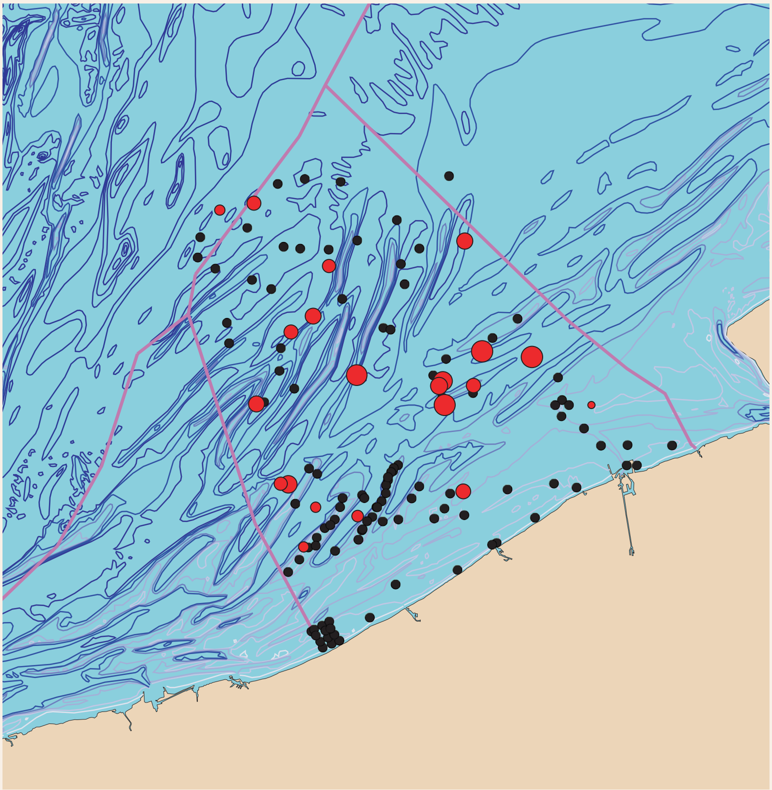
Relative occurrence





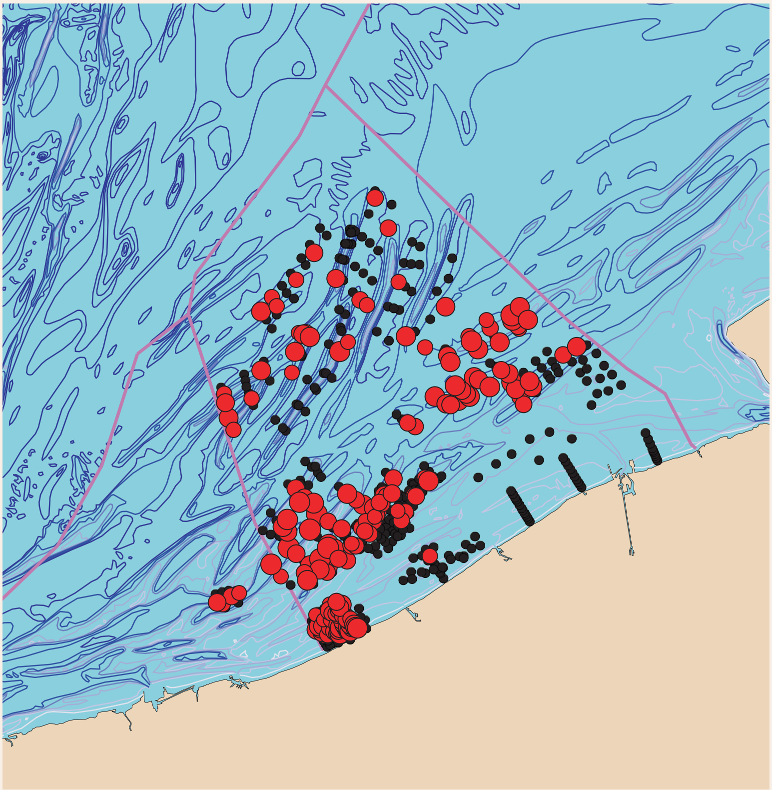
1976 • 1986

max 139 ind./m²



1994 • 2001

max 333 ind./m²



Urothoe brevicornis

(Bate, 1862)

Taxonomy

Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Urothoidae
- *Urothoe* Dana, 1852

Common names

N bulldozerkreeftje F unknown
E unknown D unknown

Description

An amphipod with a rounded, broad and robust body. Can reach lengths of 7 mm. The black eyes are very large in males and almost adjoining on top of the head. In females the eyes are moderately large and reniform. The head has a small rostrum. The body is yellowish white.

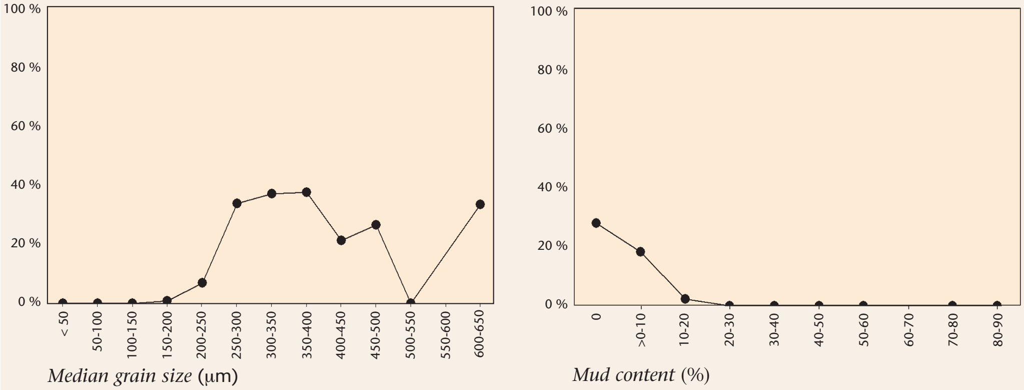
Distribution

In the 1976-1986 period *Urothoe brevicornis* was observed outside the coastal area with a low distribution frequency and in low densities (maximum 140 ind./m^2). A higher distribution frequency, higher densities (maximum 350 ind./m^2) and observations near the western coastal zone were characteristic of the species in the 1994-2001 period.

Habitat preference

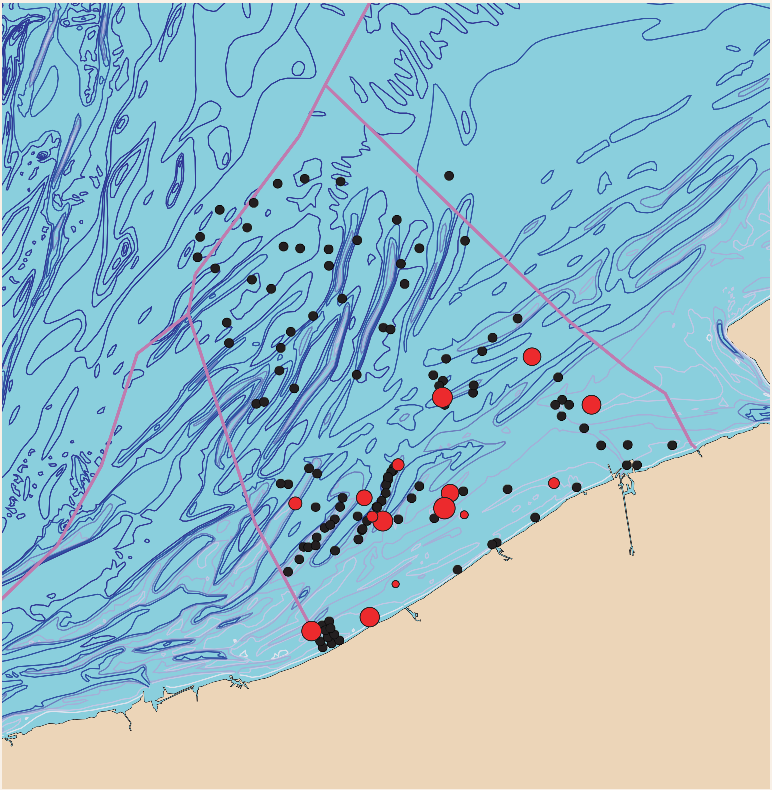
Urothoe brevicornis is typically found in medium to coarse-grained sediments (median grain size > 200 µm). The mud content remains low (chiefly < 10%). The highest relative occurrence (± 40%) is reached in sediments with a median grain size of 250 to 400 µm.

Relative occurrence



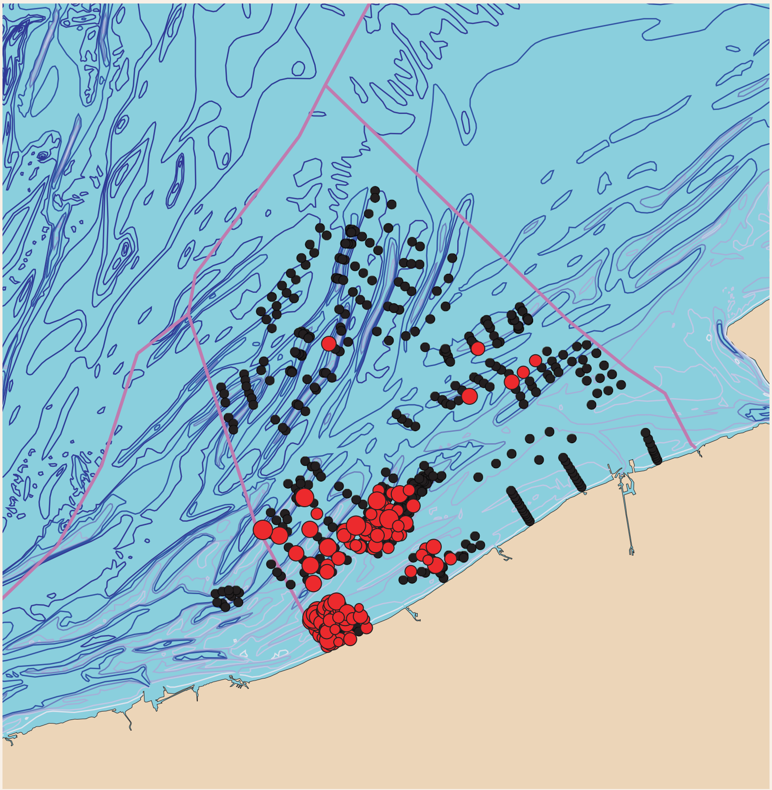
1976 • 1986

max 48 ind./m²



1994 • 2001

max 769 ind./m²



Urothoe poseidonis

Reibisch, 1905

Taxonomy

Phylum Arthropoda
- Classis Malacostraca
- Ordo Amphipoda
- Familia Urothoidae
- *Urothoe* Dana, 1852

Common names

N bulldozerkreeftje F unknown
E unknown D unknown

Description

An amphipod with a relatively rounded, broad and robust body (like *Urothoe brevicornis*). The eyes are very large in males and contiguous on top of the head. The eyes of females are smaller and oval. The body is reddish in colour. Differs from *U. brevicornis* in having a much broader fifth pair of legs.

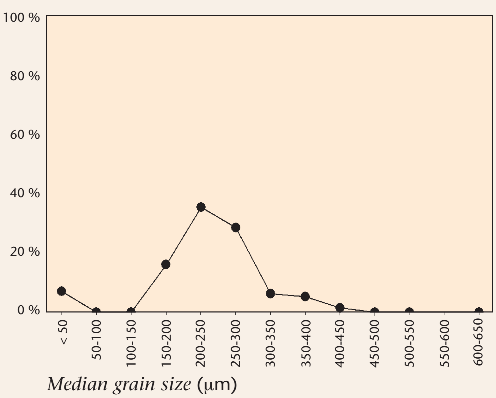
Distribution

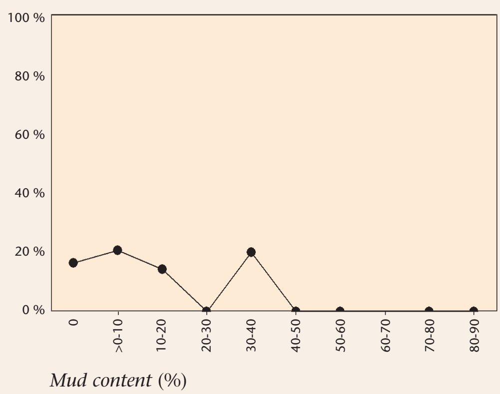
In both periods *Urothoe poseidonis* mainly occurred in the near-coastal zone, with the exception of the eastern coastal zone but with the inclusion of the western Flemish Banks. Whereas the species was only found 15 times and with a maximum density of 50 ind./m^2 in the 1976-1986 period, the species had a higher distribution frequency and maximum density (750 ind./m^2) in the 1994-2001 period. In the latter period the species was mainly found in the western near-coastal zone.

Habitat preference

Urothoe poseidonis occurs in fine-grained sediments and reaches a relative occurrence of at least 20% in sediments with a median grain size ranging from 150 to 300 µm. The species avoids muddy sediments (mud content maximum 40%).

Relative occurrence





ECHINODERMATA OR ECHINODERMS

Echinocardium cordatum • sea potato

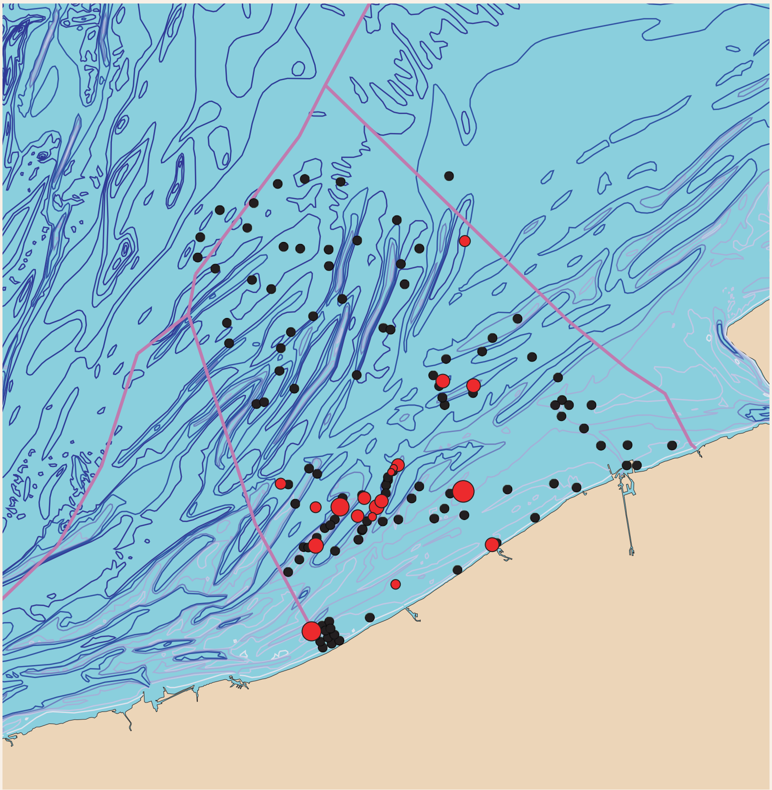
Echinocyamus pusillus • green sea urchin

Ophiura albida • brittle star

Ophiura ophiura • sand brittle star

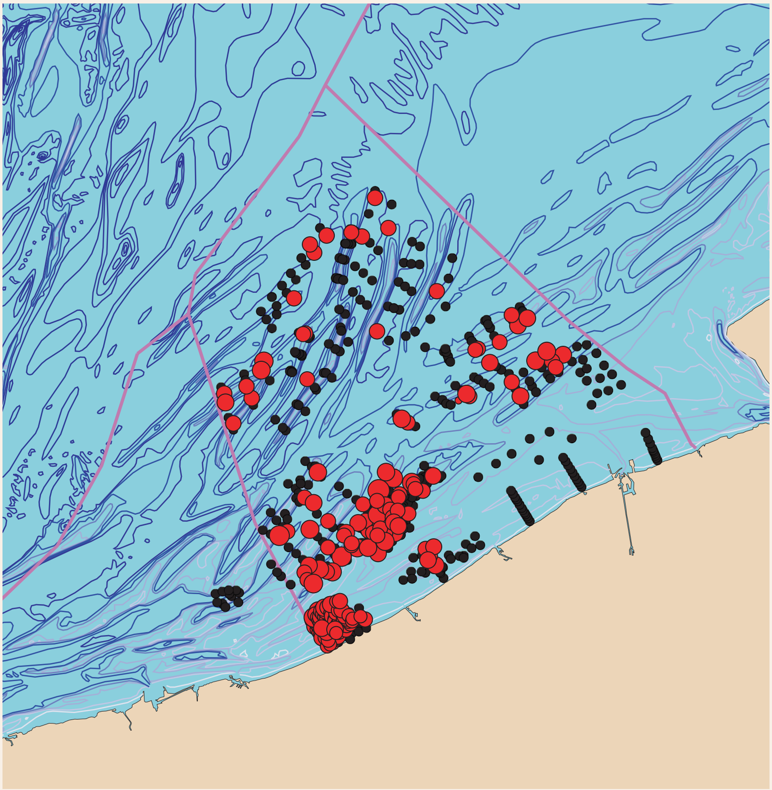
1976 • 1986

max 48 ind./m^2



1994 • 2001

max 200 ind./m^2



Echinocardium cordatum

(Pennant, 1777)

Taxonomy

Phylum Echinodermata
- Classis Echinoidea
- Ordo Echinoida
- Familia Spatangidae
- *Echinocardium* Gray, 1825

Common names

N zeeklit, hartegel F oursin cœur, oursin de sable
E sea potato, heart urchin D kleiner Herzigel

Description

The cordiform body of the sea potato is protected by a calcite skeleton and measures up to 60 mm. The skeleton is covered with soft spines that lie flat on the body and point towards the back. Yellowish brown in colour.

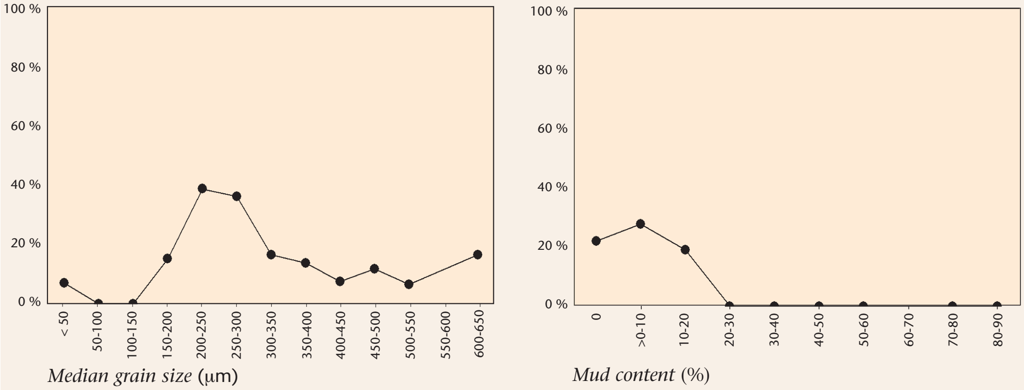
Distribution

In the 1976-1986 period *Echinocardium cordatum* was mainly found near the Flemish Banks (maximum 50 ind./m^2) whereas it was absent in the eastern coastal zone and near the Hinder Banks. In the 1994-2001 period the species is clearly distributed more widely: *E. cordatum* was only absent in the eastern coastal zone and reached densities up to 200 ind./m^2. As the species lives burrowed in the sand (up to 20 cm deep) there is a real chance that the Van Veen grab fails to scoop up *E. cordatum*. Consequently, the species may have a broader distribution than mentioned here.

Habitat preference

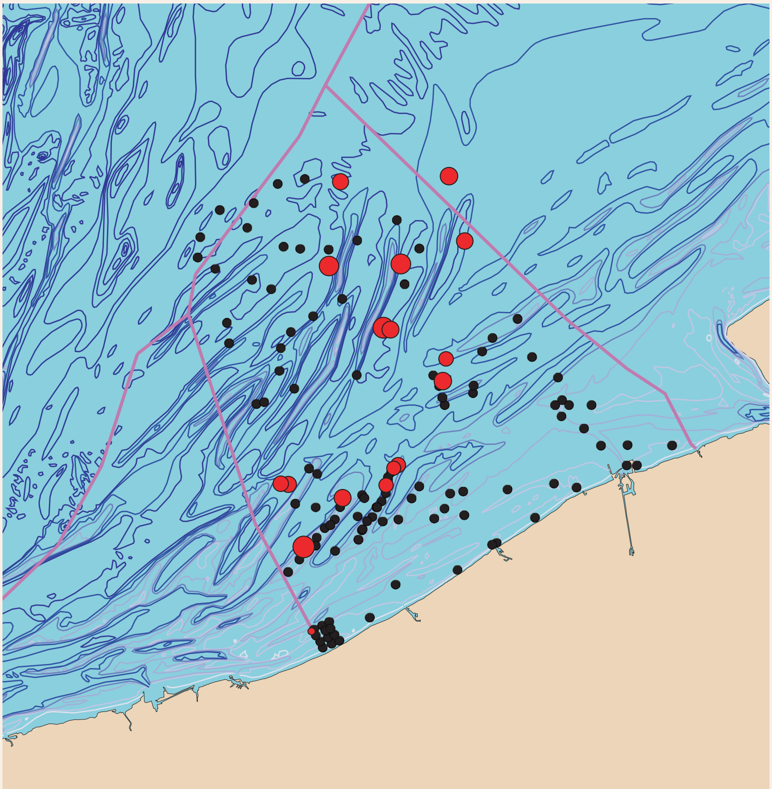
Echinocardium cordatum occurs in sediments with a wide range of grain sizes (median grain size up to 650 µm), but clearly prefers sediments with a median grain size of 200 to 300 µm (relative occurrence ± 40%). The species is only found in sediments with a low mud content (< 20%).

Relative occurrence



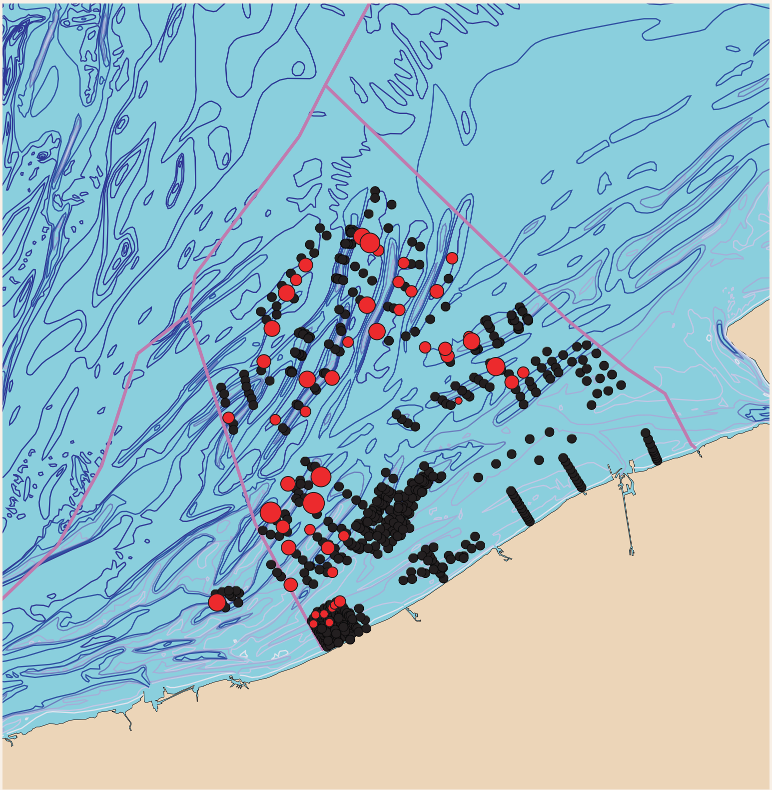
1976 • 1986

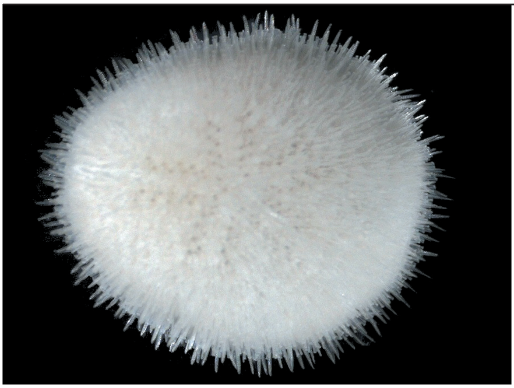
max 136 ind./m²



1994 • 2001

max 408 ind./m²





Echinocyamus pusillus
(O.F. Müller, 1776)

Taxonomy
Phylum Echinodermata
- Classis Echinoidea
- Ordo Clypeasteroida
- Familia Fibulariidae
- *Echinocyamus* van Phelsum, 1774

Common names
N zeeboontje F fève de mer
E green sea urchin D Zwergseeigel

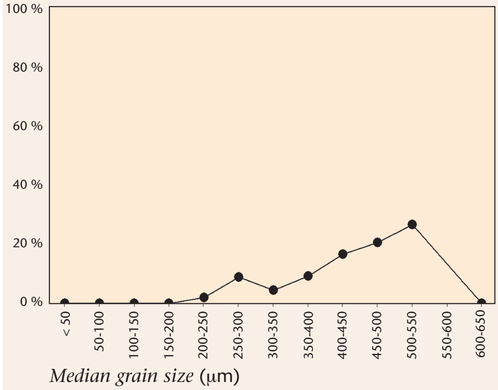
Synonyms
Echinocyamus angulosus
Echinocyamus parthenopaeus
Echinocyamus speciosus
Echinus minutus
Fibularia equina
Fibularia tarentina
Spatangus pusillus O.F. Müller, 1776

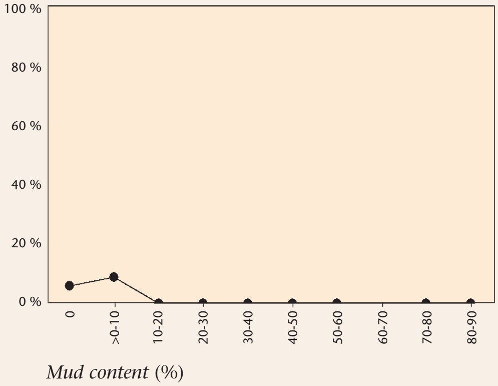
Description
Echinocyamus pusillus is a small sea urchin with an oval, flattened body measuring up to 15 mm long. The calcite skeleton is completely covered with fine short spines and coloured grey to greenish. Specimens become completely green when injured, a characteristic the species shares with some other sea urchin species.

Distribution
Echinocyamus pusillus occurred outside the near-coastal zone in both periods. In the 1994-2001 period the species was furthermore observed a number of times in the western coastal zone. Maximum density is 400 ind./m^2 (1994-2001 period).

Habitat preference
Echinocyamus pusillus has a preference for medium to coarse-grained sand (median grain size: > 200 µm) and reaches an optimum in sediments with a median grain size of 500-550 µm (relative occurrence: 30%). The species furthermore prefers sediments with a low mud content (maximum 10%).

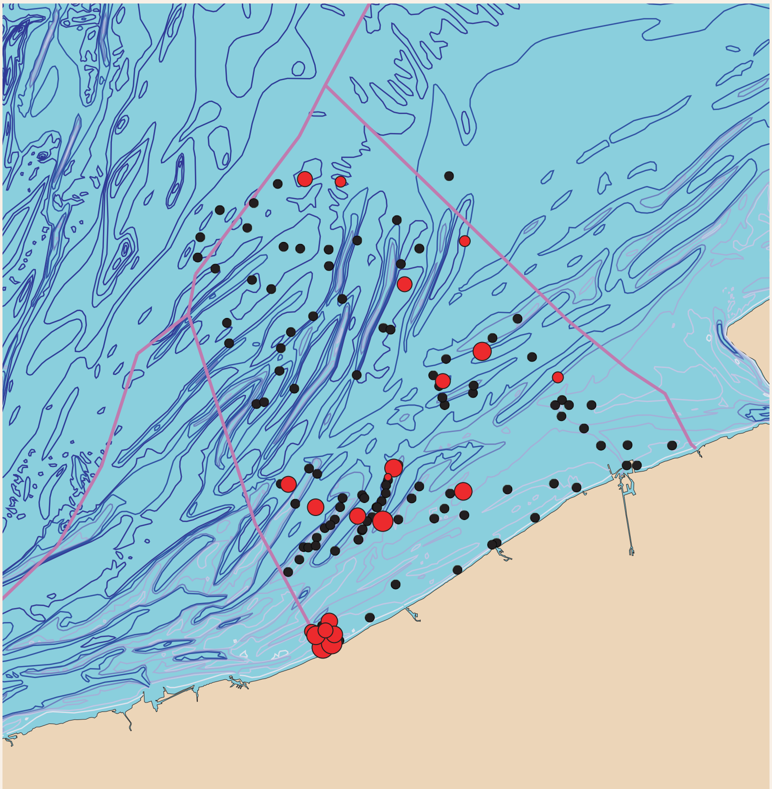
Relative occurrence





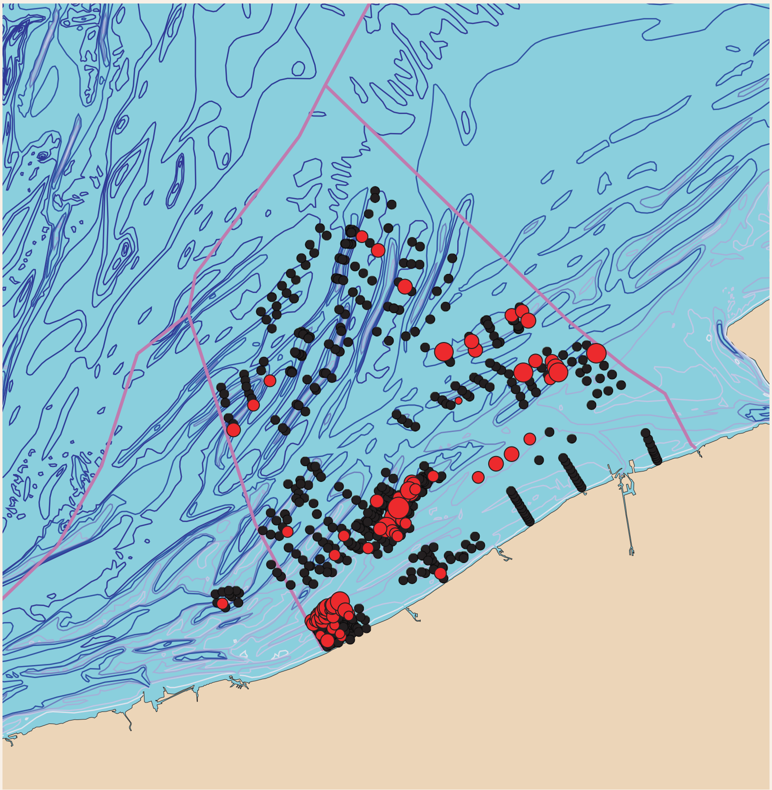
1976 • 1986

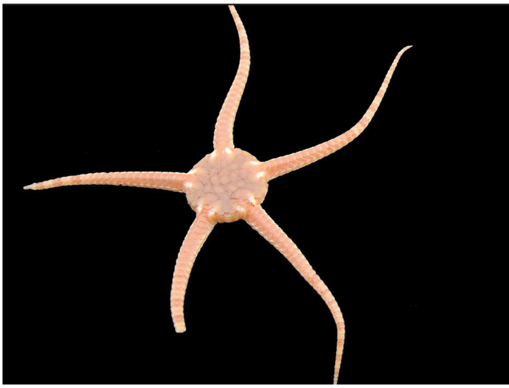
max 110 ind./m²



1994 • 2001

max 941 ind./m²





Ophiura albida

Forbes, 1839

Taxonomy

Phylum Echinodermata
- Classis Stelleroidea
- Ordo Ophiurida
- Familia Ophiuridae
- *Ophiura* Lamarck, 1801

Common names

N kleine slangster F ophiure blanche
E unknown D unknown

Description

Brittle stars consist of a central disk clearly separated from the slender, very agile and very strong arms. *Ophiura albida* is very similar to *Ophiura ophiura* and can only be distinguished from this species by the absence of pores between the arm plates. The top is reddish to orange-brown; the bottom side is dirty white.

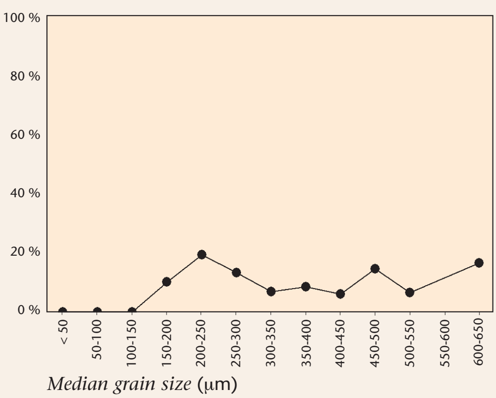
Distribution

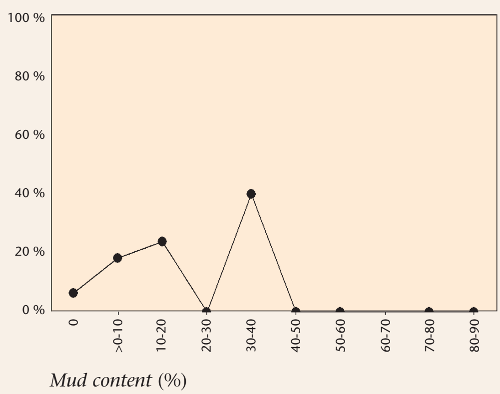
In both periods *Ophiura albida* was widely spread across the Belgian part of the North Sea and was only absent in the eastern coastal zone. The species was found in relatively high densities (1976-1986 period: maximum 100 ind./m^2; 1994-2001 period: maximum 900 ind./m^2).

Habitat preference

Ophiura albida prefers fine to coarse-grained sediments (median grain size 150-650 µm) without any preference for a particular median grain size. The species furthermore prefers sediments with a low to medium mud content (maximum 40%).

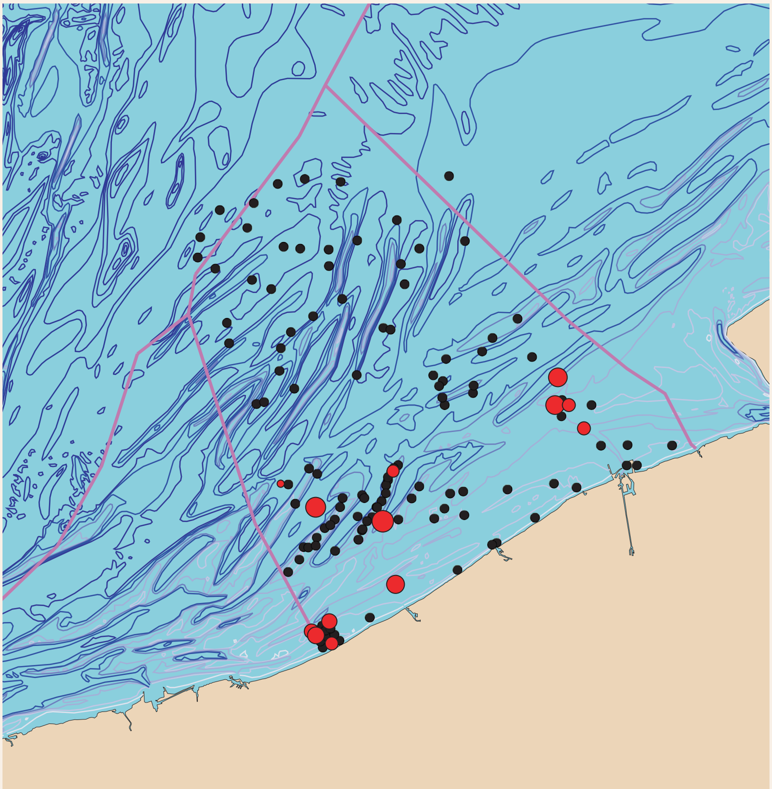
Relative occurrence





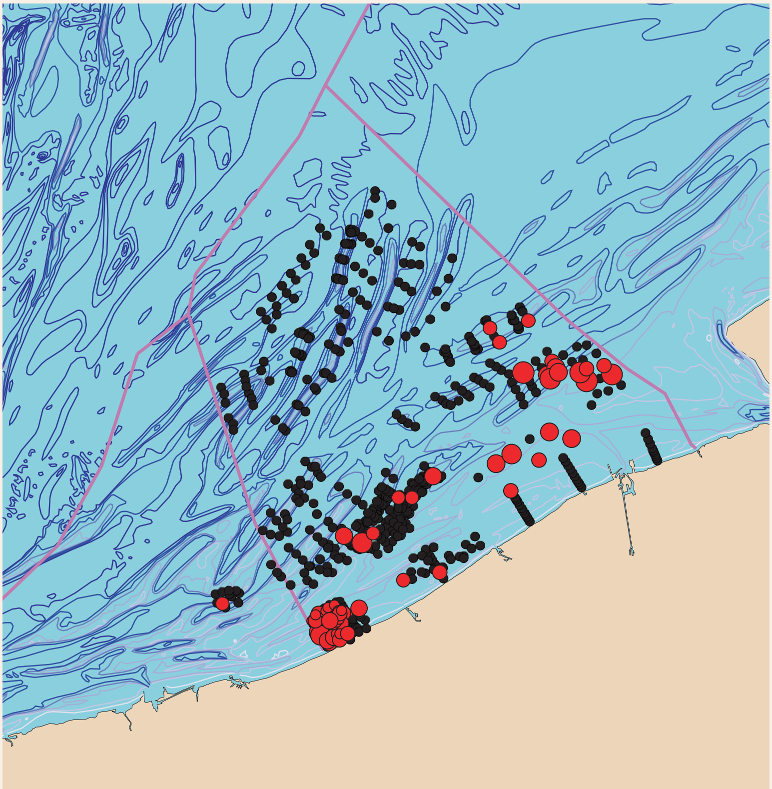
1976 • 1986

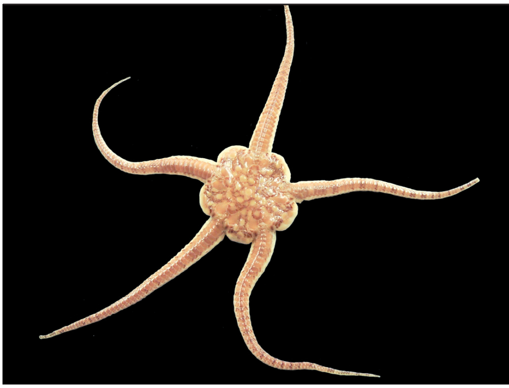
max 19 ind./m^2



1994 • 2001

max 48 ind./m^2





Ophiura ophiura
(Linnaeus, 1758)

Taxonomy
Phylum Echinodermata
- Classis Stelleroidea
- Ordo Ophiurida
- Familia Ophiuridae
- *Ophiura* Lamarck, 1801

Common names
N gewone slangster F ophiure rose
E serpent star D Schlangenstern

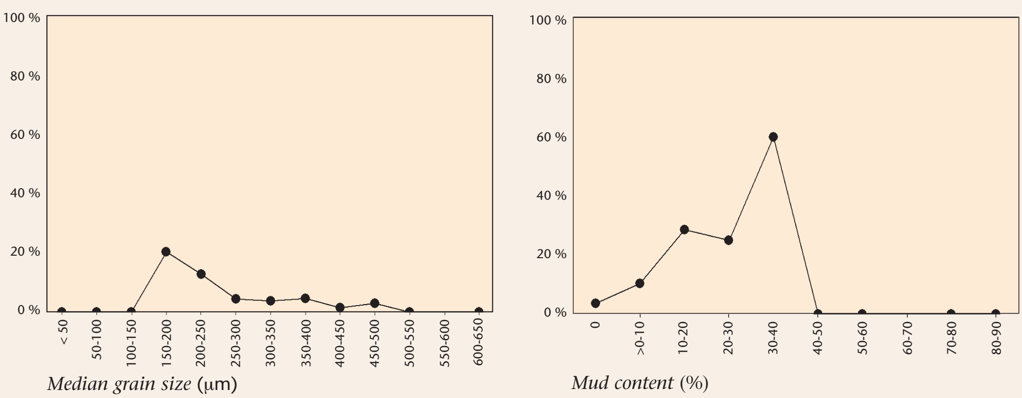
Synonyms
Ophiura ciliaris (Linnaeus, 1766)
Ophiura ciliata (Retzius, 1783) non (O.F. Müller)
Ophiura texturata Lamarck, 1816
Ophioglypha texturata (Lamarck)

Description
Brittle stars consist of a central disk clearly separated from the slender, very agile and also very strong arms. *Ophiura ophiura* is very similar to *Ophiura albida* and can only be distinguished from this species by the presence of pores between the arm plates. The top is reddish to orange-brown; the bottom side is dirty white.

Distribution
In both periods *Ophiura ophiura* was found to occur in the near-coastal zone, with the exception of the eastern coastal zone. The species always reached low densities, with a maximum of 20 ind./m^2 in the 1976-1986 period and a maximum of 50 ind./m^2 in the 1994-2001 period.

Habitat preference
Ophiura ophiura is found in fine to medium-grained sediments (median grain size: 150-500 µm) with an optimum in sediments with a grain size of 150-200 µm (relative occurrence: > 20%). The species clearly prefers sediments with a mud content of 30-40% (relative occurrence: 60%).

Relative occurrence

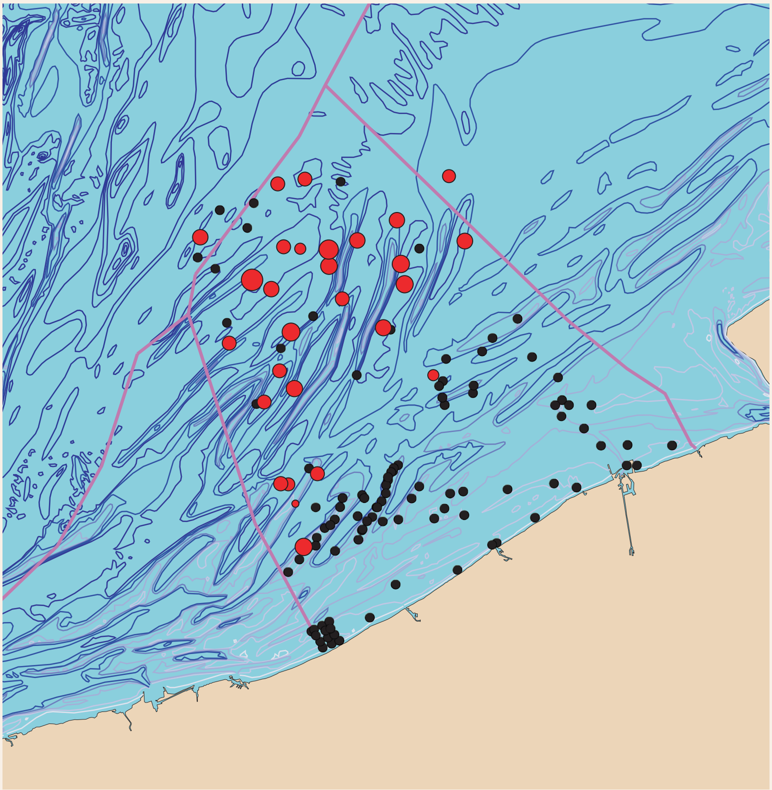


CEPHALOCHORDATA OR LANCELETS

Branchiostoma lanceolatum • common lancelet

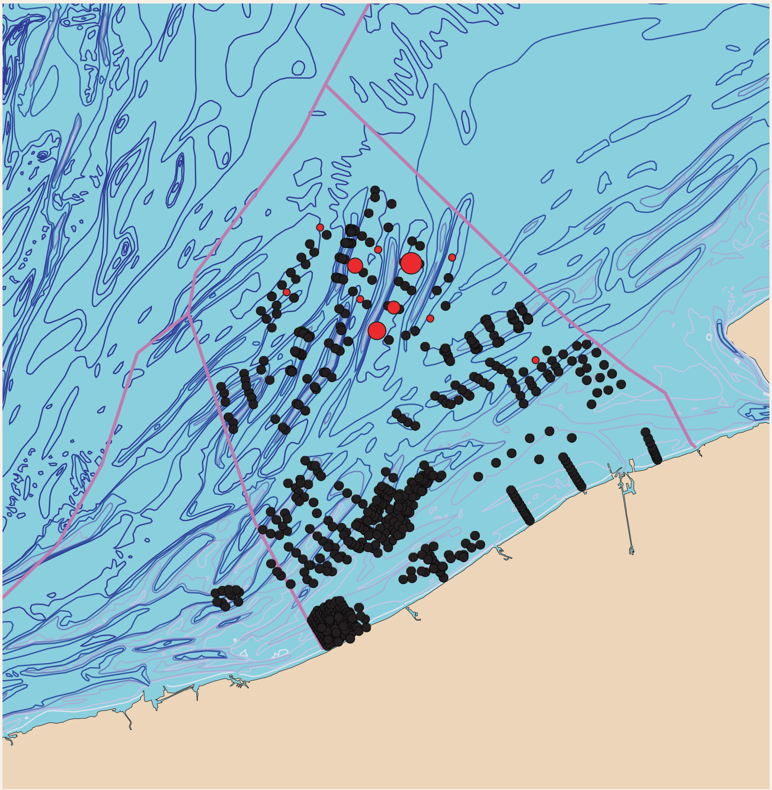
1976 • 1986

max 604 ind./m^2



1994 • 2001

max 116 ind./m^2



Branchiostoma lanceolatum

(Pallas, 1774)

Taxonomy

Phylum Chordata
- Classis Leptocardii
- Ordo Leptocardii
- Familia Branchiostomidae
- *Branchiostoma*

Common names

N lancetvisje F amphioxus, lancelet
E unknown D Lanzettierchen

Synonyms

Amphioxus lanceolatus Pallas

Description

The lancelet *Branchiostoma lanceolatum* is considered an invertebrate although the species bears quite some resemblance with 'primitive fish'. It is possible to distinguish a head with a mouth surrounded by fine tentacles (used to gather food), a 'body and a 'tail'. The animal is covered with fins and manages to cover small distances by swimming; however, the lancelet is buried in coarse sediment most of the time.

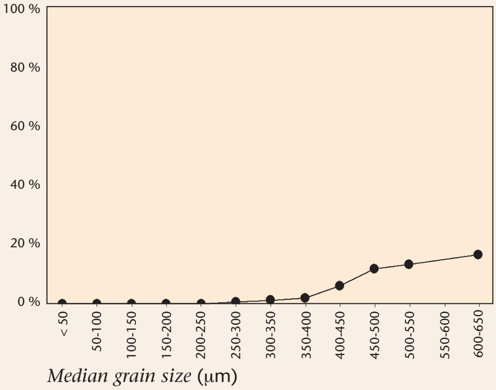
Distribution

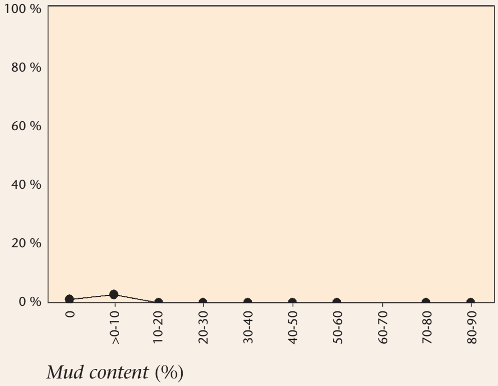
In the 1976-1986 period *Branchiostoma lanceolatum* was widely spread outside the near-coastal zone and reached densities of 600 ind./m^2 maximally in that area. In the 1994-2001 period the distribution of the species was remarkably more limited and lower densities were observed: *B. lanceolatum* was exclusively found near the Hinder Banks in densities of maximum 120 ind./m^2.

Habitat preference

Branchiostoma lanceolatum clearly prefers coarse sediments: the relative occurrence in sediments with a median grain size of 600-650 µm amounts to 20%. The mud content of the sediment is always less than 10%.

Relative occurrence





Systematic overview:
The macrobenthos of the Belgian part of the North Sea

Annelida	Oligochaeta			Oligochaeta sp.
Annelida	Polychaeta	Canalipalpata	Polygordiidae	*Polygordius appendiculatus* Fraipont, 1887
Annelida	Polychaeta	Canalipalpata	Protodrilidae	*Protodrilus* sp.
Annelida	Polychaeta	Canalipalpata	Protodriloididae	*Protodriloides chaetifer* (Remane, 1926)
Annelida	Polychaeta	Canalipalpata	Saccocirridae	*Saccocirrus papillocercus* Bobretzky, 1871
Annelida	Polychaeta	Capitellida	Arenicolidae	*Arenicola marina* (Linnaeus, 1758)
Annelida	Polychaeta	Capitellida	Capitellidae	*Capitella capitata* (Fabricius, 1780)
Annelida	Polychaeta	Capitellida	Capitellidae	*Capitella minima* Langerhans, 1880
Annelida	Polychaeta	Capitellida	Capitellidae	*Heteromastus filiformis* (de Claparède, 1864)
Annelida	Polychaeta	Capitellida	Capitellidae	*Notomastus latericeus* M. Sars, 1850
Annelida	Polychaeta	Capitellida	Maldanidae	*Nicomache* sp.
Annelida	Polychaeta	Eunicida	Dorvilleidae	*Parougia eliasoni* (Oug, 1978)
Annelida	Polychaeta	Eunicida	Dorvilleidae	*Protodorvillea kefersteini* (McIntosh, 1869)
Annelida	Polychaeta	Eunicida	Lumbrineridae	*Lumbrineris latreilli* Audouin & Milne-Edwards, 1834
Annelida	Polychaeta	Eunicida	Lumbrineridae	*Scoletoma fragilis* (O.F. Müller, 1776)
Annelida	Polychaeta	Opheliida	Opheliidae	*Euzonus flabelligerus* (Ziegelmeier, 1955)
Annelida	Polychaeta	Opheliida	Opheliidae	*Ophelia limacina* (Rathke, 1843)
Annelida	Polychaeta	Opheliida	Opheliidae	*Travisia forbesii* Johnston, 1840
Annelida	Polychaeta	Opheliida	Scalibregmidae	*Scalibregma inflatum* Rathke, 1843
Annelida	Polychaeta	Orbiniida	Orbiniidae	*Orbinia* (Orbinia) *sertulata* (Savigny, 1820)
Annelida	Polychaeta	Orbiniida	Orbiniidae	*Scoloplos* (Scoloplos) *armiger* (O.F. Müller, 1776)
Annelida	Polychaeta	Orbiniida	Paraonidae	*Aricidea minuta* Southward, 1956
Annelida	Polychaeta	Orbiniida	Paraonidae	*Paraonis fulgens* (Levinsen, 1884)
Annelida	Polychaeta	Oweniida	Oweniidae	*Owenia fusiformis* Delle Chiaje, 1841
Annelida	Polychaeta	Phyllodocida	Aphroditidae	*Aphrodita aculeata* (Linnaeus, 1758)
Annelida	Polychaeta	Phyllodocida	Glyceridae	*Glycera alba* (O.F. Müller, 1776)
Annelida	Polychaeta	Phyllodocida	Glyceridae	*Glycera capitata* Örsted, 1843
Annelida	Polychaeta	Phyllodocida	Glyceridae	*Glycera tridactyla* Schmarda, 1861
Annelida	Polychaeta	Phyllodocida	Goniadidae	*Goniadella bobrezkii* (Annenkova, 1929)
Annelida	Polychaeta	Phyllodocida	Hesionidae	*Microphthalmus listensis* Westheide, 1967
Annelida	Polychaeta	Phyllodocida	Hesionidae	*Microphthalmus similis* Bobretzky, 1870
Annelida	Polychaeta	Phyllodocida	Hesionidae	*Ophiodromus flexuosus* (Delle Chiaje, 1825)
Annelida	Polychaeta	Phyllodocida	Hesionidae	*Podarkeopsis capensis* (Day, 1963)
Annelida	Polychaeta	Phyllodocida	Nephtyidae	*Nephtys assimilis* Örsted, 1843
Annelida	Polychaeta	Phyllodocida	Nephtyidae	*Nephtys caeca* (Fabricius, 1780)
Annelida	Polychaeta	Phyllodocida	Nephtyidae	*Nephtys cirrosa* Ehlers, 1868
Annelida	Polychaeta	Phyllodocida	Nephtyidae	*Nephtys hombergii* Savigny, 1818
Annelida	Polychaeta	Phyllodocida	Nephtyidae	*Nephtys longosetosa* Örsted, 1843
Annelida	Polychaeta	Phyllodocida	Nereidae	*Eunereis longissima* (Johnston, 1840)
Annelida	Polychaeta	Phyllodocida	Nereidae	*Nereis* (Neanthes) *succinea Frey* & Leuckart, 1847
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Eteone* (Eteone) *flava* (Fabricius, 1780)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Eteone* (Eteone) *longa* (Fabricius, 1780)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Eulalia viridis* (Linnaeus, 1767)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Eumida bahusiensis* Bergström, 1914
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Eumida sanguinea* (Örsted, 1843)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Hesionura elongata* (Southern, 1914)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Hypereteone foliosa* (Quatrefages, 1865)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodoce* (Anaitides) *groenlandica* Örsted, 1842
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodoce* (Anaitides) lineata (Claparède, 1870)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodoce* (Anaitides) *maculata* (Linnaeus, 1767)
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodoce* (Anaitides) *mucosa* Örsted, 1843
Annelida	Polychaeta	Phyllodocida	Phyllodocidae	*Phyllodoce* (Anaitides) *rosea* (McIntosh, 1877)
Annelida	Polychaeta	Phyllodocida	Pisionidae	*Pisione remota* (Southern, 1914)
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Eunoe* sp.
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Gattyana cirrhosa* (Pallas, 1766)

Annelida	Polychaeta	Phyllodocida	Polynoidae	*Harmothoe* (Eunoe) *nodosa* Sars, 1861
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Harmothoe* (Harmothoe) *impar* (Johnston, 1839)
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Harmothoe spinifera* (Ehlers, 1864)
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Lepidonotus squamatus* (Linnaeus, 1758)
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Malmgrenia glabra* (Malmgren, 1865)
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Malmgrenia ljungmani* (Malmgren, 1867)
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Malmgreniella castanea* (Mc Intosh, 1876)
Annelida	Polychaeta	Phyllodocida	Sigalionidae	*Pholoe minuta* (Fabricius, 1780)
Annelida	Polychaeta	Phyllodocida	Sigalionidae	*Pholoe pallida* Chambers, 1985
Annelida	Polychaeta	Phyllodocida	Sigalionidae	*Sigalion mathildae* Audouin & Milne Edwards in Cuvier, 1830
Annelida	Polychaeta	Phyllodocida	Sigalionidae	*Sthenelais boa* (Johnston, 1833)
Annelida	Polychaeta	Phyllodocida	Syllidae	*Autolytus edwardsi* Saint-Joseph, 1887
Annelida	Polychaeta	Phyllodocida	Syllidae	*Autolytus prolifer* (O.F. Müller, 1776)
Annelida	Polychaeta	Phyllodocida	Syllidae	*Eusyllis blomstrandi* Malmgren, 1867
Annelida	Polychaeta	Phyllodocida	Syllidae	*Exogone hebes* (Webster & Benedict, 1884)
Annelida	Polychaeta	Phyllodocida	Syllidae	*Opisthodonta pterochaeta* Southern, 1914
Annelida	Polychaeta	Phyllodocida	Syllidae	*Sphaerosyllis* (Sphaerosyllis) *hystrix* Claparède, 1863
Annelida	Polychaeta	Phyllodocida	Syllidae	*Streptosyllis arenae* Webster & Benedict, 1884
Annelida	Polychaeta	Phyllodocida	Syllidae	*Streptosyllis websteri* Southern, 1914
Annelida	Polychaeta	Phyllodocida	Syllidae	*Syllis armillaris* (O.F. Müller, 1776)
Annelida	Polychaeta	Phyllodocida	Syllidae	*Syllis gracilis* Grube, 1840
Annelida	Polychaeta	Sabellida	Serpulidae	*Pomatoceros triqueter* (Linnaeus, 1758)
Annelida	Polychaeta	Spionida	Magelonidae	*Magelona filiformis* Wilson, 1959
Annelida	Polychaeta	Spionida	Magelonidae	*Magelona johnstoni* Fiege, Licher & Mackie, 2000
Annelida	Polychaeta	Spionida	Poecilochaetidae	*Poecilochaetus serpens* Allen, 1904
Annelida	Polychaeta	Spionida	Spionidae	Aonides *oxycephala* (M. Sars, 1862)
Annelida	Polychaeta	Spionida	Spionidae	*Aonides paucibranchiata* Southern, 1914
Annelida	Polychaeta	Spionida	Spionidae	*Malacoceros fuliginosus* (Claparède, 1868)
Annelida	Polychaeta	Spionida	Spionidae	*Malacoceros vulgaris* (Johnston, 1827)
Annelida	Polychaeta	Spionida	Spionidae	*Polydora* (Polydora) *ciliata* (Johnston, 1838)
Annelida	Polychaeta	Spionida	Spionidae	*Polydora* (Polydora) *cornuta* Bosc, 1802
Annelida	Polychaeta	Spionida	Spionidae	*Pseudopolydora paucibranchiata* (Okuda, 1937)
Annelida	Polychaeta	Spionida	Spionidae	*Pseudopolydora pulchra* (Carazzi, 1895)
Annelida	Polychaeta	Spionida	Spionidae	*Pygospio elegans* Claparède, 1863
Annelida	Polychaeta	Spionida	Spionidae	*Scolelepis* (Scolelepis) *bonnieri* (Mesnil, 1896)
Annelida	Polychaeta	Spionida	Spionidae	*Scolelepis* (Scolelepis) *foliosa* (Audouin & Millne Edwards, 1833)
Annelida	Polychaeta	Spionida	Spionidae	*Scolelepis* (Scolelepis) *squamata* (O.F. Müller, 1789)
Annelida	Polychaeta	Spionida	Spionidae	*Spio filicornis* (O.F. Müller, 1766)
Annelida	Polychaeta	Spionida	Spionidae	*Spio goniocephala* Thulin, 1957
Annelida	Polychaeta	Spionida	Spionidae	*Spio martinensis* Mesnil, 1896
Annelida	Polychaeta	Spionida	Spionidae	*Spiophanes bombyx* (Claparède, 1870)
Annelida	Polychaeta	Spionida	Spionidae	*Spiophanes kröyeri* Grube, 1860
Annelida	Polychaeta	Spionida	Spionidae	*Streblospio benedicti* Webster, 1879
Annelida	Polychaeta	Terebellida	Acrocirridae	*Macrochaeta helgolandica* Friedrich, 1937
Annelida	Polychaeta	Terebellida	Ampharetidae	*Ampharete acutifrons* (Grube, 1860)
Annelida	Polychaeta	Terebellida	Ampharetidae	*Ampharete baltica* Eliason, 1955
Annelida	Polychaeta	Terebellida	Cirratulidae	*Aphelochaeta filiformis* (Keferstein, 1862)
Annelida	Polychaeta	Terebellida	Cirratulidae	*Aphelochaeta marioni* (de Saint Joseph, 1894)
Annelida	Polychaeta	Terebellida	Cirratulidae	*Caulleriella killariensis* (Southern, 1914)
Annelida	Polychaeta	Terebellida	Cirratulidae	*Caulleriella serrata* Eliason, 1962
Annelida	Polychaeta	Terebellida	Cirratulidae	*Chaetozone setosa* Malmgren, 1867
Annelida	Polychaeta	Terebellida	Pectinariidae	*Pectinaria* (Lagis) *koreni* (Malmgren, 1866)
Annelida	Polychaeta	Terebellida	Pectinariidae	*Pectinaria* (Pectinaria) *belgica* (Pallas, 1766)
Annelida	Polychaeta	Terebellida	Sabellariidae	*Sabellaria spinulosa* Leuckhart, 1849
Annelida	Polychaeta	Terebellida	Terebellidae	*Lanice conchilega* (Pallas, 1766)
Annelida	Polychaeta	Terebellida	Terebellidae	*Polycirrus medusa* Grube, 1850
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	*Ampelisca brevicornis* (Costa, 1853)
Arthropoda	Malacostraca	Amphipoda	Ampeliscidae	*Ampelisca tenuicornis* Lilljeborg, 1855
Arthropoda	Malacostraca	Amphipoda	Amphilochidae	*Amphilochus neapolitanus* Della Valle, 1893
Arthropoda	Malacostraca	Amphipoda	Aoridae	*Aora typica* Kröyer, 1845
Arthropoda	Malacostraca	Amphipoda	Aoridae	*Unciola planipes* Norman, 1867
Arthropoda	Malacostraca	Amphipoda	Caprellidae	*Pariambus typicus* (Kröyer)
Arthropoda	Malacostraca	Amphipoda	Caprellidae	*Phtisica marina* Slabber, 1769
Arthropoda	Malacostraca	Amphipoda	Corophiidae	*Corophium acherusicum* Costa, 1851

Arthropoda	Malacostraca	Amphipoda	Corophiidae	*Corophium arenarium* Crawford, 1937
Arthropoda	Malacostraca	Amphipoda	Corophiidae	*Corophium volutator* (Pallas, 1766)
Arthropoda	Malacostraca	Amphipoda	Corophiidae	*Monocorophium sextonae* (Crawford, 1937)
Arthropoda	Malacostraca	Amphipoda	Dexaminidae	*Atylus falcatus* Metzger, 1871
Arthropoda	Malacostraca	Amphipoda	Dexaminidae	*Atylus swammerdami* (Milne Edwards, 1830)
Arthropoda	Malacostraca	Amphipoda	Dexaminidae	*Atylus vedlomensis* (Bate & Westwood, 1862)
Arthropoda	Malacostraca	Amphipoda	Eusiridae	*Calliopius laeviusculus* (Kröyer, 1838)
Arthropoda	Malacostraca	Amphipoda	Iphimediidae	*Iphimedia minuta* G.O. Sars, 1882
Arthropoda	Malacostraca	Amphipoda	Isaeidae	*Microprotopus maculatus* Norman, 1867
Arthropoda	Malacostraca	Amphipoda	Ischyroceridae	*Ericthonius brasiliensis* Dana, 1852
Arthropoda	Malacostraca	Amphipoda	Ischyroceridae	*Jassa falcata* (Montagu, 1808)
Arthropoda	Malacostraca	Amphipoda	Ischyroceridae	*Jassa marmorata* Holmes, 1903
Arthropoda	Malacostraca	Amphipoda	Ischyroceridae	*Jassa pusilla* (Sars, 1894)
Arthropoda	Malacostraca	Amphipoda	Leucothoidae	Leucothoe *incisa* Robertson, 1892
Arthropoda	Malacostraca	Amphipoda	Leucothoidae	*Leucothoe lilljeborgi* Boeck, 1861
Arthropoda	Malacostraca	Amphipoda	Lysianassidae	*Hippomedon denticulatus* (Bate, 1857)
Arthropoda	Malacostraca	Amphipoda	Lysianassidae	*Orchomene nanus* (Kröyer, 1846)
Arthropoda	Malacostraca	Amphipoda	Megaluropidae	*Megaluropus agilis* Hoeck, 1889
Arthropoda	Malacostraca	Amphipoda	Melitidae	*Abludomelita obtusata* (Montagu, 1813)
Arthropoda	Malacostraca	Amphipoda	Melitidae	*Cheirocratus sundevallii* (Rathke, 1843)
Arthropoda	Malacostraca	Amphipoda	Melitidae	*Maerella tenuimana* (Bate, 1862)
Arthropoda	Malacostraca	Amphipoda	Melitidae	*Melita dentata* (Kröyer, 1842)
Arthropoda	Malacostraca	Amphipoda	Melitidae	*Melita palmata* (Montagu, 1804)
Arthropoda	Malacostraca	Amphipoda	Oedicerotidae	*Monoculodes carinatus* (Bate, 1856)
Arthropoda	Malacostraca	Amphipoda	Oedicerotidae	*Perioculodes longimanus* Bate & Westwood, 1868
Arthropoda	Malacostraca	Amphipoda	Oedicerotidae	*Pontocrates altamarinus* Bate, 1858
Arthropoda	Malacostraca	Amphipoda	Oedicerotidae	*Pontocrates arenarius* (Bate, 1858)
Arthropoda	Malacostraca	Amphipoda	Oedicerotidae	*Synchelidium haplocheles* (Grube, 1864)
Arthropoda	Malacostraca	Amphipoda	Oedicerotidae	*Synchelidium maculatum* Stebbing, 1906
Arthropoda	Malacostraca	Amphipoda	Phoxocephalidae	*Phoxocephalus holbolli* (Kröyer, 1842)
Arthropoda	Malacostraca	Amphipoda	Pontoporeiidae	*Bathyporeia elegans* Watkin, 1938
Arthropoda	Malacostraca	Amphipoda	Pontoporeiidae	*Bathyporeia gracilis* Sars, 1891
Arthropoda	Malacostraca	Amphipoda	Pontoporeiidae	*Bathyporeia guilliamsoniana* (Bate, 1856)
Arthropoda	Malacostraca	Amphipoda	Pontoporeiidae	*Bathyporeia pelagica* (Bate, 1856)
Arthropoda	Malacostraca	Amphipoda	Pontoporeiidae	*Bathyporeia pilosa* Lindström, 1855
Arthropoda	Malacostraca	Amphipoda	Pontoporeiidae	*Bathyporeia sarsi* Watkin, 1938
Arthropoda	Malacostraca	Amphipoda	Stenothoidae	*Stenothoe marina* (Bate, 1856)
Arthropoda	Malacostraca	Amphipoda	Stenothoidae	*Stenula rubrovittata* (Sars, 1882)
Arthropoda	Malacostraca	Amphipoda	Urothoidae	*Urothoe brevicornis* Bate, 1862
Arthropoda	Malacostraca	Amphipoda	Urothoidae	*Urothoe elegans* (Bate, 1856)
Arthropoda	Malacostraca	Amphipoda	Urothoidae	*Urothoe marina* (Bate, 1857)
Arthropoda	Malacostraca	Amphipoda	Urothoidae	*Urothoe poseidonis* Reibisch, 1905
Arthropoda	Malacostraca	Amphipoda	Urothoidae	*Urothoe pulchella* (Costa, 1853)
Arthropoda	Malacostraca	Cumacea	Bodotriidae	*Bodotria arenosa* Goodsir, 1843
Arthropoda	Malacostraca	Cumacea	Bodotriidae	*Bodotria pulchella* (Sars)
Arthropoda	Malacostraca	Cumacea	Bodotriidae	*Bodotria scorpioides* (Montagu)
Arthropoda	Malacostraca	Cumacea	Bodotriidae	*Cumopsis goodsiri* (Van Beneden)
Arthropoda	Malacostraca	Cumacea	Bodotriidae	*Iphinoe trispinosa* (Goodsir, 1843)
Arthropoda	Malacostraca	Cumacea	Diastylidae	*Diastylis bradyi* Norman, 1879
Arthropoda	Malacostraca	Cumacea	Diastylidae	*Diastylis laevis* Norman, 1869
Arthropoda	Malacostraca	Cumacea	Diastylidae	*Diastylis lucifera* (Kröyer)
Arthropoda	Malacostraca	Cumacea	Diastylidae	*Diastylis rathkei* (Kröyer, 1841)
Arthropoda	Malacostraca	Cumacea	Diastylidae	*Diastylis rugosa* G.O. Sars
Arthropoda	Malacostraca	Cumacea	Pseudocumidae	*Pseudocuma gilsoni* Bacescu
Arthropoda	Malacostraca	Cumacea	Pseudocumidae	*Pseudocuma similis* G.O. Sars
Arthropoda	Malacostraca	Decapoda	Atelecyclidae	*Atelecyclus rotundatus* (Olivi, 1792)
Arthropoda	Malacostraca	Decapoda	Atelecyclidae	*Thia scutellata* (Fabricius, 1793)
Arthropoda	Malacostraca	Decapoda	Callianassidae	*Callianassa subterranea* (Montagu, 1808)
Arthropoda	Malacostraca	Decapoda	Callianassidae	*Callianassa tyrrhena* (Petagna, 1792)
Arthropoda	Malacostraca	Decapoda	Corystidae	*Corystes cassivelaunus* (Pennant, 1777)
Arthropoda	Malacostraca	Decapoda	Crangonidae	*Crangon crangon* (Linnaeus, 1758)
Arthropoda	Malacostraca	Decapoda	Galatheidae	*Galathea intermedia* Lilljeborg
Arthropoda	Malacostraca	Decapoda	Leucosiidae	*Ebalia* sp.
Arthropoda	Malacostraca	Decapoda	Majidae	*Achaeus cranchii* Leach, 1817

Arthropoda	Malacostraca	Decapoda	Majidae	*Macropodia rostrata* (Linnaeus, 1761)
Arthropoda	Malacostraca	Decapoda	Paguridae	*Diogenes pugilator* (Roux)
Arthropoda	Malacostraca	Decapoda	Paguridae	*Pagurus bernhardus* (Linnaeus, 1758)
Arthropoda	Malacostraca	Decapoda	Pinnotheridae	*Pinnotheres pisum* (Linnaeus, 1758)
Arthropoda	Malacostraca	Decapoda	Porcellanidae	*Pisidia longicornis* (Linnaeus, 1767)
Arthropoda	Malacostraca	Decapoda	Portunidae	*Carcinus maenas* (Linnaeus, 1758)
Arthropoda	Malacostraca	Decapoda	Portunidae	*Polybius* (Polybius) *depurator* (Linnaeus, 1758)
Arthropoda	Malacostraca	Decapoda	Portunidae	*Polybius* (Polybius) *holsatus* (Fabricius, 1798)
Arthropoda	Malacostraca	Decapoda	Portunidae	*Polybius arcuatus* (Leach, 1814)
Arthropoda	Malacostraca	Decapoda	Portunidae	*Polybius pusillus* (Leach, 1815)
Arthropoda	Malacostraca	Decapoda	Portunidae	*Portumnus latipes* (Pennant, 1777)
Arthropoda	Malacostraca	Decapoda	Upogebiidae	*Upogebia deltaura* (Leach)
Arthropoda	Malacostraca	Decapoda	Upogebiidae	*Upogebia pusilla* (Petagna, 1792)
Arthropoda	Malacostraca	Decapoda	Xanthidae	*Pilumnus hirtellus* (Linnaeus, 1761)
Arthropoda	Malacostraca	Isopoda	Bopyridae	*Ione thoracica* (Montagu, 1808)
Arthropoda	Malacostraca	Isopoda	Cirolanidae	*Eurydice pulchra* Leach, 1815
Arthropoda	Malacostraca	Isopoda	Cirolanidae	*Eurydice spinigera* Hansen, 1890
Arthropoda	Malacostraca	Isopoda	Idoteidae	*Idotea linearis* (Linnaeus, 1763)
Arthropoda	Malacostraca	Isopoda	Idoteidae	*Idotea metallica* Bosc, 1802
Arthropoda	Malacostraca	Mysidacea	Mysidae	*Gastrosaccus sanctus* (Van Beneden, 1861)
Arthropoda	Malacostraca	Mysidacea	Mysidae	*Gastrosaccus spinifer* (Goës, 1864)
Arthropoda	Malacostraca	Nebaliacea	Nebaliidae	*Nebalia bipes* (O. Fabricius, 1780)
Arthropoda	Malacostraca	Tanaidacea	Anarthruridae	*Pseudoparatanais batei* (Sars)
Arthropoda	Malacostraca	Tanaidacea	Nototanaidae	*Tanaissus lilljeborgi* (Stebbing)
Arthropoda	Maxillopoda	Thoracica	Balanidae	*Elminius modestus* Darwin, 1854
Arthropoda	Maxillopoda	Thoracica	Balanidae	*Semibalanus balanoides* (Linnaeus, 1758)
Arthropoda	Pycnogonida	Pantopoda	Nymphonidae	*Nymphon brevirostre* Hodge, 1863
Arthropoda	Pycnogonida	Pantopoda	Phoxichilidiidae	*Anoplodactylus petiolatus* (Kröyer, 1884)
Arthropoda	Pycnogonida	Pantopoda	Pycnogonidae	*Pycnogonum littorale* (Ström, 1762)
Chordata	Leptocardii	Leptocardii	Branchiostomidae	*Branchiostoma lanceolatum* (Pallas)
Cnidaria	Hexacorallia	Actiniaria	Edwardsiidae	*Edwardsia timida* de Quatrefages, 1842
Echinodermata	Echinoidea	Clypeasteroida	Fibulariidae	*Echinocyamus pusillus* (O.F. Müller, 1776)
Echinodermata	Echinoidea	Echinoida	Echinidae	*Psammechinus miliaris* (Gmelin, 1778)
Echinodermata	Echinoidea	Spatangoida	Spatangidae	*Echinocardium cordatum* (Pennant, 1777)
Echinodermata	Stelleroidea	Forcipulatida	Asteriidae	*Asterias rubens* Linnaeus, 1758
Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	*Acrocnida brachiata* (Montagu,1804)
Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	*Amphipholis squamata* (Delle Chiaje, 1829)
Echinodermata	Stelleroidea	Ophiurida	Amphiuridae	*Amphiura filiformis* (O.F. Müller, 1776)
Echinodermata	Stelleroidea	Ophiurida	Ophiotrichidae	*Ophiothrix fragilis* (Abildgaard, 1789)
Echinodermata	Stelleroidea	Ophiurida	Ophiuridae	*Ophiura albida* Forbes, 1839
Echinodermata	Stelleroidea	Ophiurida	Ophiuridae	*Ophiura ophiura* (Linnaeus, 1758)
Mollusca	Bivalvia	Arcoida	Noetiidae	*Striarca lactea* (Linnaeus, 1758)
Mollusca	Bivalvia	Myoida	Myidae	*Mya truncata* Linnaeus, 1758
Mollusca	Bivalvia	Myoida	Myidae	*Sphenia binghami* Turton, 1822
Mollusca	Bivalvia	Myoida	Pholadidae	*Barnea candida* (Linnaeus, 1758)
Mollusca	Bivalvia	Mytiloida	Mytilidae	*Modiolula phaseolina* (Philippi, 1844)
Mollusca	Bivalvia	Mytiloida	Mytilidae	*Modiolus modiolus* (Linnaeus, 1758)
Mollusca	Bivalvia	Mytiloida	Mytilidae	*Mytilus edulis* Linnaeus, 1758
Mollusca	Bivalvia	Ostreoida	Pectinidae	*Aequipecten opercularis* (Linnaeus, 1758)
Mollusca	Bivalvia	Ostreoida	Pectinidae	*Chlamys varia* (Linnaeus, 1758)
Mollusca	Bivalvia	Pholadomyoida	Thraciidae	*Thracia papyracea* (Poli, 1795)
Mollusca	Bivalvia	Veneroida	Astartidae	*Astarte elliptica* (T. Brown, 1827)
Mollusca	Bivalvia	Veneroida	Astartidae	*Goodallia triangularis* (Montagu, 1803)
Mollusca	Bivalvia	Veneroida	Cardiidae	*Cerastoderma edule* (Linnaeus, 1758)
Mollusca	Bivalvia	Veneroida	Cardiidae	*Laevicardium crassum* (Gmelin,1791)
Mollusca	Bivalvia	Veneroida	Cultellidae	*Ensis arcuatus* (Jeffreys, 1865)
Mollusca	Bivalvia	Veneroida	Cultellidae	*Ensis directus* (Conrad, 1843)
Mollusca	Bivalvia	Veneroida	Donacidae	*Donax vittatus* (Da Costa, 1778)
Mollusca	Bivalvia	Veneroida	Mactridae	*Mactra corallina* (Linnaeus, 1758)
Mollusca	Bivalvia	Veneroida	Mactridae	*Spisula* (Spisula) *elliptica* (Brown, 1827)
Mollusca	Bivalvia	Veneroida	Mactridae	*Spisula* (Spisula) *solida* (Linnaeus, 1758)
Mollusca	Bivalvia	Veneroida	Mactridae	*Spisula* (Spisula) *subtruncata* (da Costa, 1778)
Mollusca	Bivalvia	Veneroida	Montacutidae	*Montacuta ferruginosa* (Montagu, 1808)
Mollusca	Bivalvia	Veneroida	Montacutidae	*Mysella bidentata* (Montagu, 1803)

Mollusca	Bivalvia	Veneroida	Petricolidae	*Petricola pholadiformis* Lamarck, 1818
Mollusca	Bivalvia	Veneroida	Semelidae	*Abra alba* (W. Wood, 1802)
Mollusca	Bivalvia	Veneroida	Semelidae	*Abra prismatica* (Montagu, 1808)
Mollusca	Bivalvia	Veneroida	Solenidae	*Phaxas pellucidus* (Pennant, 1777)
Mollusca	Bivalvia	Veneroida	Tellinidae	*Macoma balthica* (Linnaeus, 1758)
Mollusca	Bivalvia	Veneroida	Tellinidae	*Tellina* (Angulus) *tenuis* (Da Costa, 1778)
Mollusca	Bivalvia	Veneroida	Tellinidae	*Tellina* (Fabulina) *fabula* (Gmelin, 1791)
Mollusca	Bivalvia	Veneroida	Tellinidae	*Tellina* (Moerella) *pygmaeus* Lovén, 1846
Mollusca	Bivalvia	Veneroida	Veneridae	*Dosinia exoleta* (Linnaeus, 1758)
Mollusca	Bivalvia	Veneroida	Veneridae	*Venerupis senegalensis* (Gmelin, 1791)
Mollusca	Gastropoda	Mesogastropoda	Caecidae	*Caecum glabrum* (Montagu, 1803)
Mollusca	Gastropoda	Mesogastropoda	Crepidulidae	*Crepidula fornicata* (Linnaeus, 1758)
Mollusca	Gastropoda	Mesogastropoda	Epitoniidae	*Epitonium clathrus* (Linnaeus, 1758)
Mollusca	Gastropoda	Mesogastropoda	Naticidae	*Polinices* (Euspira) *pulchellus* (Risso, 1826)
Mollusca	Gastropoda	Neogastropoda	Nassariidae	*Nassarius* (Hinia) *reticulatus* (Linnaeus, 1758)
Mollusca	Gastropoda	Nudibranchia	Coryphellidae	*Coryphella verrucosa* (M. Sars, 1829)
Mollusca	Polyplacophora	Neoloricata	Chitonidae	*Chiton* sp.
Nemertina	Anopla	Heteronemertea	Cerebratulidae	*Cerebratulus* sp.

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