De Blauwe 2009, english update, part I, ctenostomatida (version 15 march 2022)

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Bryozoa from the Southern North Sea coast of

Belgium, the Netherlands and Germany

Part I
Ctenostomatida

Version January 2022

Hans DE BLAUWE

CONTENT

SUMMARY

Before you lies an updated English version of De Blauwe (2009). It is an idendification key for marine and brackish water moss animals (bryozoans) of the Southern Bight of the North Sea. About 200 species are discussed, all of which were found on beaches, in ports and in marine habitats between Cap Griz Nez (Northern France) and the Dutch-German border and in this version expanded to the German-Danish border.

The sandy substrate that is predominant in this area is usually poor in moss animal species. The fact that such a large number of species are described in this work is the result of an in-depth study of more than 20 years of observation (tidal mark material, specimens collected on the hard substrate of breakwaters, port structures, windmill piles, gas platforms, shells and stones) and of the review of the historical collections in Brussels (RBINS).

After the publication of De Blauwe (2009), a lot of data are added. Many beach combers reported their observations and have sent me material and photo's for confirmation or identification. Some resulted in new publications. Al reliable information is here included. The past 10 years, bryozoans are better studied in marine monitoring programs. This led to more species and more distributional data.

Thanks to different identification keys and a 20-30x magnifying glass it is possible to recognize most of the moss animals in the study area.

ACKNOWLEDGMENT

For more than 20 years I have been able to enjoy the understanding of my family for my long stay at the binocular and the computer and the encouragement of many members of the Strandwerkgroep, Strandwerkgemeenschap, Flanders Marine Institute, Royal Belgian Institute of Natural Sciences and International Bryozoology Association. Thanks to all who shared information, material and photo's and for giving permission to use it to contribute to a better understanding of this undervalued group of animals. Thanks to mr. A. Naber, Waterdienst van Rijkswaterstaat, for giving permission for the use of the data related to *Triticella flava*.

CLASSIFICATION OF CTENOSTOMATIDA

Family Alcyonidiidae
- *Alcyonidioides mytili* (Dalyell, 1848)
- *Alcyonidium albidum* Alder, 1857
- *Alcyonidium condylocinereum* Porter, 2004
- *Alcyonidium diaphanum* (Hudson, 1778)
- *Alcyonidium gelatinosum* (Linnaeus, 1761)
- *Alcyonidium hirsutum* (Fleming, 1828)
- *Alcyonidium hydrocoalitum* Porter 2004
- *Alcyonidium mamillatum* Alder, 1857
- *Alcyonidium parasiticum* (Fleming, 1828)
- *Alcyonidium polyoum* Hassall, 1841

Family Flustrellidridae
- *Flustrellidra hispida* (O. Fabricius, 1780)

Family Arachnidiidae
- *Arachnidium fibrosum* Hincks, 1880
- *Arachnidium lacourti* d'Hondt & Faasse, 2006

Family Panolicellidae
- *Panolicella nutans* Jebram, 1985

Family Nolellidae
- *Anguinella palmata* van Beneden, 1845

Family Victorellidae
- *Victorella pavida* Saville Kent, 1870

Family Walkeriidae
- *Walkeria uva* (Linnaeus, 1758)

Family Mimosellidae
- *Mimosella gracilis* Hincks

Family Triticellidae
- *Triticella flava* Dalyell, 1848
- *Farrella repens* (Farre, 1837)

Family Hypophorellidae
- *Hypophorella expansa* Ehlers, 1876

Family Penetrantiidae
- *Penetrantia concharum* Silén, 1946

Family Immergentiidae
Immergentia suecica Silén, 1947

Family Spathiporidae
Spathipora sp.

Family Vesiculariidae
Vesicularia spinosa (Linnaeus, 1767)
Amathia lendigera (Linnaeus, 1758)
Amathia citrina (Hincks, 1877)
Amathia cf. *gracilis* 1 Leidy, 1855
Amathia cf. *gracilis* 2 Leidy, 1855
Amathia imbricata (Adams, 1798)

Family Buskiidae
Buskia nitens Alder, 1856

SOURCES

Taxonomy

For the classification of the species, the taxonomic criteria have been followed almost completely from https://www.marinespecies.org/ and http://bryozoa.net/.

Resources

This update is based on De Blauwe (2009). All subsequent articles about the species in this book and about bryozoans identified in the area concerned, known to the author, have been incorporated. Practically all marine and brackish water species living in the southern bight of the North Sea, between the Pas de Calais and the German/Danish border, are included. The same applies to the species that washed up on the Belgian and Dutch beaches.

The following sources were used to determine the occurrence of the species:

- The author carried out a revision of the RBINS collection, of which the 'Gilson Collection', collected between 1899 and 1914, occupies the vast majority. The Belgian species list could be updated on the basis of this revision.
- Furthermore, almost all published and unpublished observations of the author from the area are included here. Beached material without citing the source, concerns observations made by the author himself from 1999 to the present.
- Interpretation of literature data provided a wealth of information from which a fairly complete picture was distilled of the historical situation. An evolution is noticeable in a number of species. Observations from the biological journals 'De Strandvlo' and 'Het Zeepaard' or from members of the Strandwerkgroep (Belgium) and the Strandwerkgemeenschap (The Netherlands) were checked where possible and complete the picture. For The Netherlands, the publication of Faasse & De Blauwe (2004) and Faasse et al. (2013) was used. Ancient literature often does not state whether the colonies are alive or washed ashore.
- Reports of Alcyonidiidae were treated very critically and many have been omitted. Only those observations that seem reliable and relevant are mentioned from 19th century literature.
- Previous sources were used for De Blauwe (2009). Since 2009 many new observations have been made and much literature has been published on the

taxonomy and occurrence of the species here. These are implemented here as well as possible.

Illustrations

Photos and drawings made especially for De Blauwe (2009) have been retained. They were supplemented with new photographic material. The author's photos are marked with (HD). In addition, I am very grateful to a few people: René Vanoutryve † (RV) for taking color photos of a lot of material from my collection; Julien Cillis (JC) of the RBINS for the black-and-white photos with the electron microscope. Much photographed material was collected in Normandy and Brittany. This choice was made when more beautiful material was collected there or when indigenous material was not available.

Bryozoa under the microscope

The appearance of an individual (autozooid) or of a colony is extremely varied. The autozooid can be calcified or not, the colony encrusting or upright, firm or flexible, a few millimeters to 30 cm in size. The color varies from species to species and brightly colored embryos can give the colony a characteristic color during the reproductive period.

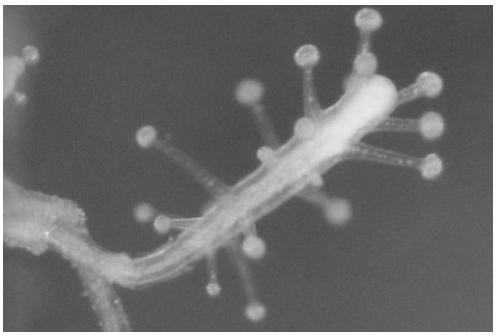
For beginners, the distinction between Hydrozoa and Bryozoa is not easy. The tentacles of hydroids capture and anesthetize the prey with nettle cells and bring them to the mouth opening. Moss animals have a ring of tentacles that carry cilia, not stinging cells. These cilia initiate a flow of water through which suspended particles flow to the mouth opening. The tentacles can move individually. When examining fresh substrates (mussels, pebbles, algae, etc.) in seawater, sometimes unexpected moss animls are discovered due to the characteristic tentacle crown that is bulged out.

1 a) Tentacles not retractable in an enclosure (fig. 1). ...……..... athecate hydroid
b) Tentacles in a whorl and retractable in an enclosure (arrow in fig. 2, 4). 2

2 a) Tentacles with nettle cells do not create a water flow (fig. 2). thecate hydroid
b) Tentacles with cilia create a flow of water (fig. 3, 4) ..... bryozoan

A colony consists of a group of individuals called autozooids that interact with each other. Each autozooid (Fig. 4) consists of a protective wall containing a polypid. Polypids can disappear and degenerate into "brown bodies". The protective wall or zoecium may persist after the death of the polypide, especially if it is calcified. The zoecium has an opening through which the polypid can partially come out for food intake. A polypide consists of a tentaculate lophophore, a U-shaped gut, muscular system, reproductive organs and a nervous system. In the center of the tentacle crown is the mouth, outside the tentacle crown is the anus.

The location on an individual is very important (fig. 5):
- basal: the surface of the zooid applied to the substratum;
- lateral: the sides;
- frontal: the top surface containing the opening;
- proximal: closest to the origin of the colony;
- distal: towards the growth end of the colony.



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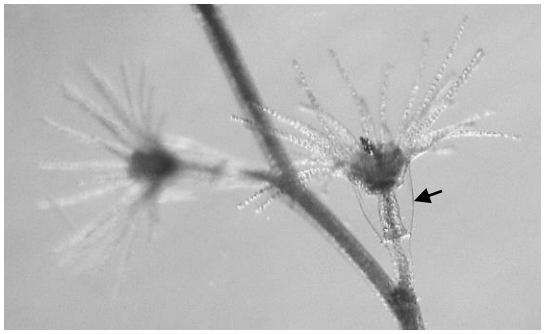

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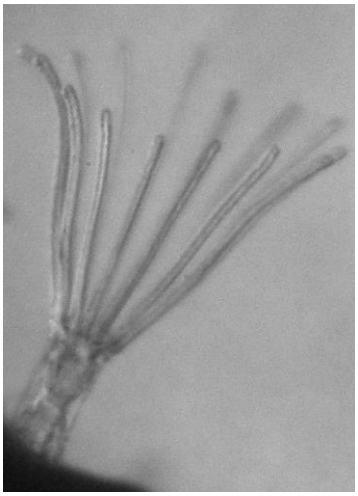

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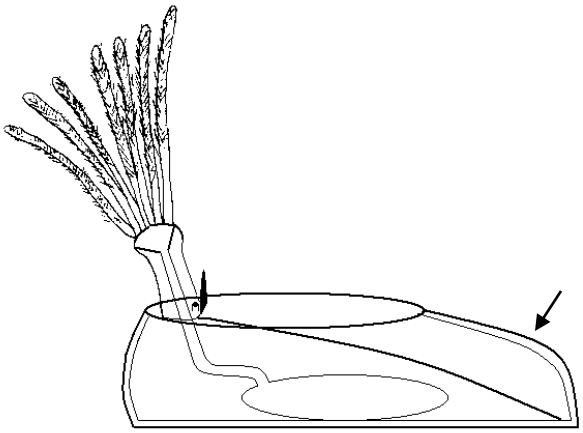

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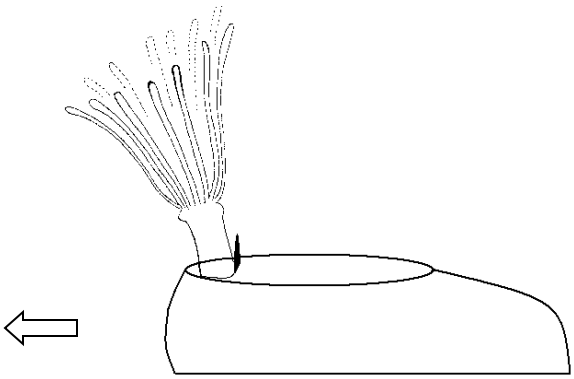


5 growth direction (distal) proximal

Depending on the function of the individual, a classification is made between autozooids and heterozooids. Autozooids have a nourishing function and therefore a tentacle crown. Heterozooids have no nourishing function and therefore no tentacle crown.

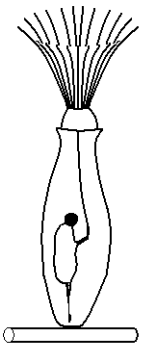
We distinguish three groups of moss animals in terms of structure: Ctenostomatida (fig. 1) have no calcified parts, Cyclostomatida (fig. 2) have a cylindrical calcification and Cheilostomatida (fig. 3) have a box-like calcification.

Ctenostomatida are not calcified and do not have an operculum. In Ctenostomatida the term "peristome" is used for a mouth cone, an elevation with the mouth opening at the end (fig. 4).

Cyclostomatida are also not closed by an operculum. Peristome here refers to the erect cylindrical part of the autozooid (fig. 5).

We can further divide the order of the Cheilostomatida into three large groups:
- species that have a large opening frontally (this group used to be called "Anasca"). This opening or opesia is covered by a membrane. The operculum is in the membrane. (fig. 7)
- the Family Cribrilinidae, characterized by a basket-shaped shield of fused flattened spines. (fig. 8)
- Species whose frontal surface is completely calcified, except for the opening closed by the operculum (formerly "Ascophora"). (fig. 9)

Heterozooids are individuals without a nutritional function. They do not have a protrusible tentacle crown and are unable to feed. In Ctenostomata heterozooids are kenozooids. They form root-like structures or spines. Root-like structures (rhizoids) are used for the attachment of the colony.



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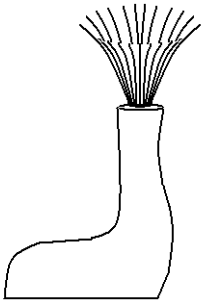

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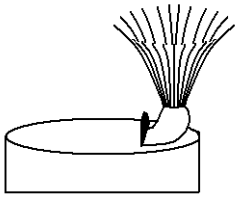

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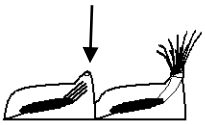

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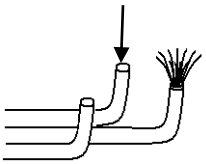

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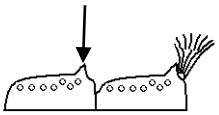

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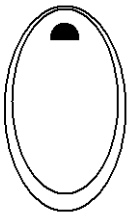

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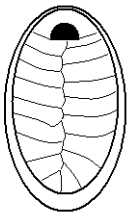

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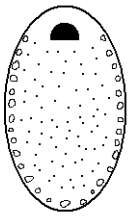

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REPRODUCTION, ESTABLISHMENT AND DISSEMINATION

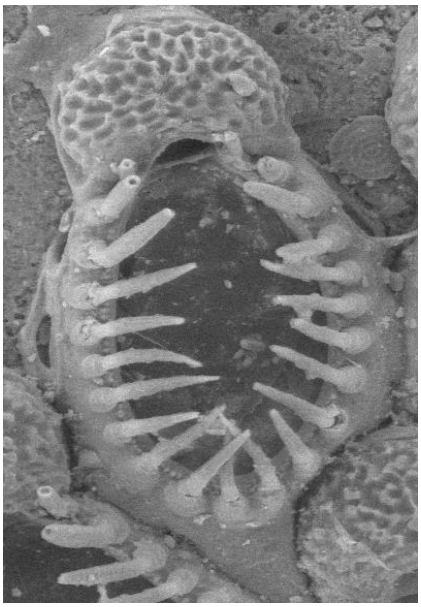
Moss animals are ambiguous. They make male and female sex cells, often at different times. Embryos are incubated in ovicells (photo 1) or in the zooecia itself (photo 2) or in Cyclostomatida in swollen gonozooids (photo 3).

Most cheilostome species have coronate larvae that are brooded until their release, do not feed, and live only a short time (hours or days) in the plankton before settling. Consequently, great distances cannot be bridged in this way.

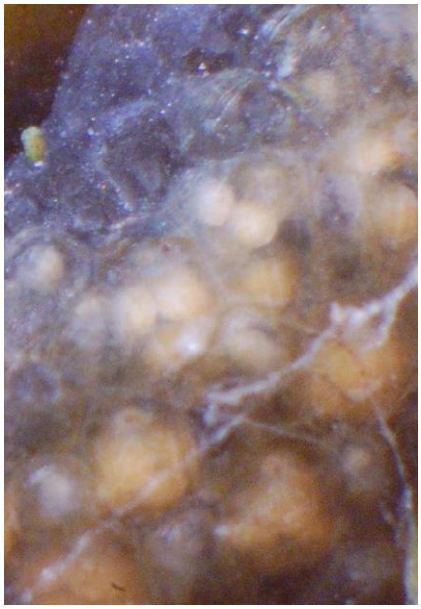
An exception to this are the Membraniporoidea and some species from the genus *Alcyonidium*. They secrete eggs into the sea that grow into larvae that can survive free-floating for a few weeks or months and feed while in the plankton. For example, they can cover great distances and therefore species such as *Electra pilosa* and *Conopeum reticulum* are the first to colonize new substrates such as recent shipwrecks.

An attached colony that moves with its substrate can of course cover great distances. Fertile colonies, for example, move on floating algae, plastic objects or ship hulls. The large amount of plastic in the sea is undoubtedly contributing to the spread of moss animals today. Recreational boating transfers species from one marina to another.

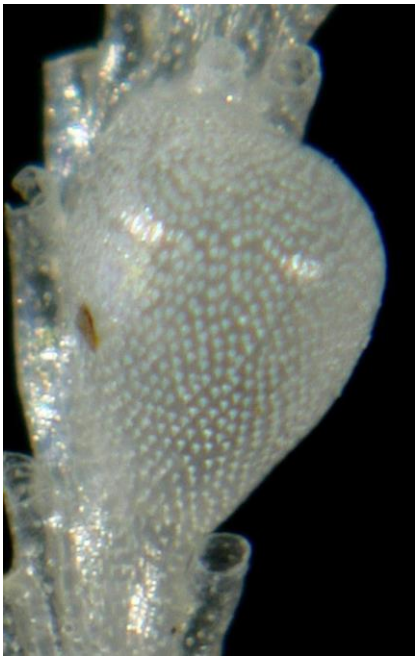
The larva settles on a suitable substrate and forms a first zooid or ancestrula (photo 4). This ancestrula is usually different in shape from the later zooids and can be used for identification. The ancestrula buds 1, 2 or 3 first daughterzooids, which in turn expand the colony by budding. Colonies of tens to hundreds of genetically identical autozooids are formed.



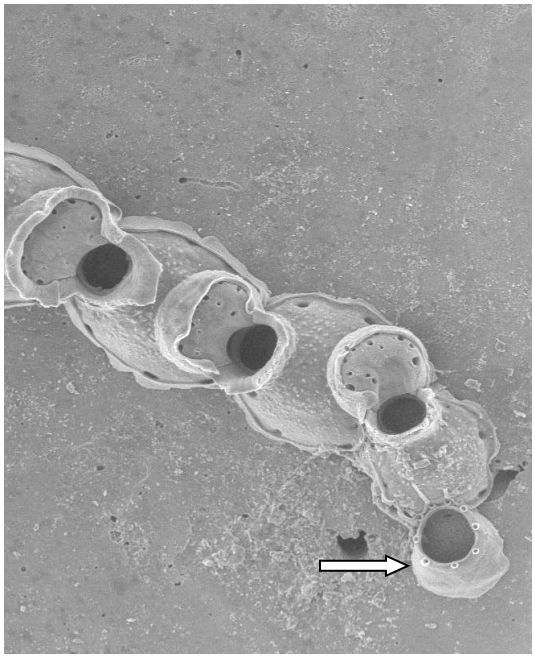
1 zooid with ovicell (JC)
Cheilostomatida



2 embryos in the zooecia, Ctenostomatida (HD)



3 gonozooid Cyclostomatida (HD)



4 ancestrula (arrow) (JC)

COLLECT, IDENDIFY AND STORE

COLLECTION

Scientific samples are often transported in 70% alcohol, formalin or special liquids for DNA research. A beachcomber with interest in moss animals can transport beached substrates dry. Uncalcified species should be transported in seawater or alcohol. Pruning shears are useful for cutting the most interesting pieces out of plastic, so you don't have to carry large amounts. Bush-shaped colonies are best removed from the substrate with a knife. Handle them gently to preserve important features, e.g. spines. The use of brushes to clean the colony is therefore not recommended for species with spines. Rinsing under running water is sometimes sufficient. In dry, calcified species, annoying grains of sand can be removed under magnification with a moist needle to which they adhere. Dirt can be removed from calcified colonies by soaking them in a bleach solution for a while (about half an hour, depending on the firmness of the colony). Rinse well afterwards. Bleach removes membranes and tissues but unfortunately also uncalified joint of some kenozooids, spines or even autozooids.

EXAMINATION AND IDENTIFICATION

A magnification of 30x is very helpfull. In some species photography with a scanning electron microscope is even necessary.
Uncalcified colonies are examined in sea water, as are all living colonies. In fresh, living colonies, one can easely observe the number of tentacles and color of the tentacles, eggs, embryo’s, tissue… .
Calcified colonies are viewed or dry, or completely submerged. Damp colonies that have just been removed from the water are difficult to identify due to the glittering effect of the remaining water.
Keep in mind that many features may have disappeared from washed up or deceased colonies. Spines are usually found in young zooids on the colony edge; in older colony parts, they are often broken. The frontal surface may be worn off from sanding. Species that have a membrane over the frontal surface, over the opesia or over a frontal surface may have lost that membrane.

Lighting is very important in the investigation. Lighting from above does not always provide good results. Side lighting casts shadows to enhance features, usefull to count the spines.

An impression can be made of the few species that drill into shells. Brush the shell with liquid polyester on the inside with a brush. Leave to dry, preferably on a vibrating surface such as the air pump of an aquarium. Then place the shell in hydrochloric acid (30% solution) in a Petri dish. When the shell has dissolved, you can carefully rinse off the remaining polyester fleece. The impression of the zooids and kenozooids can then be studied under binocular magnification. Store with care, the prints are very delicate.

CONSERVATION

Calcified species can be kept dry after rinsing with fresh water. With colonies on algae, it must be taken into account that the algae shrink when drying and the moss animals do not, so that they will break down. It is better to keep such colonies in 70% alcohol. Colonies without calcification are best stored in 4% neutralized formalin made with seawater. Important finds belong in a Natural History Museum. The amateur can keep the colonies, properly labeled, temporarily in rubbing alcohol from the supermarket or pharmacist and donate them later to a museum.

IDENTIFICATION KEYS

CLASSIFICATION AND KEY TO ORDERS

Class Stenolaemata: Body wall calcified and tubular.

Order Cyclostomatida: Opening circular, at the end of a small tube.

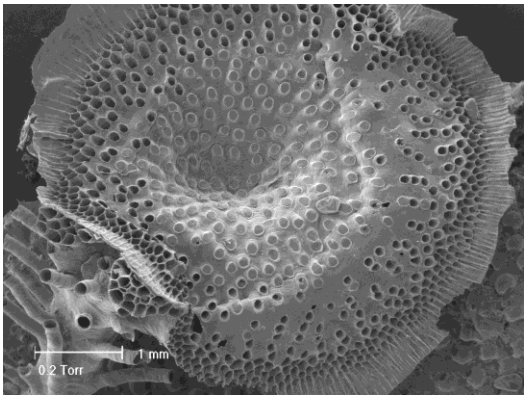
Class Gymnolaemata: Body wall calcified or not calcified. Zooids tubular, bottle-shaped or flattened.

Order Ctenostomatida: Body wall not calcified. Zooids cylindrical, bottle-shaped or flattened. Opening terminal, or frontal in encrusting species, not closed by an operculum.

Order Cheilostomatida: Body wall calcified, box-shaped. Frontal or subterminal opening, closed by a hinged flap (operculum).

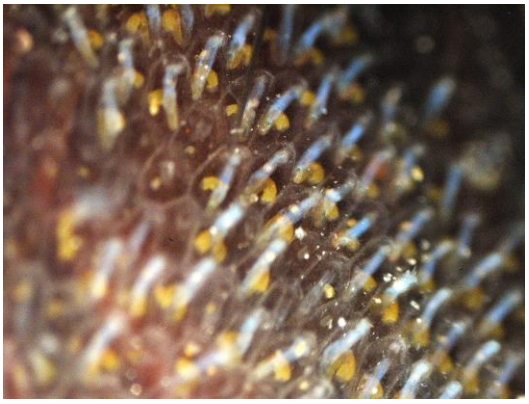
1 a) Body wall not calcified (photos 3 and 4). ..... Ctenostomatida (p 18)
b) Calcification is always present, at least in the side walls. 2

2 a) Opening at the end and round, wall completely calcified, tubular (photo 1, 2). …… Cyclostomatida
b) Frontal or subterminal opening, usually closed by an operculum, the autozooid is box-shaped, frontally calcified (photo 5) or membranous (photo 6). ..... Cheilostomatida

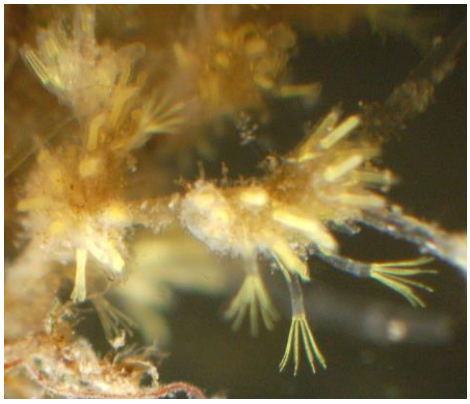


1: encrusting Cyclostomatida (JC)

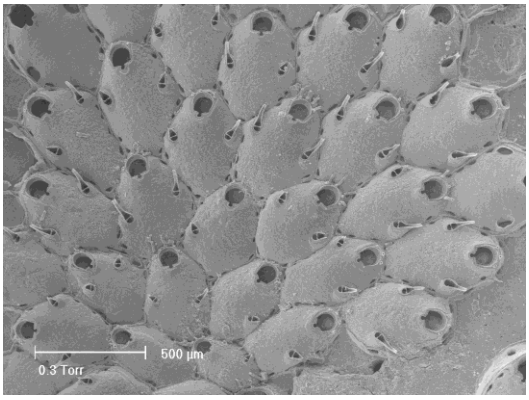
2: erect Cyclostomatida (RV)



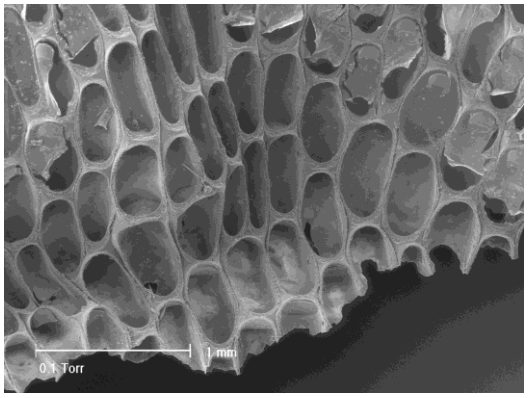
3: encrusting Ctenostomatida (HD)



4: erect Ctenostomatida (HD)



5: Cheilostomatida, frontally calcified (JC)



6: Cheilostomatida, opesia and frontal membrane

CTENOSTOMATIDA

Key to the genera of Ctenostomatida

1 a) Colony forming a flat crust (Fig. 1) on the substrate or erect fleshy lobes. Autozooids budding from other autozooids without any linking stolon. 2
b) Zooids slingly or in groups on a common stolon (fig. 2), or autozooids form branching, linear chains and may be erect cilindrical with a narrow stolonlike proximal adnate part (fig. 3). …….…….…….. 4

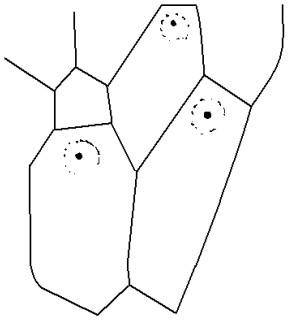
2 (1) a) Forming a thick, purplish-brown crust, orifices surrounded by pointed spine-like kenozooids. On intertidal algae, escpecially on *Fucus serratus*. (fig. 4). ….. ..... *Flustrellidra hispida* (p. 48)
b) Zooids without spine-like kenozooids. …… 3

3 (2) a) Peristomes with longitudinal stripes, colony an encrusting sheet or linear chains of zooids, frontal surface with spine-shaped appendages (fig. 5). ..... *Arachnidium fibrosum* (p. 50)
b) Colony forming flat or nodular sheets and/or erect fleshy lobes. On hard substrates, hydroid stems or algae. ……..... *Family Alcyonidiidae* (p. 24)

4 (1) a) Colony a gray-brown muddy, dense, erect tuft, 5-20 cm high. Zooids cylindrical, budding from each other, orifice terminal. The colony looks more like a hydroid, easily distinguished from it by its typical tentacle crown (fig. 6). .....… *Anguinella palmata* (p. 60)
b) Not as described. .....……... 5

5 (4) a) Zooids budding from a branching stolon (fig. 2). ……..... 8
b) Colony a chain of zooids, each with a slender proximal portion (fig. 3). ……. 6

6 (5) a) Zooids completely adnate, drop-shaped, linked to the proceeding zooid by a filiform proximal portion. Zooid chains often closely packed and thus appearing to form a loose sheet. (fig. 7) ……..…..... *Arachnidium* (p. 50)
b) Colony a chain of zooids, each with a slender proximal portion and an erect cilindrical portion (peristome) (fig. 8). …….....……..… 7



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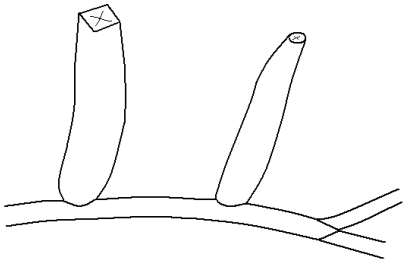

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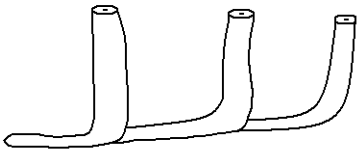

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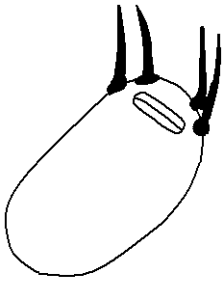

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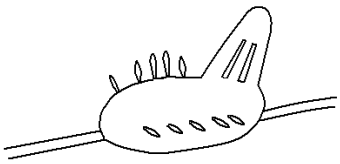

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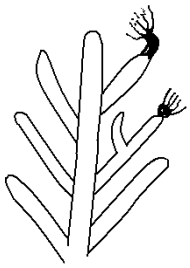

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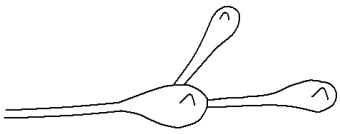

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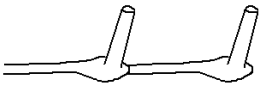


8

7 (6) a) In fresh or brackish water only, often on stems of reed.*Victorella pavida* (p. 62)
b) In marine conditions. .....…….…… *Panolicella nutans* (p. 58)

8 (5) a) Colony within the linings of the tubes of sedentary polychaetes (*Chaetopterus* and *Lanice*). Stolons and holes, made by previous zooids are common, zooids oval with a pair of spherical kenozooids (fig. 1). ..... *Hypophorella expansa* (p. 72)
b) Not as described. .....…….…….…….… 9

9 (8) a) Colony boring in shells, and limestone. Most frequently discovered in het inner side of bivalves as rounded, oval, comma-haped of s-shaped holes, about 0.1 mm diameter. Stolons between zooids seen by penetrating light within the shell. ……..... 16
b) Not in, but on the substrate. ….....…….…….. 10

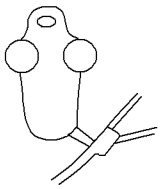
10 (9) a) A thin stolon creeping over the surface of hydroid, erect bryozoan, shells or algae, with at intervals very small (0.5 mm) slipper-shaped autozooids, adnate, only the distal portion is bent away from the substrate (fig. 2).
……..…..... *Buskia nitens* (p. 92)
b) Not as described. .....…..... ……. 11

11 (10)a) Autozooids stalked (fig 3). …….. Family Triticellidae (p 68)
b) Autozooids may be tapered proximally, but not stalked. …….....…….. 12

12 (11)a) All colony branches terminating in a short spine-like kenozooid. Oval autozooids on a socket-like protuberance of the stolon (fig. 4). Colony tufts 5 till 30 cm hight. ……... *Vesicularia spinosa* (p. 80)
b) Branches do not terminate in a short spine-like kenozooid. …….. 13

13 (12)a) Erect, stiff, brown tufts. Autozooids arranged in well-defined biserial, straight or spiraling clusters of definitive zooid numbers, where, typically, adjacent zooids are laterally joined (fig. 5). ..... *Amathia* (p. 82)
b) Autozooids group more loosely and are never laterally joined. 14

14 (13)a) Colony erect, fernlike devided with a main branch and regular side branches. Zooids in regular, paired series on the side branches. *Mimosella gracilis* (p. 66)
b) Colony not as described. ……..…… 15



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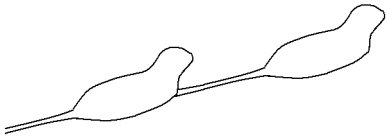

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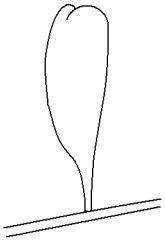

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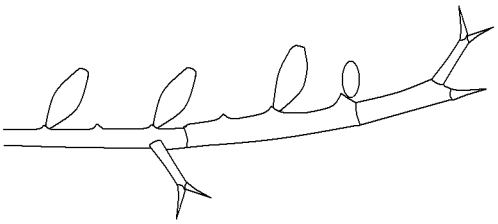

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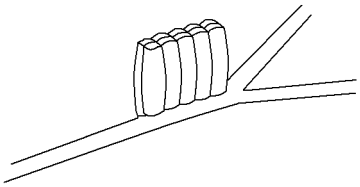
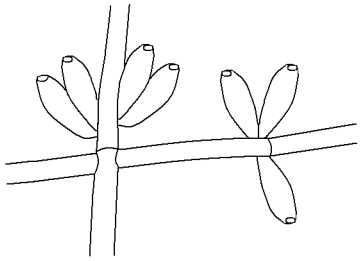


5

15 (14)a) Stolons adnate or erect, excist of cilindrical kenozooids, distinctly divided by septa (fig. 1) mostly near groups of zooids. Zooids short, with a quadrate orific. ..... *Walkeria uva* (p. 64)
b) Stolons without septa (fig. 2). ..... *Amathia* (before *Bowerbankia*) (p. 82)

16 (9) a) Orifice on the stolon, S-shaped (fig. 3). …… *Immergentia suecica* (p. 76)
b) Orifice beside the stolon. .....……..……..... 17

17 (16)a) Orifice kidney-shaped (fig. 4). .....……. *Penetrantia concharum* (p. 74)
b) Orifice oval or comma-shaped (fig. 5). …….....…… *Spathipora* sp.(p. 78)



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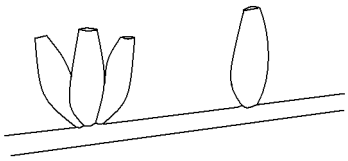

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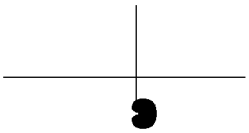

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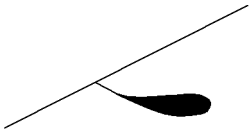


5

Systematic part

Family Alcyonidiidae

Genus Alcyonidioides d'Hondt, 2001
Genus Alcyonidium J.V.F.Lamouroux, 1813

The identity of these species has long remained a mystery. The lack of calcification and skeletal features makes it difficult to distinguish between species. Recent research has clarified the true identity of some species. The number of tentacles varies within one species according to habitat and competitive pressure. A combination of characteristics such as colony shape, color, number of tentacles, mode of reproduction and substrate preference make a reliable determination possible. Genetic research provides a definitive answer in cases of doubt. Most species breed embryos in the autozooids and give birth to larvae. Other species secrete eggs that develop into larvae in the water column. Only the egg-producing species (*broadcasters*) develop an intertentacular organ (photo p. 30). This organ plays a role in the uptake of sperm and the excretion of eggs and, if present, is a good identification feature.
Reproduction either oviparous, with numerous eggs discharged through a small, flask-shaped intertentacular organ situated between the two dorsal tentacles, or larviparous, with few to several large fertilized ova developing to larvae in internal brood-chambers formed following degeneration of the polypide.
Alcyonidioides produce so-called cyphonautes larvae with a bivalved shell. These larvae are supposed to be planktotrophic. By contrast, species in the genus *Alcyonidium* do not produce cyphonautes, but barrel-shaped larvae with lecithotrophic habits, developing on yolk.
Alcyonidium species with unknown larvae should formally be mentioned as Alcyonidiidae incertae sedis. However, for faunistic purposes this is unpractical and they are reported here as *Alcyonidium*.

Reproduction in the genus Alcyonidium also varies among species and does not seem to correlate with any specific colony morphology. Many species have a distinct intertentacular organ and are broadcasting species (Ryland & Porter 2006, Ostrovsky & Porter 2011), but others brood their embryos in brood chambers that usually consist of a modified tentacle sheath with the polypide degenerating (Ostrovsky, 2013).

1 a) Autozooids with small spherical or conical kenozooids on the surface. Encrusting, sometimes with short erect lobes. On interidal seaweeds. ……..... *Alcyonidium hirsutum*
b) Autozooids without small kenozooids on the surface. ……. 2

2 a) Colony erect, by itself, or as an encrustation around the stalk of a hydroid. …….....……..…… 3
b) Colony encrusting on seaweeds, stones, mussels or other substrate, no erect colony parts occur. ……..….....……... 6

3 a) Colony large (often 10-30 cm high), firm and rubbery, greyish or brownish, smooth or nodulous, branched or unbranched, growing erect from a crustaceous base. Mainly sublittoral, often washed ashore after storms. .....…. 4
b) Colony surrounds a hydroid stem, usually only a few centimeters high, transparent or mud-colored. .....……...…..…… 5

4 a) Colony shape very variable, honey-colored to brown. *Alcyonidium diaphanum*
b) Branches always cylindrical and grayish. ..... *Alcyonidium condylocinereum*

5 a) Forms a gray-brown, mud-colored crust around hydroids. When magnified, you only see the peristomes of the zooids on a surface that contains a lot of dirt particles ..... *Alcyonidium parasiticum*
b) Colony sometimes with attached dirt, but not with a continuous dense silt layer. Colony rather transparent. Usually grows on stems of *Tubularia indivisa* or *Vesicularia spinosa*. ..... *Alcyonidium hydrocoalitum*

6 a) Zooids opening on a high peristome so that the colony surface looks bristly. ..... *Alcyonidium mamillatum*
b) No tall cones, unless the polypid is partially bulged. 7

7 a) Colony forming irregular, lobed patches or open meshworks, often with lingle linear series of atuozooids budded from the periphery. Autozooids randomly orientated. Spaces within the colony filled by irregularly shaped kenozooids. Subtidal on hard substrates, algae or epizootic. ……. *Alcyonidium albidum*
b) Not as described. ……. 8

8 a) Zooids with thick white lateral walls. ..... *Alcyonidium gelatinosum*
b) Zooids without thick white lateral walls. …… 9

9 a) On hard substrate. ……..... 10
b) On seaweed. 11

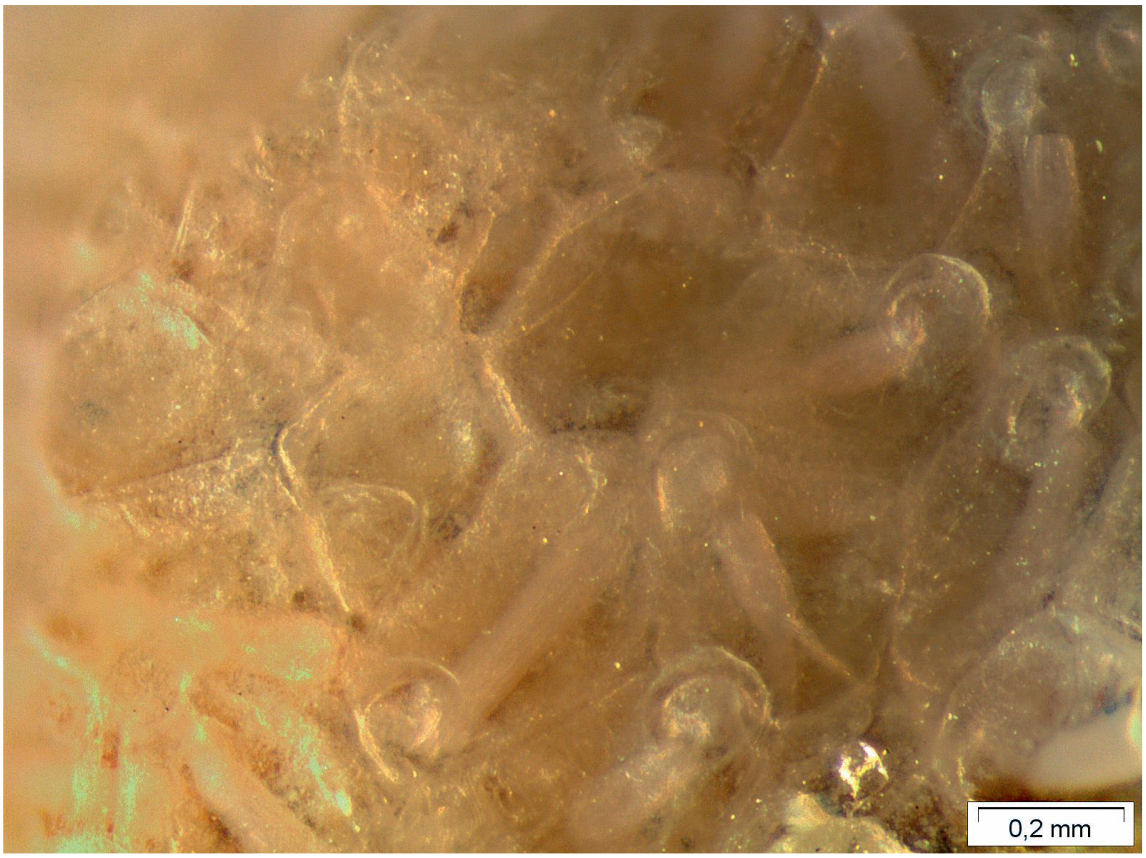
10 a) Crust relatively thick and easily peelable, often erect colony parts or knobby outgrowths on the colony crust, 16-18 tentacles. On stones, snail shells and crab shells. ..... *Alcyonidium condylocinereum*
b) Young crust thin, hardly peelable. Especially on mussels, also on stones and metal. Usually 13-16 tentacles. ..... *Alcyonidioides mytili*

11 a) Usually 19 tentacles, only on *Fucus serratus*, yellow or orange embryos in groups of 6 or 7. ..... *Alcyonidium polyoum*
b) 17-18 tentacles, white or pink embryos in groups of 3 or 4. …… ..... *Alcyonidium gelatinosum*
c) 13-16 tentacles, never incubates embryos, white eggs, an intertentacular organ is present in the breeding season. ..... *Alcyonidioides mytili*

***Alcyonidium albidum* Alder, 1857**

Description: Colony forming a thin, light brown sheet, irregularly lobate or loosely anastomosing, budding linear series of zooids on its periphery. Orientation of the zooids seems haphazard where colony lobes or linear series meet. Subsequently the gaps are filled with kenozooids that are as large as autozooids or larger or much smaller. Slightly raised peristome in the shape of a shallow disc surrounded a horseshoe-shaped distal fold. Frontal surface translucent, polypide and side walls clearly. Tentacle number 17-20. Broadcaster developing an ITO.

Occurrence:
The Netherlands: The single colony collected is attached to an empty shell of a netted dogwhelk *Nassarius reticulatus* (Linnaeus, 1758), which was occupied by a hermit crab, as may be judged from the presence of an attached hydrozoan *Hydractinia echinata* (Fleming, 1828). The shell was found in a box core sample, taken on 2 March 2010, 30 km offshore the coast of Walcheren (51°43’06”N, 003°06’43”E, depth 30 m) (Faasse *et al*., 2013).
Germany: mentioned from the German sublittoral North Sea (Zettler *et al*. 2018).



Alcyonidium albidum, off the Walcheren coast.
Photo David Tempelman (Faasse *et al*. 2013)

Alcyonidium condylocinereum **Porter 2004**
Only described in 2004 and formerly recognized and reported, together with *A. diaphanum* as *Alcyonidium gelatinosum*, that in fact is another species.

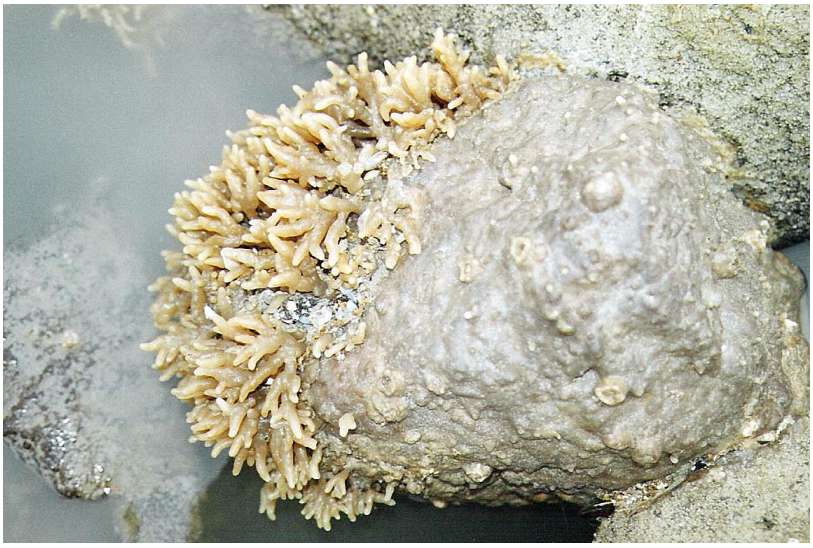
Description: Forms an extensive crust on stones, shells or crabs at first. Later, knobby outgrowths develop on the crust that develop into erect colony parts. These colony parts branch, both the main branch and the branches are cylindrical. The surface has bumps about 0.5 cm in diameter. The crust can be easily peeled off the substrate. The crust and upright parts are gray to gray-brown. There is often a shallow gap between the zooids, which in a silty environment becomes filled with silt. As a result, the colony can have a brownish color, which leads to confusion with *A. diaphanum*. The zooids have 18-19 tentacles, usually 18. Material from the infralittoral fringe at Koksijde, however, usually had 16-17 tentacles. During the reproductive season, an intertentacular organ is present (broadcaster) and eggs are released into the water column.

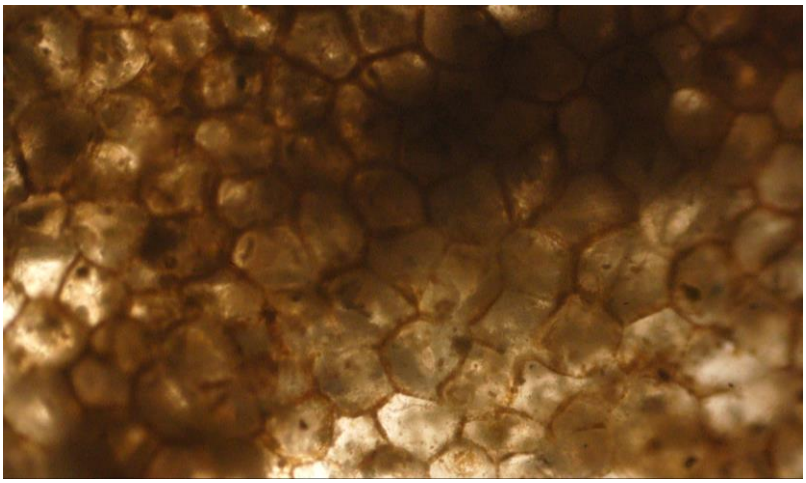
Occurence: Between 1900 and 1910 several colonies were collected on the Flemish Banks and near the Scheldt estuary (RBINS collection). Erect colony parts are found on the beach in B and NL, as well as colonies attached to strings, snails enhabitted by hermit crabs (especially *Hinia*, also *Euspira*) and bivalve shells as *Ensis* and on crabs.
https://waarnemingen.be/species/84236/photos/?advanced=on
https://waarneming.nl/species/84236/
Found living in situ in Belgium at:
Hinderbanken 2005: On *Hinia reticulata* en *Natica* enhabitted by hermit crab
Nieuwpoort 2012 on groynes: https://waarnemingen.be/photos/2907171/
Koksijde from 2003 on (De Blauwe, 2004a) and 2014 on groynes:
https://waarnemingen.be/photos/6039749/
Heist Feb 2013: on *Ensis directus* (own observation)
De Panne and Koksijde 2016, 2018, 2019, 2021 on permanent fishing gear/ropes:
https://waarnemingen.be/photos/24443350/
Found living in situ in the Netherlands at:
Westkapelle (Faasse & De Blauwe, 2004) and Veerhaven Anna Jacobapolder on pontoon 2019 and 2020 :
https://waarneming.nl/observation/171126013/
https://waarneming.nl/observation/193271909/
France: Normandy, Granville: 2019 (own obs), beached at Pas de Calais.
Germany: no records

United Kingdom: At 4 locations, in a total of 188 sampled, *A. condylocinereum* was collected by beamtrawling on depths between 26 and 77 m, in the Dover Strait and at 2 locations in the English Channel (Porter, 2004).

Alcyonidium condylocinereum:

erect colony part beached at Nieuwpoort, 2005 (FN)


encrusting colony (right), erect colony parts (left) on a groyne at Koksijde, March 2005 (HD)


pealed colony (HD)


tentacles with intertentacular organ ITO (HD)

Colony on *Hinia reticulata* (Arnold Wijker)


Colony on *Ensis* sp., after sand suppletion in Oostende, October 2013 (HD)

***Alcyonidium diaphanum* (Hudson, 1778)**
Formerly recognized and reported, together with *A. condylocinereum* and *A.polyoum* as *Alcyonidium gelatinosum*, that in fact is another species. Porter (2004) has shown that *A. proliferans*, *A. topsenti* and *A. gelatinosum* form *lacourti* can be synonymized with *A. diaphanum*.

Description: Erect colony parts, smooth, firm and fleshy, flexible, up to 30 cm long, in estuaries up to 50 cm long. The erected parts are narrowed at their base. Material in the RBINS shows that the encrusting base is very limited in surface area. The erect colony parts are very variable. Six shapes are distinguished: sausage-shaped, cylindrical, shoelace-shaped, bushy, leaf-shaped or knotted. Zooids densely packed, with openings on all sides of the colony, the polypids are perpendicular to the colony surface and have 14-16 tentacles. Multiple embryos are incubated in the zooids themselves. There is never an intertentacular organ.
The color is honey to brown. May be confused with a grayer species, *A. condylocinereum*, with different tentacle number and different mode of reproduction.

Occurrence: Grows on stones and shells (*Euspira catena* and *Ostrea edulis*) and large stones (http://britishbryozoans.myspecies.info/bryozoa/alcyonidium). In the past, erect colony parts often washed up on the Belgian and Dutch coasts after autumn storms, in recent years to a much lesser extent (B still common, NL rare). The RBINS collection shows that this species was distributed between the French border and the estuary of the Scheldt in the first half of the last century. (De Blauwe, 2009). Perhaps reduced by beam trawling and the eradication of the oyster beds. The establishment of offshore wind farms and the reintroduction of the native oyster can have a positive impact on populations in Belgian waters.
Sublittoral widespread throughout the North Sea; on both sides of the English Channel thought less common in the middle of the channel. Dense populations in the Thames estuary, in the bay of the Seine and on the Dogger Bank. Its southernmost European record appears to be from Glénan (Brittany). Occurs from the infralittoral fringe to 100 m depth with dense populations at 10-30 m depth. (Porter *et al*., 2002).
Only a few colonies were collected during research on the Hinder Banks (June 2005). One recent, unverified offshore observation in the Netherlands: https://waarneming.nl/observation/200252037/
A colony was collected on the Dogger Bank in 2016, it is not certain whether it was attached to the site or was adrift.
Germany: Collected in German North Sea (Zettler *et al.* 2018).

Alcyonidium diaphanum:

Long erect colony with to the right the very small encrusting base on a peble (HD)

Many colony forms of *Alcyonidium diaphanum* are possible (HD)

Alcyonidium gelatinosum **(Linnaeus, 1761)**
This species was incorrectly considered a new species (*A. reticulum*) for a short time. Ryland & Porter (2000) describes *Alcyonidium reticulum* as a new species. Later it turned out that this species had already been described by Linnaeus in 1761 under the name *Alcyonidium gelatinosum* (Ryland & Porter, 2003).

Description (after Ryland & Porter, 2000 as *A. reticulum*): The colony forms a single-layer crust, opaque white, yellowish or brown, which is easily peelable. Zooids 0.3-0.5 x 0.2-0.4 mm, rectangular or polygonal, flat or slightly convex, translucent when young, older zooids with a distinct white border, particularly during autumn/winter.
15-18 tentacles, usually 17 or 18. An intertentacular organ is never present. Polypids usually absent in the reproductive season. Embryos white or pink, with 3 or 4 per brooding zooid. Ancient zooids of *A. mytili* often have a white color (photo 25), but the zooids do not have the striking white border of *A. gelatinosum* (photo 17 and 18).

Occurence: Intertidal on sheltered beaches on stones, shells and *Fucus serratus*.
Belgium: absent. *A. gelatinosum* in Belgian coastal waters, dredged in the period 1973-1975 (Redant, 1976) is nothing more than *A. diaphanum* and / or *A. condylocinereum*. For Belgium there is only one certain observation and it is on beached plastic: https://waarnemingen.be/observation/87299633/
The Netherlands: Grows in situ in at Schelphoekkreek, the tide pool at Topshuis on Neeltje Jans and Yerseke, with embryos in July (Faasse & De Blauwe, 2004). Literature data from the Netherlands before 2004 are unreliable.
Germany: Collected in German North Sea (Zettler *et al.* 2018) and Helgoland (pers. comm. Britta Kind).
UK: Widespread and abundant on fucoids and other algae (Ryland & Porter, 2003).
https://observation.org/observation/135950932/
France : Roscoff (Ryland & Porter, 2006), Sillon de Talbert (own obs.),
https://observation.org/observation/185441413/
https://observation.org/observation/227114083/

Alcyonidium gelatinosum:

zooids, Sillon de Talbert (France), juli 2003 (HD)

zooids with pink embryo's, Sillon de Talbert (France), juli 2003 (HD)

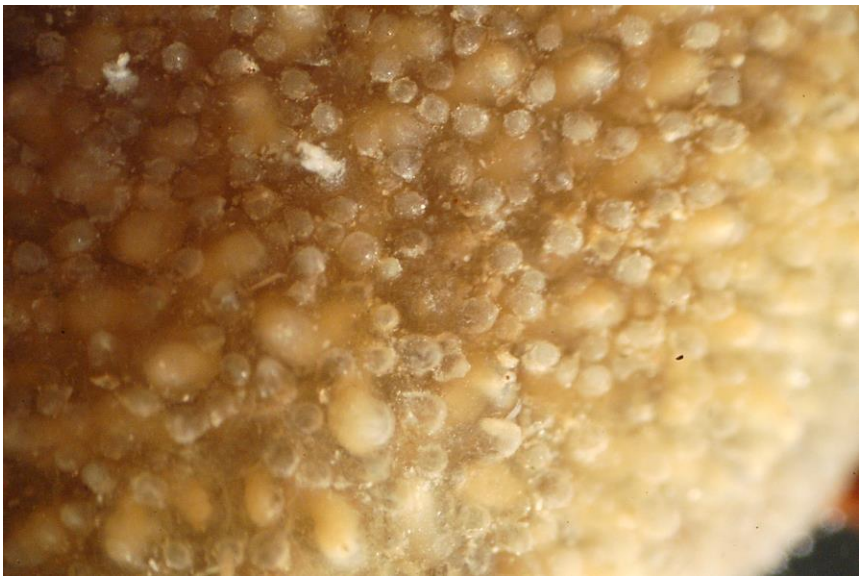
***Alcyonidium hirsutum* (Fleming, 1828)**

Description: Forms thick, fleshy crusts or cylinders on seaweed. The colony surface feels velvety soft. The zooids' frontal surface is convex and smooth with the orifice almost in the center. The only species where kenozooids originate frontally on the zooids. The kenozooids resemble small spheres and are located on the edge of each zooid. It is as if the entire surface of the colony is covered with spheres.

Occurence: On intertidal seaweeds, especially on *Fucus serratus*, also on firm red algae.
Belgium: Absent. Material available in the RBINS, which was labeled *A. hirsutum*, appears to be *A. condylocinereum* and mainly *A. diaphanum*.
The Netherlands: Collected in situ near Zierikzee and Colijnsplaat (Faasse & De Blauwe, 2004).

Author found colonies in situ in the **United Kingdom** at Dale Field fort Centre and Marloes Sands in 2017 and in **France**: St-Jacut-de-la-Mer (2008), Granville (2019), Piriac-sur-Mer (2020), St-Lunaire and St-Jacut-de-la-Mer (2021).

Alcyonidium hirsutum (large colony) en *A. polyoum* (2 small colonies), St-Jacut-de-la-Mer (France) 2008 (HD)



Alcyonidium hirsutum, zooids and kenozooids (small spheres), idem (HD)

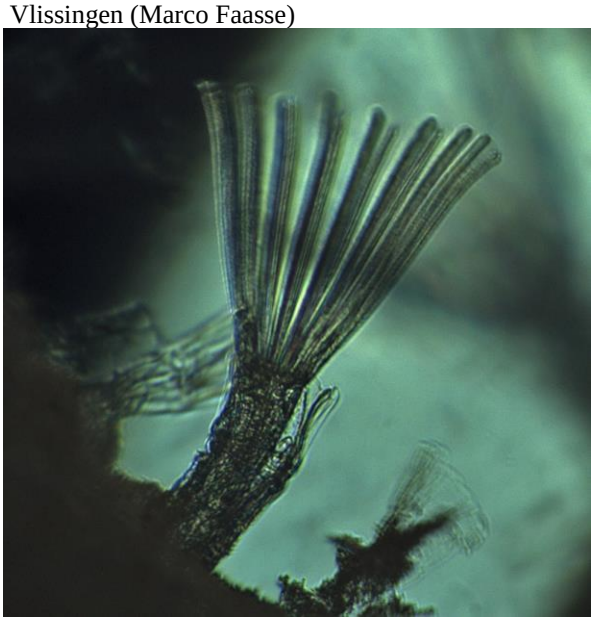
Alcyonidium hydrocoalitum **Porter 2004**

Description: Forms a firm gelatinous crust around the hydroid stem of *Tubularia indivisa* and *Obelia bidentata*, possibly also around other hydroids and on the bryozoan *Vesicularia spinosa*. Up to 6 mm thick, smooth with irregular outline, transparent or light brown-gray. 14-18 tentacles, usually 16. In the breeding season there is an intertentacular organ present.

Occurence: Only a few records are known.
United kingdom: Oxwich Bay in South Wales and the Strait of Dover (Porter, 2004).
The Netherlands: Oosterschelde and Westerschelde (Faasse & De Blauwe, 2004). Washed up in the Netherlands on Texel on *Obelia bidentata* on October 13, 2019 (de Ruijter, 2020a). Collected at the Dutch Borkum Reef Grounds (Coolen *et al.* 2015).
Belgium: In May 1905 and June 1906, resp. 1 and 5 colonies fished on the Flemish Banks on the bryozoan *Vesicularia spinosa* (RBINS collection) (De Blauwe *et al*., 2006). Recently, a few colonies were found on *Tubularia* on shipwrecks (Zintzen, 2007; Zintzen & Massin, 2010), namely on the Kilmore (51 ° 23'N 2 ° 29'E; 3 colonies in 2003, 1 in 2004 and 1 in 2005) and on the Birkenfels (51 ° 38'N 2 ° 32'E; 1 colony in 2002).
Two in situ observations (2013 and 2016) and three on beached material at the harbour of Zeebrugge:
https://waarnemingen.be/observation/73764949/
https://waarnemingen.be/observation/115346208/ on *Obelia bidentata*

Alcyonidium hydrocoalitum

Vlissingen (Marco Faasse)



With ITO (?) left (HD)

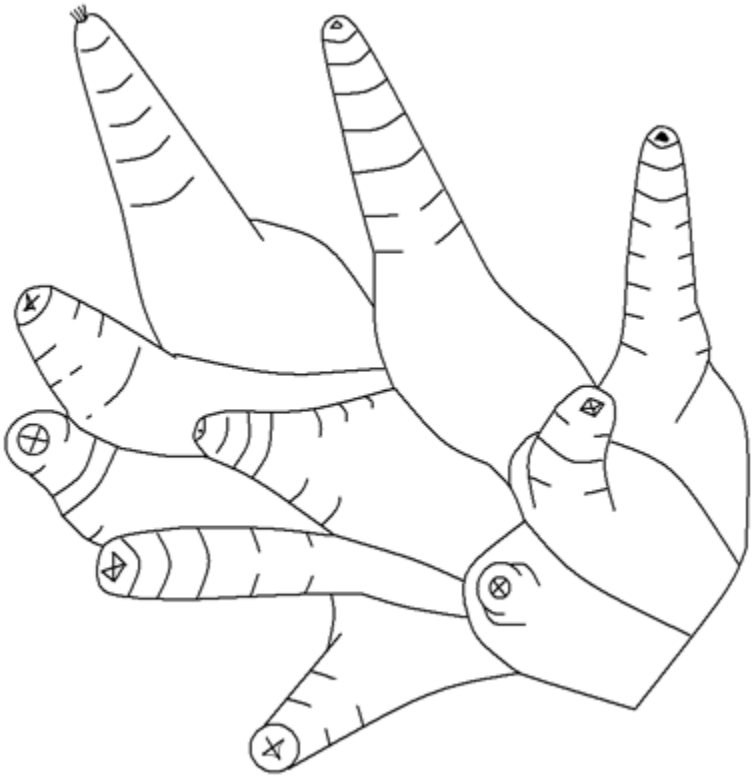
Alcyonidium mamillatum **Alder, 1857**

Description: Forms irregular, lobed or star-shaped crusts on shells or cylinders around erect substrate such as hydroids. The colony has a spiny appearance. Zooids in one continuous layer, flat or somewhat convex, separated by clear grooves. Translucent light brown, darker towards the peristome. Orifice on a conspicuous cylindrical peristome, often clearly ringed in older zooids. The peristome remains evident with tentacles retracted and is perpendicular to the frontal surface. Dirt can hide the surface of the zooids, the peristome remains visible.

Occurence: Sublittoral on hydroids, *Laminaria* holdfasts, solitary ascidians, decapods and living or dead bivalves. Probably widely distributed in the north-eastern Atlantic, as far south as the English Channel. (Ryland, 1985).

Belgium: Records (Loppens, 1906) are unreliable and cannot be verified. Loppens considers this species to be fairly common on mussels, but does not mention *A. mytili*, a typical mussel epiphyte.
The Netherlands: The same can be said of Lacourt (1949) and the identification key of Lacourt (1978). Lacourt took over the drawings from Marcus (1940), so that these drawings do not provide proof of correct Dutch identifications. Faasse & De Blauwe (2004) list a number of records and there is another recent record from 1996 on buoys in the Eemshaven (Koulman *et al*., 2003). A colony is collected in July 2016 on the Doggerbank (pers. comm. Merkens Bart)
Germany: Collected in German North Sea (Zettler *et al.* 2018) and Helgoland (pers. comm. Britta Kind).

Alcyonidium mamillatum (Joël Cuperus, rws, e-mail 14 maart 2018 Merkens Bart)



Alcyonidioides mytili **(Dalyell, 1848)**

Description (redescription after Cadman & Ryland, 1996): The colony forms a well-adhered crust on all kinds of substrates and is therefore difficult to peel off. Young zooids on the colony margin are very thin and completely transparent. The polypid is highly visible in the octagonal or irregular polygonal zooecia. Older colony parts are thicker (up to 2 mm). Budding creates a new layer of zooids on top of the old ones, which are compressed. Their frontal surface is slightly convex and less translucent, usually brown, also white or gray, often covered with a diatom layer. During the growing season, the zooids store fat droplets, giving them a white appearance.

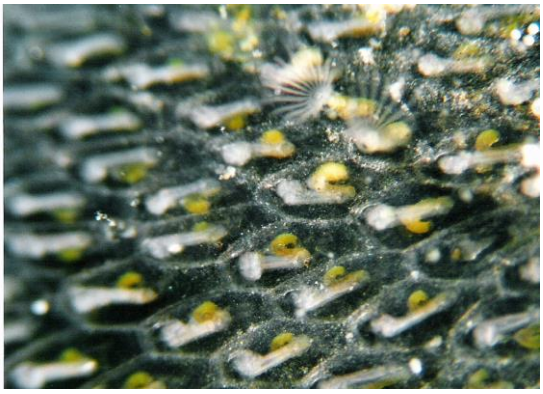
In the breeding season (November-March according to Cadman & Ryland (1996), March-April in Zeebrugge, own observation) the frontal wall becomes more transparent again so that the eggs can be seen as white dots at 40x magnification. At the start of reproduction, an intertentacular organ develops (light blue and 1/3 of the tentacle length, not on young zooids). This organ plays a role in the absorption of sperm and the excretion of fertilized eggs. The organ remains until the end of reproduction and until the polypid degenerates.
Polypid degeneration leads to the formation of 1 or 2 brown bodies that persist during successive polypid generations. For example, zooids typically contain 1 to 5 brown bodies in addition to the polypid. The polypid bears 13 to 18 tentacles, but usually 15 or 16 (Cadman & Ryland, 1996), in the Zeebrugge marina usually 15 tentacles and in young colonies only 13 or 14 tentacles. Extensive colonies on substrates other than mussels are difficult to distinguish from related species.

Occurence: Reports from before 1996 are unreliable. Often, but not as common as *Conopeum reticulum*, on mussels presented for consumption. On algae, barnacles, mussels, oysters, stones, concrete and iron in the infralittoral fringe and below.
Belgium: Large colonies can be found on stones in Nieuwpoort, on mussels at Zeebrugge, Heist and Duinbergen.
The Netherlands: Faasse & De Blauwe (2004) mention a number of sites from the literature from Zeeland and the Wadden Islands. Additional: Westkapelle (own. obs.). Mok Bay on Texel (De Boois, 1998), shipwreck 'Klipper'(UTM 534415 5758926) (Lengkeek *et al*., 2013).
UK: So far recorded from the southern shore of the Firth of Forth and Pembrokeshire, near Pembroke Dock in Milford Haven and from Monkstone Point, near Tenby. Distributions by previous authors must be considered dubious (Cadman & Ryland, 1996). Ryland & Porter (2006) gives verified overall distributional records.

France: Uncommon.
https://observation.org/observation/64340346/,
https://observation.org/observation/46047717/
Germany: mentioned by Zettler *et al*. (2018)

Alcyonidioides mytili: (HD)


colony on mussel (Yerseke, 2006)


young colony on mussel (Zeebrugge, 2004)


older colony on mussel (Yerseke, 2006)


polypids regenerate to brown bodies

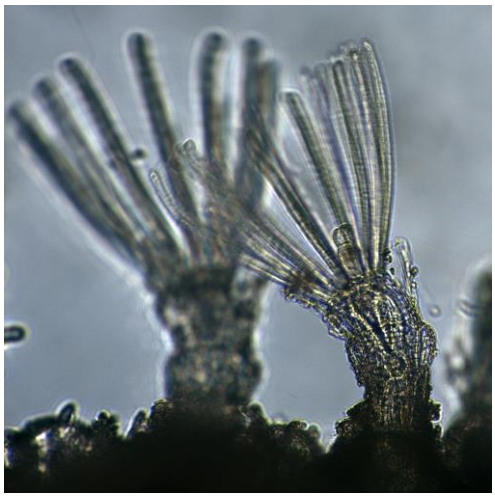
Alcyonidium parasiticum **(Fleming, 1828)**

Description:
Forms silty-colored cylinders around hydroids. The surface is covered with silt and fine sand. This gives the typical appearance and hides the details of the zooids. Colony up to 3 cm long and 5 mm thick, usually thinner. At first single-layered with elongated zooids. Frontally emerging zooids are hexagonal or irregular and small. Zooids are delimited by clear groves. The terminal conical opening is transversely oval. The frontal surface bears many short filaments around the rim and around the opening. These filaments retain the silt. To see them, the silt has to be removed. Confusion with a dense mat of *Arachnidium fibrosum* is possible, the zooids of *A. parasiticum* are up to 0.5 mm long while the zooids length in *A. fibrosum* is 0.6 to 1.3 mm.

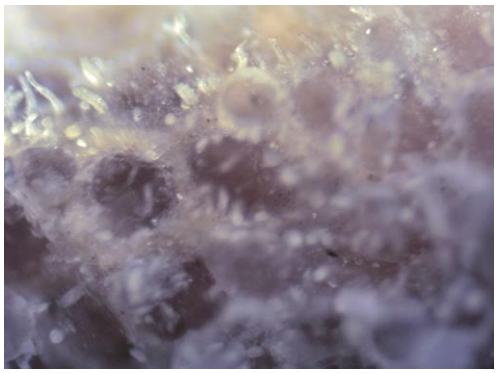
Occurence: In Belgium and the Netherlands (de Ruijter 2019a, 2020a) often washed ashore on thecate hydroids (*Hydrallmania falcata*, *Sertularia*) and shrub-like bryozoans (*Vesicularia spinosa*), usually found in the wash-up banks of wood and peat blocks.
Belgium: At the RBINS, many colonies are present on hydroids, collected at the beginning of the last century in the area between the Channel and the mouth of the Scheldt (De Blauwe et al., 2006). Loppens (1906) found this species generally on hydroids, and rather rarely on the beach. Several colonies were recently found in situ in the Baai van Heist and on a groyne at Koksijde on the bryozoan *Anguinella palmate.*
The Netherlands: Near Wissenkerke, on the Klaverbank (pers. communication G. van Moorsel) and in 2016 on the Doggerbank. Collected at the Dutch Borkum Reef Grounds (Coolen *et al*., 2015). Lengkeek *et al*., (2013) report the species from the shipwreck 'SS Nautilus'(UTM 580751 5886316).
Germany: mentioned by Zettler *et al*. (2018)

Alcyonidium parasiticum (HD)

on hydroid beached at Zeebrugge 2006



Tentacles with ITO



zooids with filaments

***Alcyonidium polyoum* Hassall, 1841**

Description:

Encrusting algae, mainly *Fucus serratus*. Zooids quite long (0.5-0.8 mm). 18-21 tentacles, usually 19-20. Buff-coloured to orange embryos are incubated in clusters of 6-7 in the zooid. Reproduction season (February) April to September. Colonies in which many embryos are present have a striking orange color.

Occurence: Reports from before 2000 are unreliable.

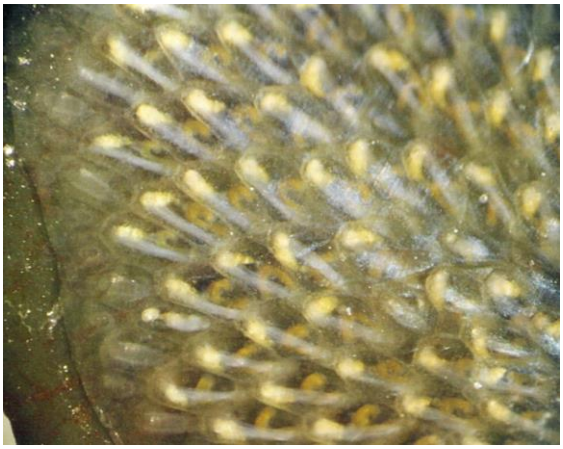
Belgium: Not found in Belgium and not present in the collection of the RBINS. Redant (1976) mentions this species in Belgian coastal waters in the period 1973-1975, but given the substrate preference of *A. polyoum*, the dredged material certainly belongs to a different species.

The Netherlands: In the Delta area, this species was observed near Zierikzee, the Goesse Sas, Wemeldinge and Yerseke.

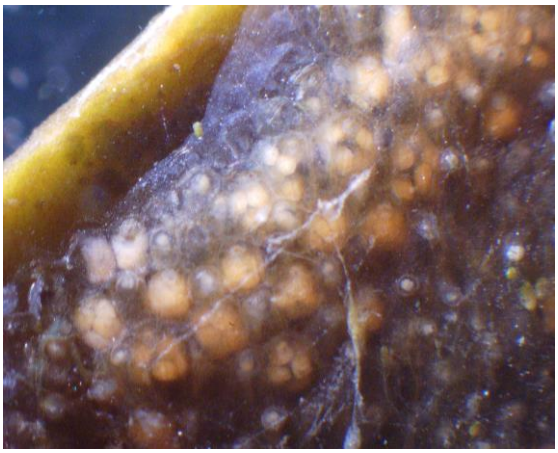
UK: Widely distributed on British shores (Ryland & Porter 2003) and the French Channel coast (own obs.).

Alcyonidium polyoum (HD)

colony with embryo's (Yerseke, september 2006)



Damgan (France) 2006



zooids with embryo's (Yerseke, sep. 2006)

Family Flustrellidridae

Genus Flustrellidra

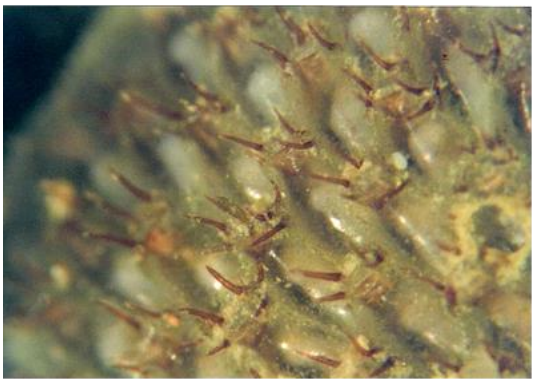
Flustrellidra hispida **(O. Fabricius, 1780)**

Description: Forming extensive, thick, lobed patches on *Fucus serratus* and fleshy cylinders on *Gigartina* and *Chondrus*, sometimes on other algae. The colony is dark reddish brown and has a furry appearance. In the Netherlands the colonies are quite thin and not that extensive. Divers especially notice the outstanding bluish-white tentacle crowns. Autozooids large, oval to hexagonal and convex. Frontally smooth, translucent, the polypid as a white stripe. The subterminal opening is wider than long, with proximal and distal lip. Polypid relatively large with many tentacles (27 to 40). Yellow-white embryos in February. The 4 to 6 typical brown spines around the distal half of each zooid are kenozooids.

Occurrence:
Belgium: Loppens (1906) considers this species to be very rare on algae, mainly on *Fucus serratus*. No location is given, possibly he only found them washed up on the beach. No recent growing sites are known from Belgium. Rarely does a colony wash up on plastic, probably originating from the French Channel coast (De Blauwe, 2000, 2005).
The Netherlands: Lacourt (1949) found washed up colonies on Schouwen and Scheveningen in the 'National Museum of Natural History' in Leiden.
Rarely does a colony wash up on plastic *Himanthalia* buttons (de Ruijter, 2017b) or *Sargassum mucticum* (de Ruijter 2019a). Only known in the Netherlands for a limited number of locations in the Oosterschelde.
UK, France: Common at both sides of the English Channel (own obs.).
Germany: mentioned by Zettler *et al*. (2018) and ollected at Helgoland (pers. comm. B. Kind).

Flustrellidra hispida (HD)

https://observation.org/observation/72485955/ colony op *Fucus serratus*



zooids with brown spines

tentacles

Family Arachnidiidae

Genus Arachnidium

The genus *Arachnidium* contains elusive species, forming inconspicuous colonies. They are seldom recorded.

Hayward (1985) mentions 2 other species in addition to the species below (*A. simplex* and *A. clavatum*).

1 a) Zooidal surface with fine filaments that hold detritus. Forming linear series to dens mats of zooids. 12 tot 16 tentacles. In seawater. .. *Arachnidium fibrosum*
b) Zooids without fine filaments. …….. 2

2 a) In sea water, number of tentacles unknown. ..... *Arachnidium hippothooides*
b) Polypide with 8 tentacles. In brackish water. ..... *Arachnidium lacourti*

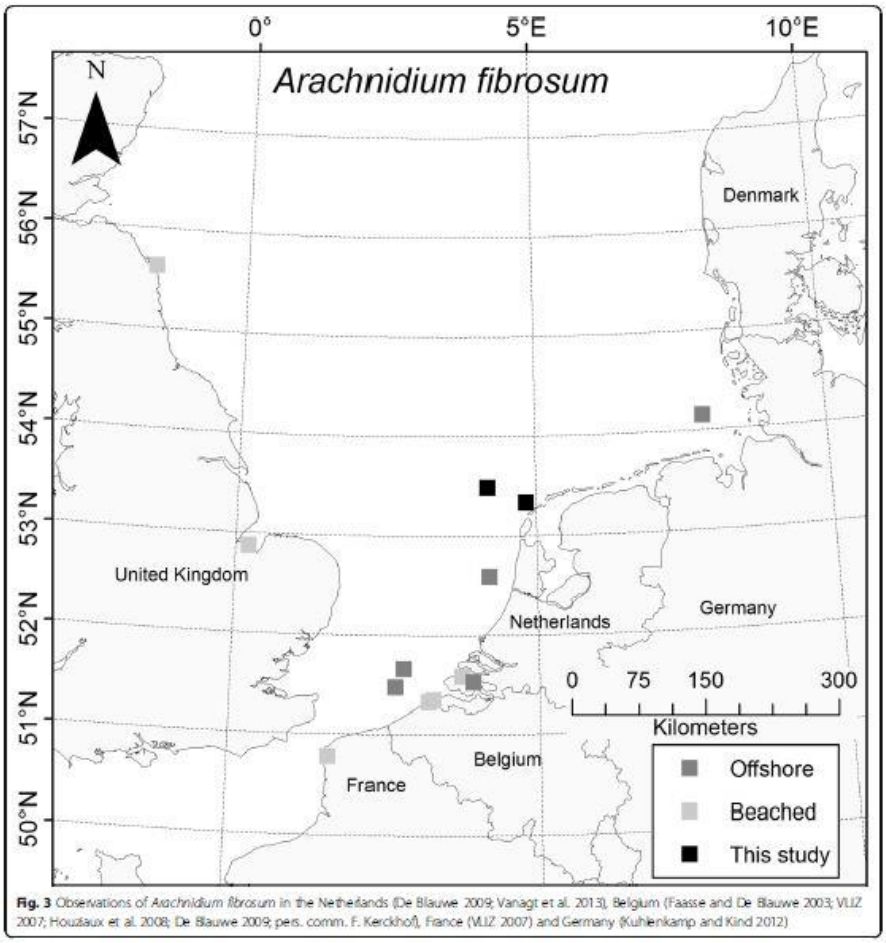
***Arachnidium fibrosum* Hincks, 1880**

Description: Zooids arranged irregularly in branching chains, sometimes densely and differently directed. Zooids distally oval with a narrow tubular portion proximally, of varying length. Opening on a striking cone-shaped peristome. Peristome often (or always?) with beige-like longitudinal stripes. Short cylindrical filaments develop around the edge of the zooids, often on the frontal surface as well. Sometimes a flat star-shaped widening develops from a bud, which can give rise to new buds. Branches can also split without forming a zooid at the split. This creates a network of short tubes. 12 to 16 tentacles, mostly 13. Dense colonies retain silt and grains of sand and between the filaments and can thus be confused with *Alcyonidium parasiticum*. The species often stays unnoticed in preserved material, especially if *Jassa* spp. (Arthropoda, Malacostraca) tubes are present. Research on living material would facilitate the discovery and identification of this species in future research.

Distribution:
Belgium: Common subtidaly, where it gives a muddy appearance to stones on the Hinder Banks and on mussels and stones on windmills (August 2018 – Belwind, pers. comm. Francis Kerckhof). Infralitoral in the Baai van Heist on *Alcyonidium* sp. and *Crisularia plumosa*. Occured on beached *Alcyonidium diaphanum* and *Abietinaria*

abietina at Zeebrugge. On a buoy near Koksijde in Januari 2021 (pers. comm. Francis Kerckhof). *Arachnidium fibrosum* was extremely common on reef balls deployed in 2013 on the Bligh Bank and studied in 2014 (pers. comm. F. Kerckhof).

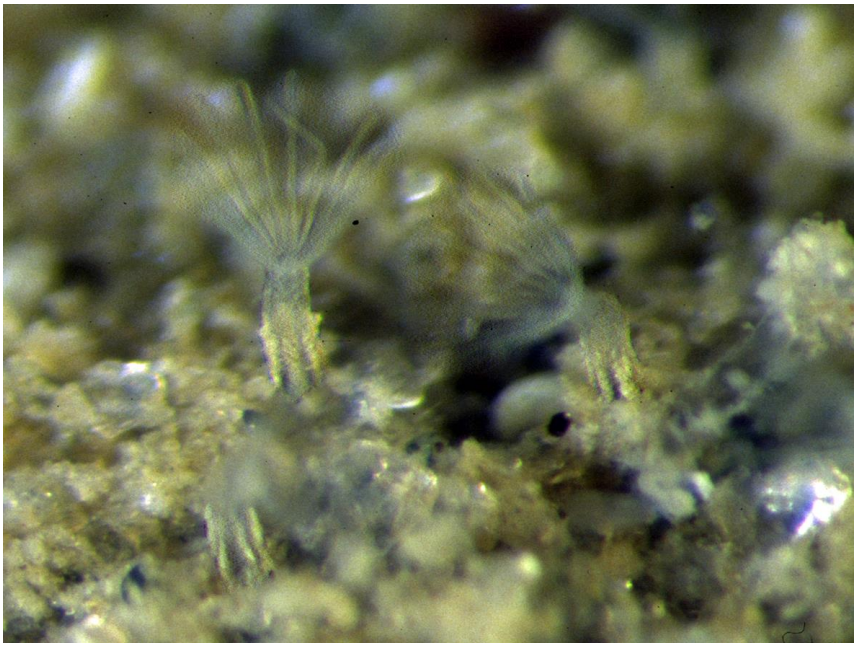
The Netherlands: on empty shells near Goesse Sas on 5-10 m depth (Faasse & De Blauwe, 2003) and near Wissenkerke (pers. comm. Faasse M.). At the PAWF at 5, 10 and 17 m depth (Vanagt *et al*., 2013). Encountered in two samples taken from the foundation of platform L10-G at 10 m depth. Both colonies were attached to *Mytilus edulis*. Another colony of *A. fibrosum* was observed on a scour protection rock collected at the bottom of platform L15-A (Beukhof *et al*., 2016).



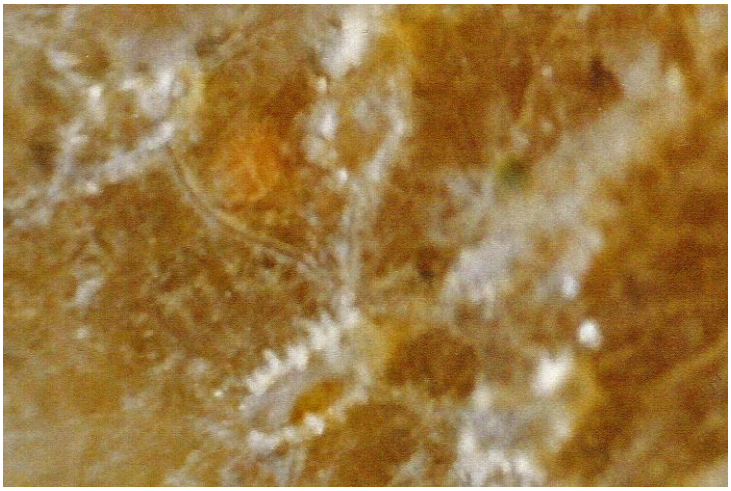
Map from Beukhof *et al*., 2016 Observations of *Arachnidium fibrosum* in the Netherlands (De Blauwe 2009; Vanagt et al. 2013), Belgium (Faasse and De Blauwe 2003; VLIZ 2007; Houziaux et al. 2008; De Blauwe 2009; pers. comm. F. Kerckhof), France (VLIZ 2007) and Germany (Kuhlenkamp and Kind 2012)

Recent publication : Schwaha, T.; De Blauwe, H. (2020). Morphology of ctenostome bryozoans: 1. *Arachnidium fibrosum*. J. Morphol. 281(12): 1598-1606. https://hdl.handle.net/10.1002/jmor.21275

Arachnidium fibrosum:



Peristomes, with beige-like longitudinal stripes, between sand graines (MF)



with white filaments on *A. diaphanum*, beached in Zeebrugge (HD)

with black filaments (transmitted light) on *Bugulina* sp. Baai van Heist (HD)

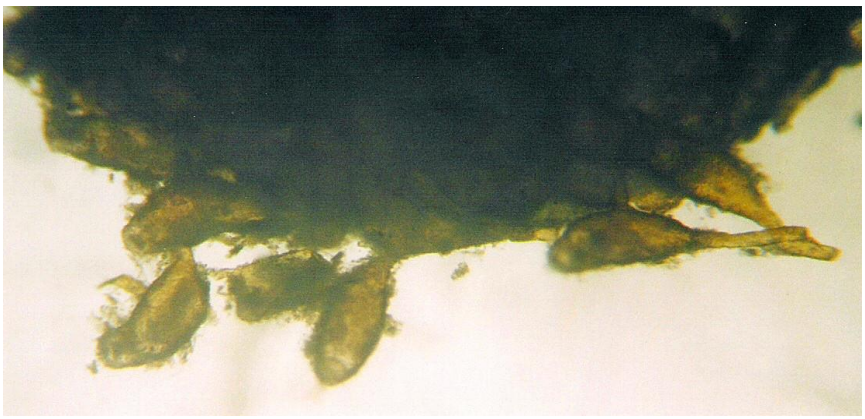
Arachnidium fibrosum with intertentacular organs (HD)

Arachnidium lacourti **d'Hondt & Faasse, 2006**

Description: Colony attached to hard substrates. Zooids in dichotomous branching rows. A large part of the zooids can be attached to the substrate by means of small rectangular teeth. The polypid has 8 tentacles. Each zooid consists of 3 parts: an attached elongated proximal portion of variable length, a wide distal portion, and a cylindrical peristome that is oblique and has a circular opening. According to the original description (d'Hondt & Faasse, 2006), the zooid is distally free from the substrate, this is not retained as a characteristic here because the colony is detached from the edge of a barnacle. The rectangular ancestrula does not have a polypid.

Occurence: This species is known from the Netherlands in oligohaline waters of the Western Scheldt and the Nieuwe Waterweg. Type material comes from Bath in the brackish eastern part of the Western Scheldt. Grows in the lower half of the tidal area on the underside of boulders, on barnacles (*Balanus improvisus*) and on the Pacific oyster (*Crassostrea gigas*). In the Western Scheldt *A. lacourti* has not been found after 2003, in the Nieuwe Waterweg a small colony was found in 2011. (Faasse *et al*., 2013).

Arachnidium lacourti:



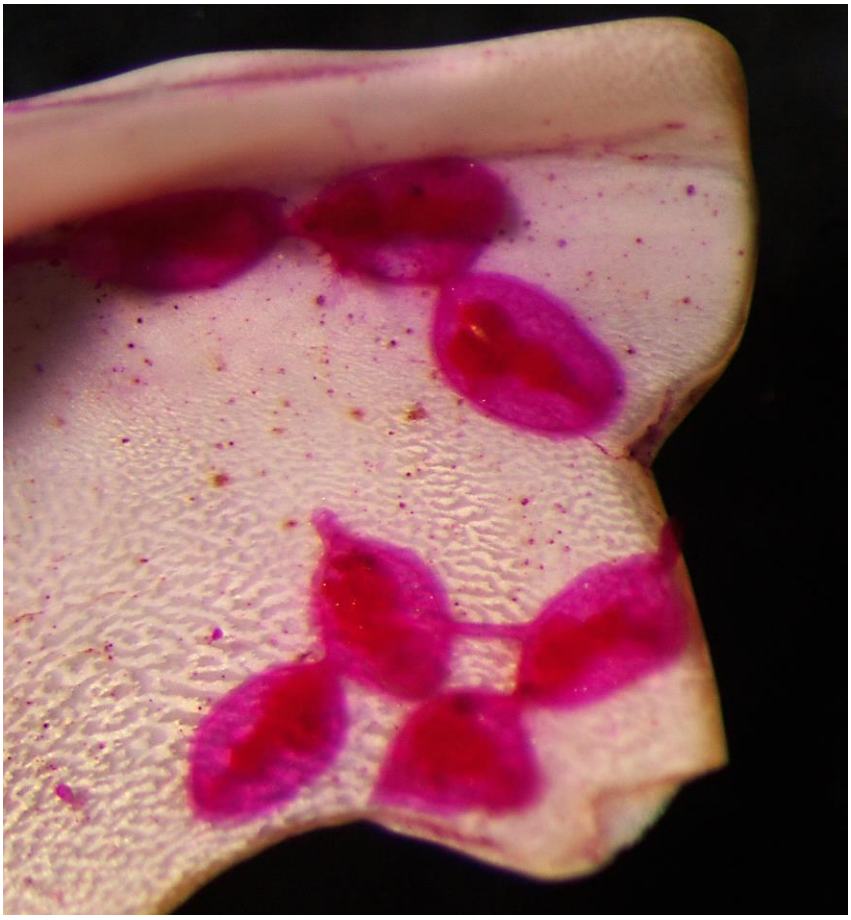
typemateriaal a the edge of a barnacle, Bath (HD)

Nieuwe Waterweg 2006 (Marco Faasse)

***Arachnidium hippothooides* Hincks**

Description: Colony forming an inconspicuous, diffuse tracery on shell or stone. Autozooids in branching, linear chains; club-shaped, comprising a slender tubular proximal portion and an oval distal portion. Orifice subterminal; closed forming a small papilla. Tentacle number unknown. Colony inconspicuous, the only Dutch

Occurrence: A specimen cf *A. hippothooides* was recently collected in the Netherlands (unpublished comm. Marco Faasse). The colony was discovered by coloring the material with Bengal rose.



On a shell fragment close to the Dutch coast.
Photo - E-mail Nov 2018 Marco Faasse

Family Panolicellidae

Genus Panolicella

***Panolicella nutans* Jebram, 1985**

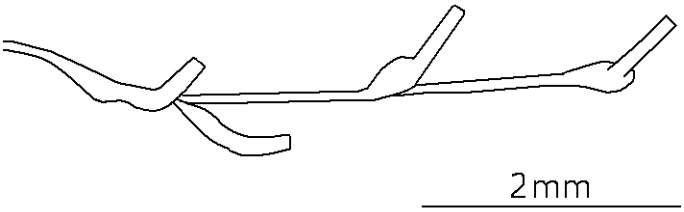
Description: Scattered branching zooid chains, zooids up to 2 mm apart, connected by very slender filiform proximal zooid parts. The zooid consists of a basal portion, proximally long filamentous, and an erect cylindrical portion (up to 0.9 mm high) containing the polypid. Opaque with attached detritus. The opening is round and terminal. The polypid bears (rarely 7) 9 to 11 tentacles. Usually only discovered when a substrate containing living material is examined, the tentacles revealing its presence.

Occurrence:
Belgium: In 2004, a colony was found on a stone from a channel between the Hinderbanken and in 2002 on the wreck of the Birkenfels (Zintzen, 2007; Zintzen & Massin, 2010). In the Netherlands recently found in a tide pool near the Goesse Sas on a shell fragment (De Blauwe, 2003), in the Westkapelse Kreek on the hydroid *Gonothyrea loveni* and at Bommenede (Grevelingen) on a stone. Often occurs together with *Amathia* species.

Faasse & De Blauwe (2004) mentioned *Nolella pusilla* (Hincks, 1880) from the Netherlands. Reverter-Gil & Fernández-Pulpeiro (2006) concluded that the description of *Nolella pusilla* is inadequate for reliable identification. Type specimens probably no longer exist. Reverter-Gil & Fernández-Pulpeiro (2006) concluded that material from the Netherlands, mentioned under this name, belongs to the species *Panolicella nutans* Jebram, 1985, like numerous colonies collected in Galicia (Spain). (Faasse *et al*., 2013).

Panolicella nutans:

peristome (middle) between 2 zooids of *Amathia cf. gracilis*, tidal pool Goesse Sas (HD)



part of a colony

Family Nolellidae

Genus Anguinella

***Anguinella palmata* van Beneden, 1845**

Description: Forming grey-brown, mud-colored tufts, 5 to 20 cm high. More reminiscent of a hydroid or of a miniature *Codium* seaweed. Several main branches have spirally implanted side branches. The zooids emerge from the side of the side branches. New zooids can spring from every zooid. The colony is attached with slender rhizoids. Zooids opaque, elongated cylindrical, curved slightly towards the axis of the colony. Due to the adhesion of silt, only the terminal opening remains clearly visible. Polypid relatively small with 10 or 11 tentacles. d'Udekem d'Acoz (1993) reports hibernating buds or hibernaculas on colonies from Belgium in February.

Occurence:
Belgium: On stones, shells, wooden poles and groynes, low in the tidal area, especially where there is a lot of silt. Can tolerate low and fluctuating salt levels. Loppens (1906) mentions this species common in Belgium. Found in 1990 on groynes in Ostend and Duinbergen (d'Udekem d'Acoz, 1991) and on the eastern breakwater in Zeebrugge in February 1993 (d'Udekem d'Acoz, 1993). Locally common along the Belgian coast (Baai van Heist, beach head Koksijde).
The Netherlands:
Port of Den Helder (van der Sleen, 1920), the Texelstroom (van Benthem Jutting, 1922) and Wadden area (Lacourt, 1978). Locally common in Westkapelle, western part of the Westerschelde and the Oosterschelde. Large colonies at Borssele in Februray 2017 (pers. comm. Marco Faasse).
Germany: collected at Helgoland (pers. comm. Britta Kind).

Anguinella palmata:

colony, Yerseke, 2006 (HD)

zooids, Yerseke, 2006 (HD)

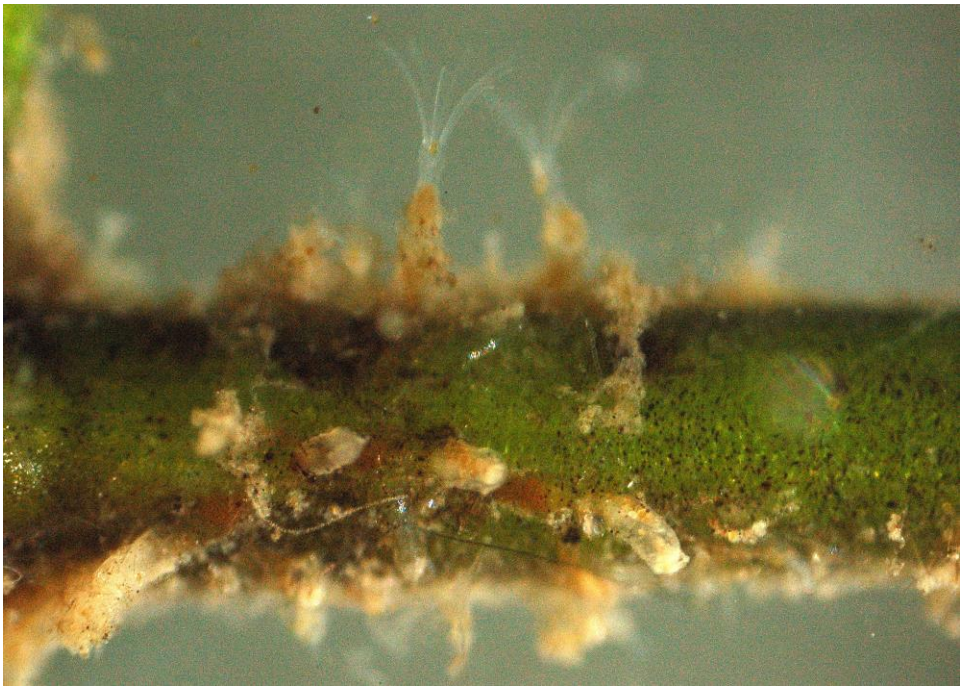
Family Victorellidae

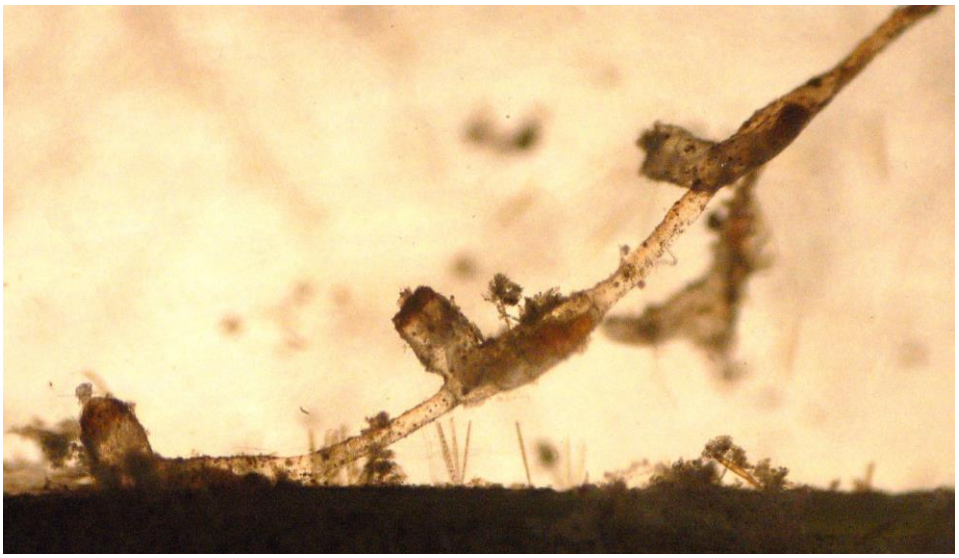
Genus Victorella

***Victorella pavida* Saville-Kent, 1870**

Description: Forming diffuse branching chains or develop into dense autozooid clusters. In summer, colonies have the appearance of velvet. Usually the colony is attached, sometimes parts of the colony are free from the substrate. A zooid consists of an attached basal portion and an erect cylindrical peristome 0.3 to 1.6 mm long. Erect zooids may be cylindrical or slightly bulbous at the base. The longest peristomes occur where the zooids grow close together. The attached part is usually very short, but sometimes long. New zooids originate distal and lateral from the basal part of each zooid or from the peristome. Polypid with 8 tentacles. Embryos released through special intertentacular organ. Produces dark brown/black hibernacula (dormant resting buds). With respect to the lifespan of a Victorella pavida colony, new colonies emerge from dormancy during the spring and when temperatures are approximately 13°C. By November and the onset of winter, zooids begin to degenerate and eventually only the asexually produced dormant resting bodies (hibernacula) remain. The hibernacula germinate again in the spring and the cycle begins again. Approximately 25 eggs can be produced per gravid zooid from June to September. *Victorella pavida* has a short-lived planktonic larvae, which probably settle from July to September (Carter, 2004; Carter & Jackson 2007).

Distribution: Found in areas of low and fluctuating salinity. In shallow water on submerged stones, shells, barnacles, plants (*Phragmites australis*) and wood as well as artificial substrata such as concrete. In Belgium (Nieuw Gedelf in Nieuwpoort 2006) and Netherlands (from Zeeland to Friesland) only in inland fresh and weak brackish water (Faasse & De Blauwe, 2004). In the British Isles, *Victorella pavida* is only found in Swanpool: a brackish water lagoon near Falmouth in Cornwall (Carter, 2004).


habitus on reed (*Phragmites australis*)


zooids detached from the reed stem, Goes 2006 (HD)

Family Walkeriidae

Genus Walkeria

Walkeria uva **(Linnaeus, 1758)**

Description: At intervals, groups of autozooids stand on a branching stolon. Stolon formed by a chain of cylindrical kenozooids that are clearly separated, each kenozooid 0.5 to 1.5 mm long, attached to the substrate or not. Autozooids oval, translucent, small (0.4 mm long), not stalked. The square opening is terminal. Polypid relatively large with 8 tentacles, 2 of which curved outwards.

Distribution:
Belgium: No locations known from Belgium.
The Netherlands: Collected in Zeeland in 2006. Other reports of colonies with central erect stem, bearing paired pinnate branches (Photo 46 and 47 in De Blauwe, 2009) possibly concern *Mimosella gracilis* Hincks.
Germany: Collected the German North Sea (Zettler *et al*., 2018) and at Helgoland (pers. comm. B. Kind).

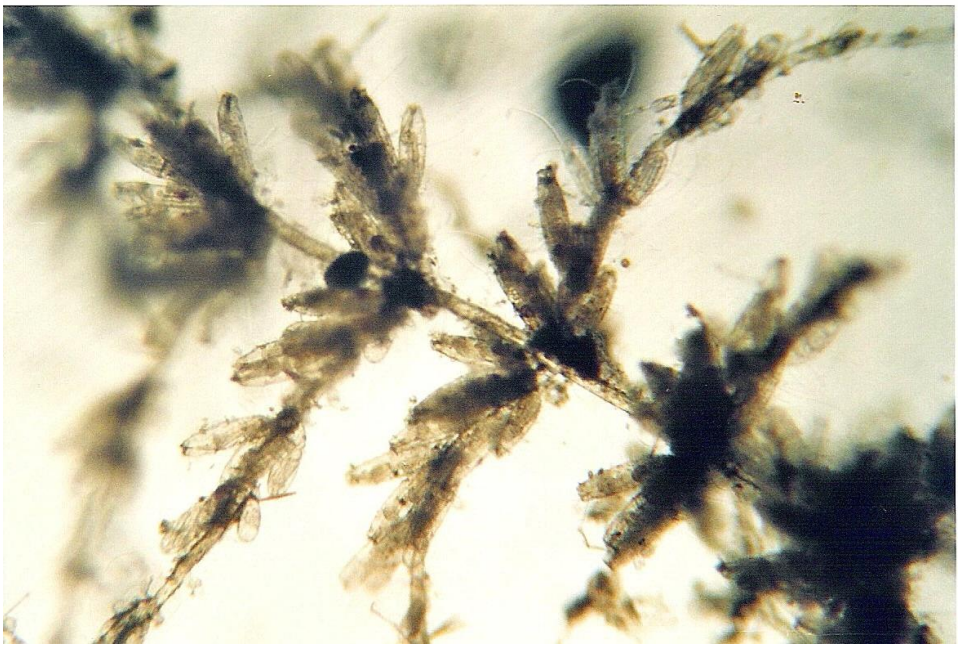

kenozooids and few autozooids, the Netherlands, 2006 (HD)

Family Mimosellidae

***Mimosella gracilis* Hincks**

Description: Colony forming dens tufts; comprising a central stem and paired, pinnate branches both composed of tubular kenozooids. Each kenozooid of the secondary branches buds a pair of autozooids. Autozooids cylindrical, transparent, not pedunculated; 0.5 x 0.2 mm. Orifice terminal and squared. Lophophore with 8 tentacles.

Occurrence: No locations known from Belgium. Colonies cf *M. gracilis* are collected by the author in Brittany (Damgan, 2006) and Zeeland (2004). M. Faasse found a similar colony in Zeeland, http://home.kpn.nl/faassema/Walkeriauva.html.


Typical colony form, but after collection identified als Walkeri uva, Damgan, Brittany, 2006. Material does no longer excist.

Family Triticellidae

1. a) The peduncle is an erect kenozooid, separated by a septum (interior transverse wall) from the autozooid, orifice circular. ……...……. 2
   b) The peduncle is formed by a tapered proximal portion of the autozooid, without septum, orifice bilabiate. 11-15 tentacles. …….…….. *Farrella repens*
2. a) 17–20 tentacles. Autozooid asymetrical, often with an angular outline. Septum between autozooid and peduncle distinct. ……. *Triticella flava*
   b) Similar but 12 tentacles. …….……...……. *Triticella pedicellata*

Genus *Triticella*

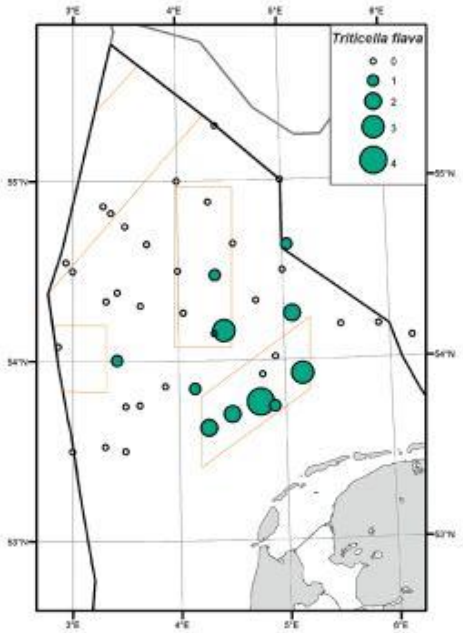
***Triticella flava* Dalyell**

Description : The zooids resemble thick hairs and are easily overlooked. Stalked zooids arrise from a network of slender stolons. The stolons consist of linear series of kenozooids, ending at a septate junction, where chains of short flattened kenozooids are budded. From there very slender peduncles grow vertically and support a single distal autozooid. Distinct septum between peduncle and autozooid.

Occurrence :
Noticed in samples of the Frisian front since 2006, near Terschelling and north of Den Helder. Found in the period 2008-2012 at 12 stations, where at least 37 % of the *Upogebia* acted as hosts for *Triticella flava* (Tempelman *et* al. 2013). The colonies are found on the claws and antennae of *Upogebia deltaura* and *Upogebia stellata*.
Recently, *T. flava* was found in the North Sea (German EEZ and Dutch NCP) on the carapace of males of *Goneplax rhomboides* (Linnaeus, 1758) (Neumann *et al*., 2010).

***Triticella pedicellata* (Alder, 1857)** encrusting on decapods, similar to *Triticella flava*, but lophophore with 10 - 12 tentacles seems to be a rarely reported species or species complex. **Not reported from the southern North Sea** but we should be aware of its existence.

Triticella flava :



Distribution and frequenty in 2008-2012 samples (Tempelman et al. 2013).

On claw, Photo David Tempelman

Genus Farrella

Farrella repens **(Farre, 1837)**

Description: Kenozooids form a slender creeping stolon. Erect cylindrical zooids at the distal end of each kenozooid. The stolon branches off at this point, forming groups of zooids every 1 to 2 mm. Zooids transparent, cylindrical or club-shaped, the proximal part suddenly narrows and resembles a stem. The terminal opening is conspicuously bilobed. Polypid with 11 to 15 tentacles. The length of the zooids and of the narrow proximal portion is variable. Unlike *Triticella*, the polypid sometimes degenerates and forms a residual "brown body". The bilobed opening is the most striking distinction from *Triticella*.

Distribution: Loppens (1906) considered this species to be very common along the Belgian coast. Lacourt (1949) mentions various sites from Zeeland to Friesland.
Common sublittorally on stones, shells, hydroids and crabs in Belgium and the Netherlands (Faasse & De Blauwe, 2004). Tolerant of variable salt levels.

Farrella repens:

few zooids (RV)

Family Hypophorellidae

Genus Hypophorella

***Hypophorella expansa* Ehlers, 1876**

Description: The colony lives within the linings of polychaete tubes. The colony is composed of elongated stolonal kenozooids with a distal capsule-like expansion. An autozooid is laterally attached to the capsule. Single autozooids are attached in an alternating right–left succession on subsequent stolons. The most obvious apomorphic features of *Hypophorella* are space balloons and a gnawing apparatus. The former are two fronto-lateral spherical structures on autozooids, which provide space inside the tube. The latter perforates layers of the polychaete tube wall and consists of two rows of cuticular teeth that, together with the entire vestibular wall, are introvertable during the protrusion-retraction process. (Pröts, et al. (2019)). Polypide with 12 to 14 tentacles.

Remove the outer layer of the *Chaetopterus* tubes. The inner layers are studied under transmitted light under a binocular. Usually the zooids have disappeared and a small borehole remains, usually surrounded by a brown spot. The outer layers of the tube may contain older colonies, with only stolons and holes where the zoids have disappeared. The stolons are very fine but still easily recognizable. Zooids may still be present in fresh material.
For searching *Lanice* tubes, the samples are colored with Bengal rose and *Hypophorella* are then clearly visible.

Occurence:
Lives in tubes of *Chaetopterus variopedatus* and *Lanice conchilega*.
Belgium: Tubes of *Chaetopterus variopedatus* washed up on the Belgian coast often containing remnants or traces of colonies (De Blauwe, 2001). Present on the Hinderbanken in tubes of *Chaetopterus variopedatus*.
The Netherlands: found in tubes of *Lanice conchilega* (pers. comm. M. Faasse 2017).
Germany: collected at Helgoland by Britta Kind (pers. comm.)


worm tube of *Chaetopterus variopedatus*, washed ashore (RV)

Hypophorella expansa (HD)



prepared membrane with stolons and drill holes (left), with 2 zooids (right photo)

Family Penetrantiidae

Genus Penetrantia

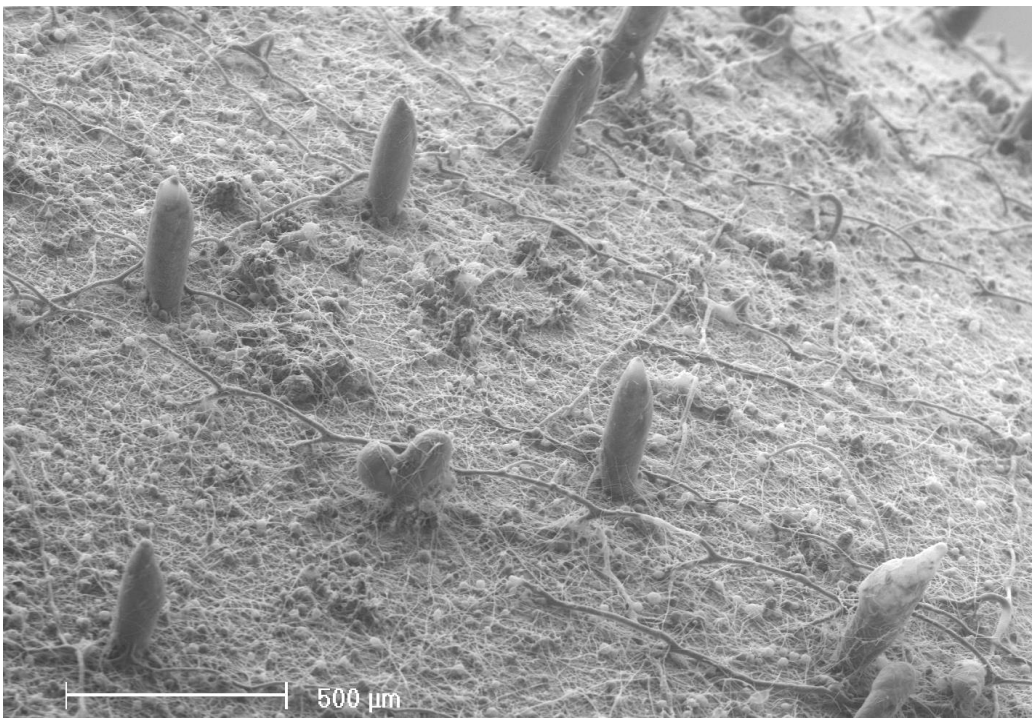
Characteristic are the kidney-shaped openings that lie next to the main stolon. *Penetrantia concharum* is the only recent species known from Europe. A fossil species, *Penetrantia soulei* Pohowsky, 1978, is known from the Plio-Pleistocene of the Kaloot (Zeeland).
In *Penetrantia soulei* additional stolons arise on the zooids and gonozooids and immediately split into three branches, which grow to the surface of the substrate. Gonozooids barely longer than half the zooid length with nearly spherical brood sac between proximal and distal ends. Zooidal opening kidney-shaped. This genus and the next two, which also drill in shells, have already been reported in De Blauwe, 2004b.

***Penetrantia concharum* Silén, 1946**

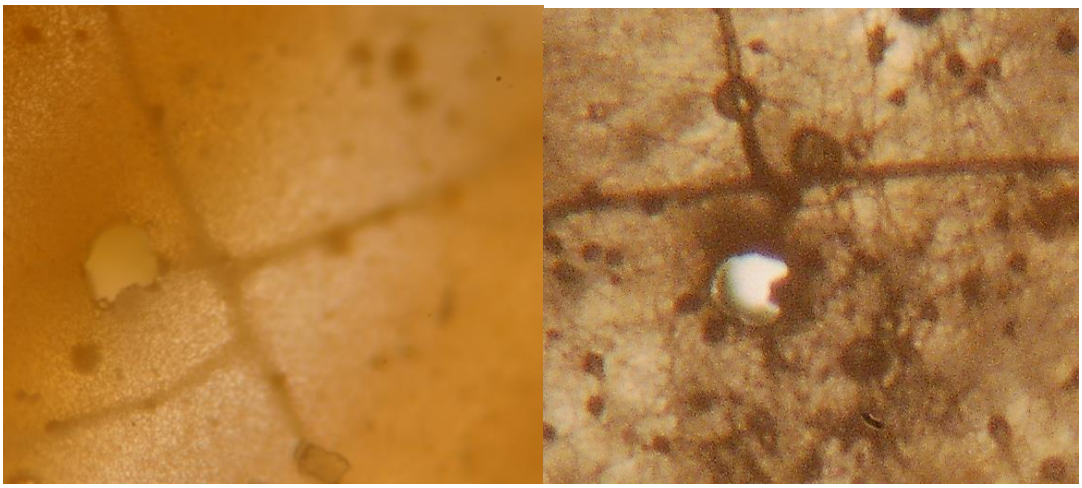
Description: The colony immersed in empty or living shells. Occurs in many shell species, bivalves and gastropods, also in the plates of the barnacles. In living specimens, the brown epidermis can be seen in the small or kidney-shaped holes. The drill holes are interconnected by fine thread-like stolons just below the shell surface. Zooids cylindrical, slender, proximally pointed, perpendicular to the shell surface. Opening terminal, closed by a tan, D-shaped operculum. The stolons consist of many cylindrical kenozooids of variable length. Their distal end is curved upwards, a small protuberance often punctures the shell surface. The zooids are connected to the stolons by means of a short stalk. Polypide with 10 tentacles. The surface openings have a characteristic kidney shape. The drill holes have a constant size, approximately 0.1 mm in diameter. Brood sacs begin and end near the proximal and distal ends of the gonozooids.

Occurence:
Belgium: Borings are very common in shell valves on the Flemish Banks.
The Netherlands: Collected in a shell of Vlieland, Egmond and Dishoek (de Ruijter 2012, 2016, 2019b). Collected on the Dogger Bank in 2016.
Germany: collected by Britta Kind at Helgoland (pers. comm.)

Penetrantia concharum:



cast in polyester, stolons, zooids and gonozooid with brood sac (left of center) Westhinderbank (JC)


Borings, Kwintebank (RV)

Family Immergentiidae

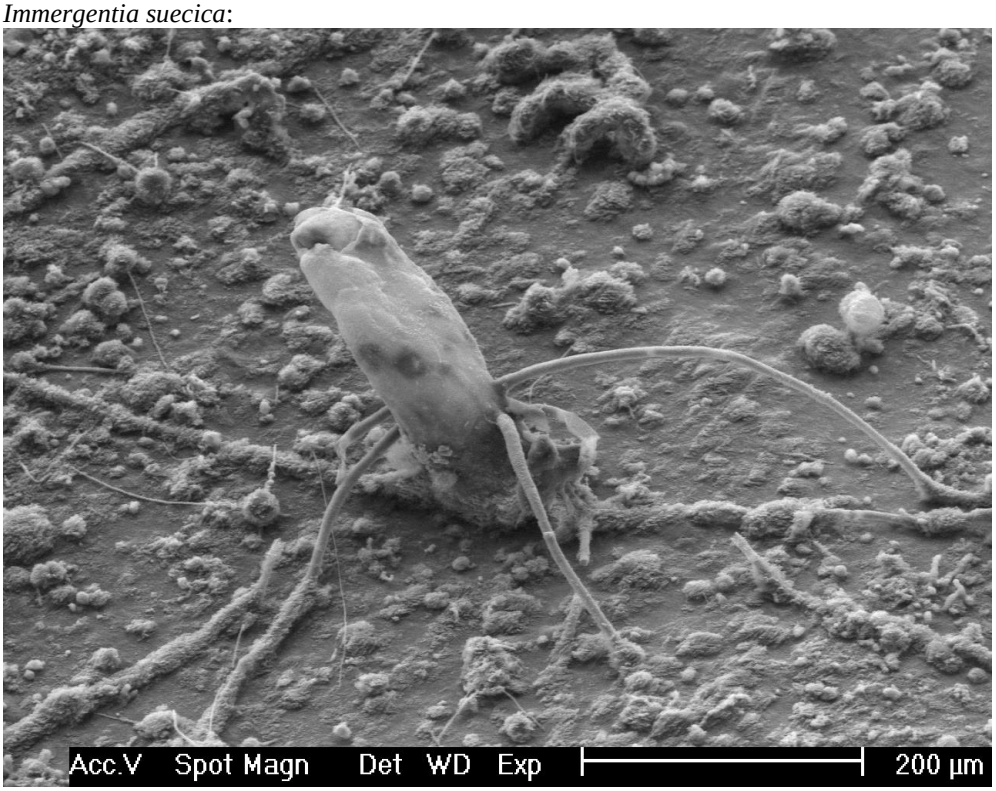
Genus Immergentia

***Immergentia suecica* Silén, 1947**

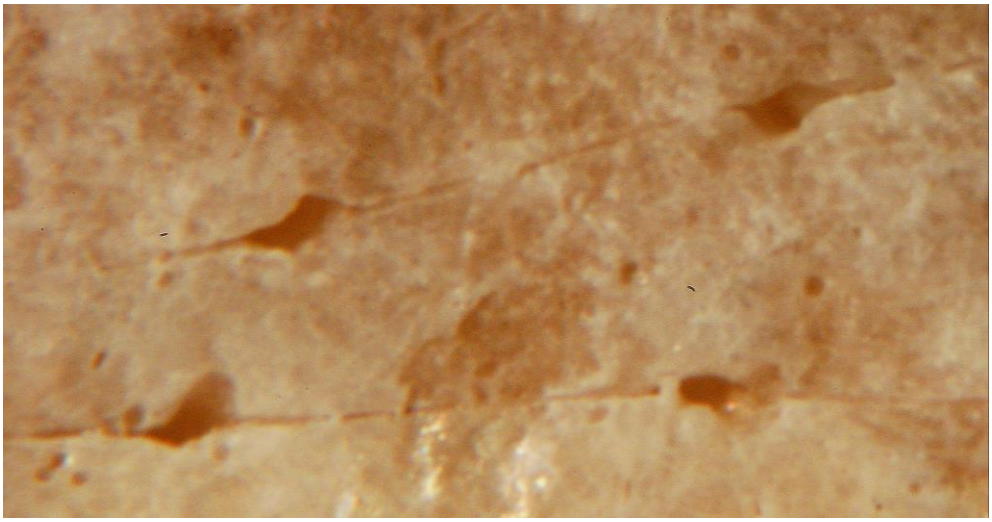
Description:
The colony forms an irregular branching network. Zooids not stalked, they lie on the stolon that connects them. Side branches of the colony are opposite to each other. Opening like a swollen S or its mirror image. The zooids are not perfectly perpendicular to the substrate, the proximal (lower) part of the zoid is oriented proximally.

Occurence:
Belgium: Borings occur in shell valves on the Flemish Banks. The least common borer of the three included here.
The Netherlands: Collected on the Dogger Bank in 2016.
Germany: collected by Britta Kind at Helgoland (pers. comm.)

Immergentia suecica:



cast in polyester, stolons and zooid, Kwintebank (JC)



Borings, Kwintebank (HD)

Family Spathiporidae

Genus Spathipora Pohowsky, 1978

Spathipora borings are common in shells (ancient or fossilized) in the area. For identification it is necessary to make polyester casts of the cavities. Species differ in the site where the peduncle is inserted along the zooid.

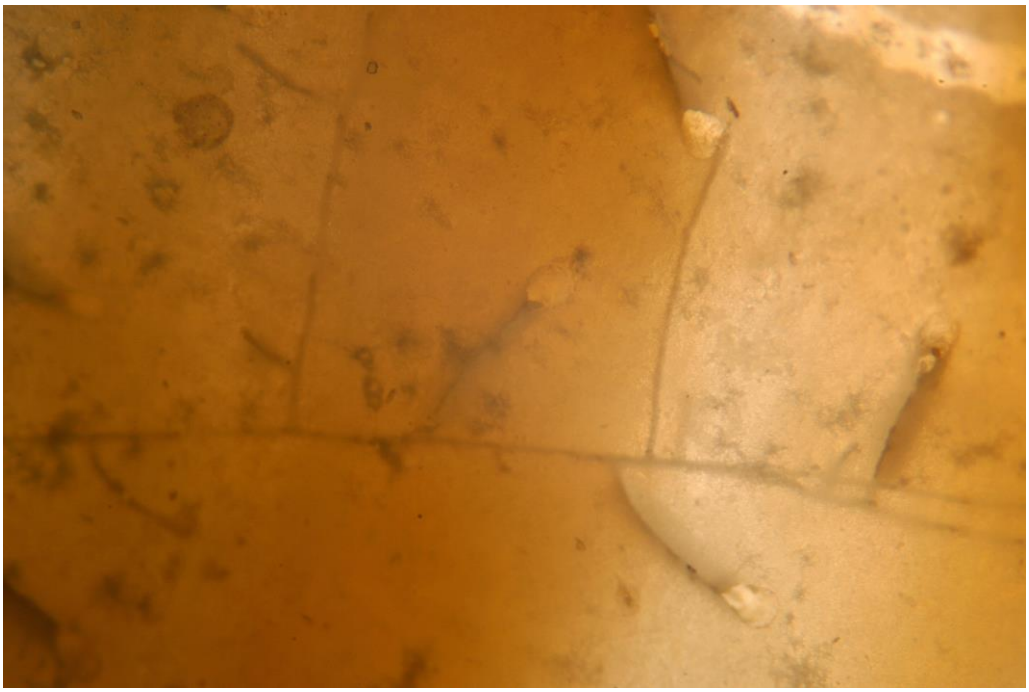
Most of the shells in which the borings were found have a fossil appearance, so there is a good chance that the *Spathipora* made the tracks long time ago. For example, in 2005 there were also borings found from an *Orbignyopora* sp., a genus of which no younger representatives than the Pliocene were hitherto known.

Spathipora sertum
Diagnosis: the peduncle enters the zooid at its tapered proximal end, so that no portion of proximal end is free. This is not the case in the SEM picture on the next page.

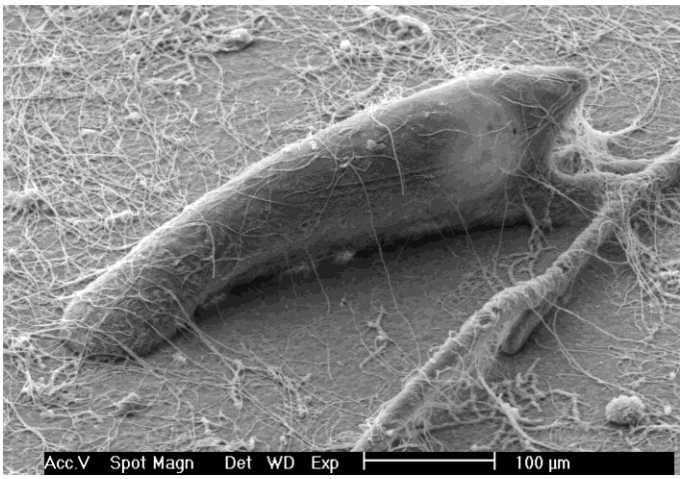
Spathipora sp.
Describtion: Boring Bryozoa witgh peduncle inserted near or proximal to midlength of zooid. Zooids inclined to the horizontal, varying in species; and commonly bear frontal vane with tubulets. Aperture and openings associated to the vane typically form a comma-shaped pattern at surface of the substratum. Ovicelled gonozooids present in some species.

Occurence:
Belgium: Borings are common in shell valves on the Flemish Banks. A live colony was found by Marco Faasse (pers. comm. 2020). He found them by staining with Bengal pink when breaking away a piece of the last turn of a *Hinia reticulata*, collected 0.5-1 km off the coast of De Panne.
The Netherlands: Borings recorded from Schiermonnikoog (Holsteijn, 1998), Vlieland (de Ruijter, 2012), Egmond (de Ruijter 2016) and 60 km west of Walcheren (Heerebout, 1970).
Germany: borings collected by Britta Kind at Helgoland (pers. comm.)

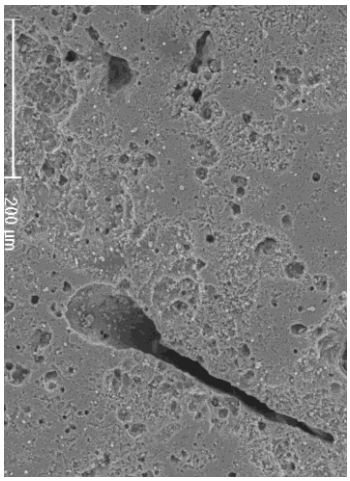
Spathipora sp.:



Borings in shell, Kwintebank



cast in polyester



Borings in shell, Kwintebank

Family Vesiculariidae

Genus Vesicularia

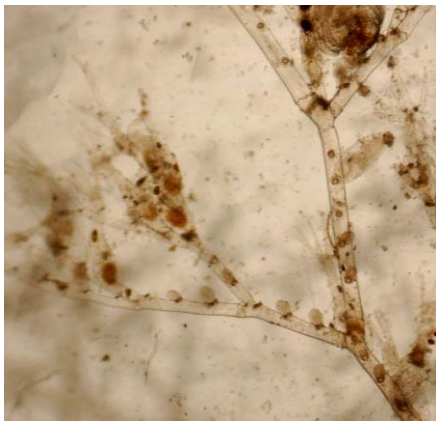
Vesicularia spinosa **(Linnaeus, 1767)**

Description: Forms erect light grey-brown dense clumps, 5 to 30 cm long. The main branch is sturdy and branches continuously at intervals. The branches composed of kenozooids and are separated by transverse walls. The side branches branch in the same way. All growing tips end in a pointed kenozooid. Zooids on a row along the branches, especially on the youngest branches, not permanent. Oval, translucent, narrowing proximally but not stalked, on a protrusion of the branch. Polypide with 8 tentacles.

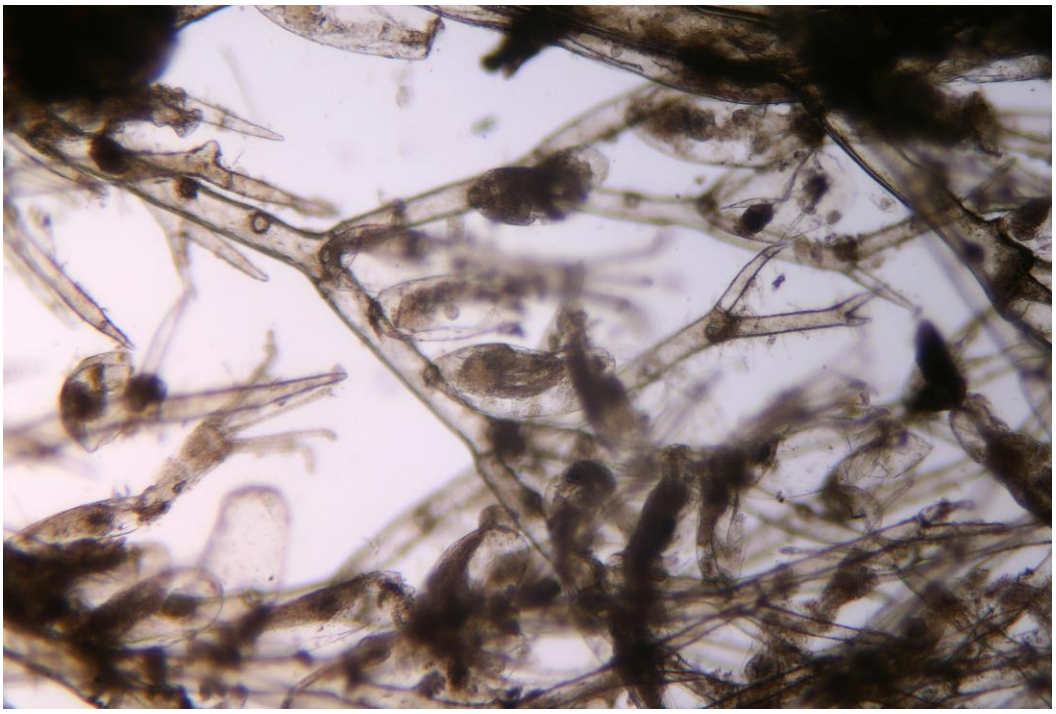
Occurence:
Belgium: Loppens (1906) mentions this species as fairly common on rocks, oysters and seaweed. At the beginning of the last century, Gilson only encountered this species in the vicinity of the Hinderbanken. The absence in samples taken near the coast is remarkable. It is apparently not a species of shallow water.
Research in 2005 showed that *Vesicularia spinosa* is still present in the channels between the Hinderbanks (De Blauwe et al., 2006). On April 30, 2006, a colony was found attached to a beach head in Koksijde. In 2003 a colony was collected on the wreck of the Bourasque (Zintzen, 2007; Zintzen & Massin, 2010). Often washes up along the Belgian coast in autumn and winter.
The Netherlands:
Vesicularia spinosa was found during the MWTL programme on the Oyster Grounds. The loose colonies leave some doubt whether they lived at the exact box core locations (MWTL 2006: 54°49’24”N, 003°22’00”E, depth 42 m, 2009: 53°30’00”N, 03°00’00”E, depth 36 m) (Faasse *et al*., 2013).
There are older reports of which it is uncertain whether the colonies were washed ashore or established (Lacourt, 1949).
Washed up on the shores of Katwijk and Westkapelle (Maitland, 1851) and Noordhollands Duinreservaat in 2020 (waarneming.nl).

Vesicularia spinosa:

washed up at Zeebrugge, 2006 (HD)



colony branch



zooids on kenozooidal branch with spiky end, washed up at Oostende, 2006 (RV)

Genus Amathia

The genera *Bowerbankia* and *Zoobotryon* have been placed in synonymy with *Amathia* by Waeschenbach et al. (2015)

1 a) Erect, stiff, brown tufts. Autozooids arranged in straight comb-like rows, typically, adjacent zooids are laterally joined. ……... *Amathia lendigera* (p 90)
b) Autozooids group more loosely and are never laterally joined. 2

2 a) Zooids in groups, each group in a semi-spiral around an erect stolon. Zooids shorter than 0.5 mm, polypide bright yellow. ..... *Amathia citrina* (p. 82)
b) Zoids not spirally implanted on the stolon. 3

3 a) Polypide with 10 tentacles. ..... *Amathia imbricata* (p. 88)
b) Polypide with 8 tentacles. 4

4 a) Embryos pink. ……..…….. *Amathia* cf. *gracilis 1* (p. 84)
b) Embryos yellow. ……..… *Amathia* cf. *gracilis* 2 (p. 86)

Amathia citrina **(Hincks, 1877)**

Description:
At first adherent, with later spreading erect tufts up to 5 cm high. Stolons cylindrical, as wide or wider than the zooids. Internodes 1.5 to 2 mm long. Zooids in separate groups in a semi-spiral on the stolon, just before a bifurcation. Active feeding colonies are yellowish. Inactive, degenerate colonies are to be confused with *A. pustulosa*, a similar species with colorless polypide, which was recently found in Boulogne (Northern France) by Marco Faasse (pers. comm.). Zooids cylindrical and short, 0.4 mm long, truncated distally. Degenerate zooids shorter and distally pointed or rounded. Zooids colorless, translucent, polypide bright lemon yellow, with 8 tentacles.

Occurrence: Found in Zeeland from 1997on, near Zierikzee, Strijenham and Yerseke and present from July to early October (Faasse & De Blauwe, 2004).

colony, Yerseke 2006 (HD)

part of a colony

spiral implantation of the zooids, Yerseke 2006 (HD)

***Amathia gracilis* Leidy (1855)**

Amathia gracilis is described from the USA. Results (Waeschenbach et al. 2015) from BI phylogenetic reconstruction and the presence of a 20% difference between cox1 sequences suggest that the European and USA specimens are clearly separate species. The identification for the European material still needs to be established. Based on embryo colour, morphometrics and allozyme work, there are likely to be two British species referred to as *B. gracilis*; one with yellow embryos and one with pink embryos. Colonies that harbour yellow vs. pink embryos exhibit slight morphological differences, specifically zooid and stolon dimensions. Embryo colour needs to be observed in living material.

Amathia cf. gracilis 1 - pink embryos

Description: Colony adherent, diffuse or with dense clumps of zooids. Stolons may be free from the substrate. Stolon very slender, half as broad as the zooids, translucent at first, later opaque brown. Autozooids budding from sides of the stolon, scattered or in dense groups, truncate distally, often with a caudal projection (short proximal tail-shaped kenozooid). Zooids 0,6 to 1,2 mm long. Polypide with 8 tentakels. Embryos pink.

Often forms dense mats. The largest zooids are active feeding zooids, smaller ones often breed embryos or have a degenerating polypid. Often two or three 'brown bodies' are present in the zooids.

Occurence: On the lower beach and shallow sublittoral on rocks, shells, algae and often on hydroids. Tolerates low and variable salinity levels.

Belgium: Loppens (1906) generally found this species in brackish water, but probably underestimated the numbers due to confusion with *A. imbricata*. Very common on ship hulls and submerged structures in marinas, in creeks and on groynes.

The Netherlands: Lacourt (1949) faced the same problem. Very common on ship hulls and submerged structures in marinas, in creeks and on groynes in Zeeland. Collected on the Doggerbank in 2016.

Germany: Collected at Helgoland (pers. comm. B. Kind).


Photo 70: part of a colony, Zeebrugge, 2006 (HD)

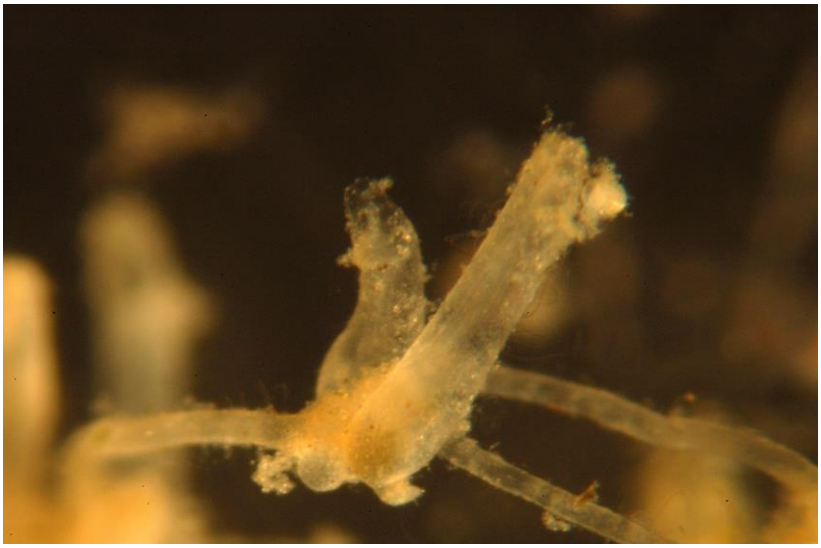
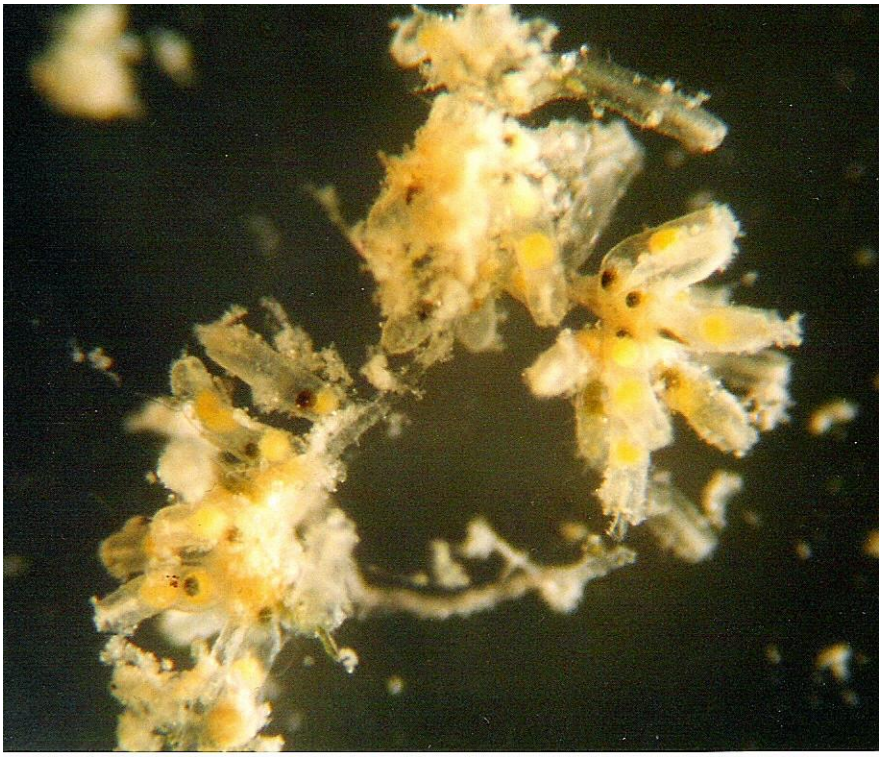


Photo 71: 2 zooids with ‘cauda’, Burghsluis, 2007 (HD)

***Amathia* cf. *gracilis* 2 – yellow embryos**

Description:
Occasionally, *Amathia* cf. *gracilis* (8 tentacles, stolon thinner than zooids) except that the embryos are yellow instead of pink. Waeschenbach *et al*. (2015) call European *A. gracilis* with yellow embryos *A.* cf. *gracilis*. It's genetically different from the true *A. gracilis* from Rhode Island.

Occurence:
The author found such colonies in Zeebrugge and Arcachon (France), they have also been found in Swansea (Wales) (Hayward, 1985). According to Ryland (pers. comm.), this may be an undescribed species. Further morphological, DNA and ecological research into *Amathia* is desirable.


Stolon thinner than the zooids, embryos yellow (HD)

Amathia imbricata **(Adams, 1798)**

Description:
Colony adherent or erect, dense feathery tufts to over 5 cm in length. Stolon often wider than the zooids. Zooids in groups on the stolons. Zooids rounded cylindrical, proximally somewhat swollen, ending quadrangular distally. Zooids quite large: 0.8 to 1.5 mm long. Zooids with a degenerate polypide are shorter and swollen with rounded distal end. Polypide with 10 tentacles. Embryos deep yellow.

Occurence: In the tidal area and in shallow coastal waters, on brown algae, on rocks and wooden structures and on other Bryozoa and Hydrozoa. In sheltered places, luxuriant erect tufts may occur. Especially in turbid waters of estuaries and on sheltered beaches. Colonies of *Amathia gracilis* (with 8 tentacles) and *A. imbricata* (with 10 tentacles) sometimes grow together.
Belgium: Loppens (1906) mentions this species as fairly common in the sea and in brackish water, but was unable to distinguish it well with *Amathia gracilis*, which he called var. *A. imbricata* var. *caudata*, this is apparent from his statement of the number of tentacles.
The Netherlands: Occurs in the Oosterschelde, in the Canal of Goes in the canal through Zuid-Beveland (Faasse & De Blauwe, 2004). Lengkeek *et al*. (2013) report *A. imbricata* from the shipwreck 'HMS Scott' (UTM 564929 5805707).
Germany: Collected at Helgoland (pers. comm. B. Kind).

10 tentacles, stolon relatively wide, St-Lunaire, France, 2021

Amathia lendigera **(Linnaeus, 1758)**

Description:
Forms stiff, spreading, light brown tangles, up to 4 cm in diameter. Twigs firm, cylindrical, branching dichotomous, each internode is a single kenozooid. Zooid groups consist of 5 to 8 pairs. Autozooids arranged close together in double, **straight**, comb-like rows on the distal half of each internode, just before the bifurcation. Zooids cylindrical, truncated and with terminal opening. Polypide with 8 tentacles. Fully grown zooids have the same length, at the growing points the zooids decrease in length towards the end of the internode, so that the zooid groups there have a triangular shape. Internode typically 2 mm long.

Occurence:
Belgium: Loppens (1906) found this species rather rarely on hydroids and algae, mainly on *Halidrys siliquosa*. Washed up on a lobster trap in Zeebrugge in December 1999, on a fishing net in Ostend in November 2000 and in a water bottle in De Haan in December 2011.
The Netherlands: Reported from the Netherlands from Scheveningen on washed-up algae (Maitland, 1851). Washed up in November 2016 on a plastic basket in Petten (de Ruijter, 2017a) and in January 2018 on Texel (Sytske Dijksen email with photo). In addition to many colonies of *Tricellaria inopinata* and *Cryptosula pallasiana*, a colony of *Amathia lendigera* (de Ruijter, 2018) grew on a valve of *Mya arenaria* that was under a bunch of bladderwrack *Fucus vesiculosus*. Two colonies *on Sargassum muticum* on Texel (de Ruijter, 2020b).

Amathia lendigera:

Petten @Rien de Ruijter 2016

Living colony, Damgan (Bretagne), 2006 (HD)

Family Buskiidae

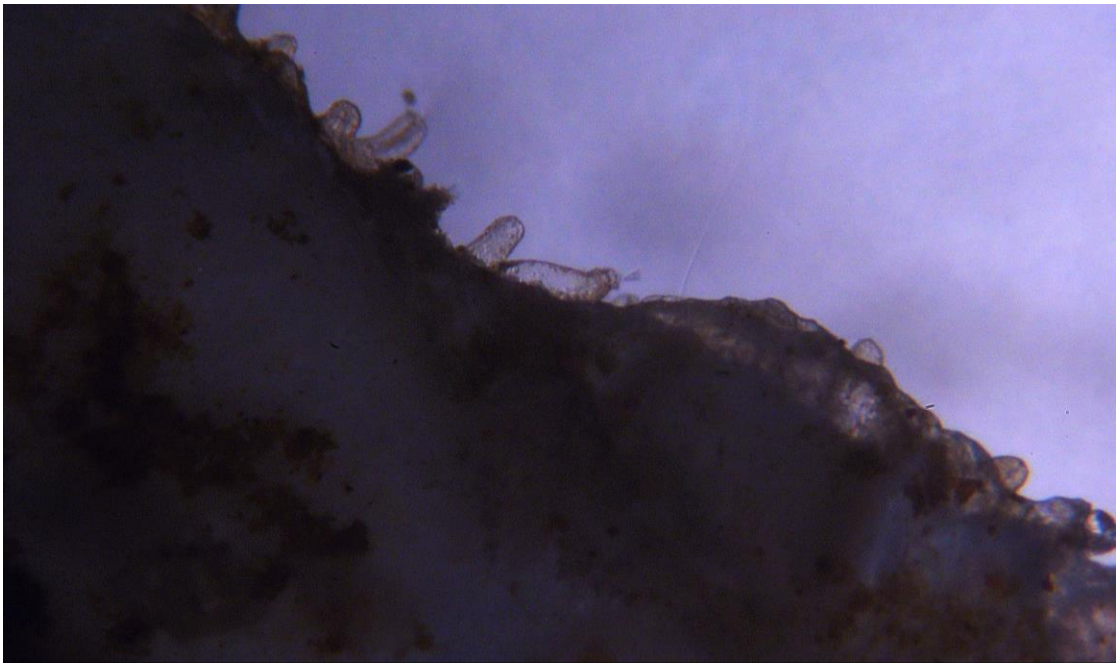
Genus Buskia

Buskia nitens **Alder, 1856**

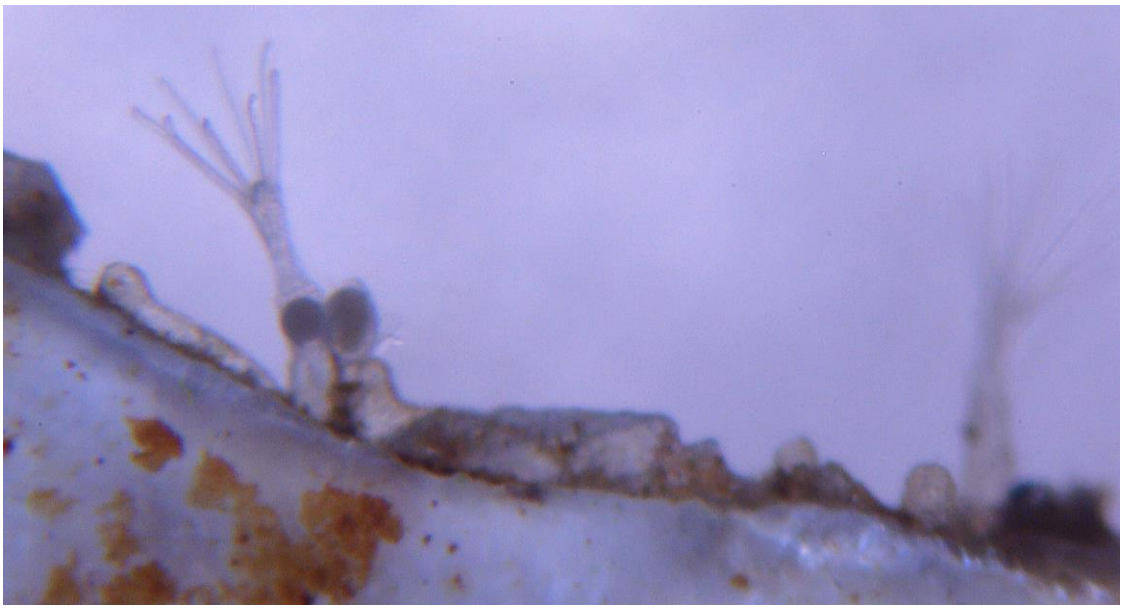
Description:
Stolons branch inconspicuously over the substrate. They are very thin, only 0.05 mm thick, translucent, almost invisible and closely attached to the substrate. Zooids ovate, 0.3 to 0.4 mm long, for the most part attached to the stolon. The distal end projects upward, is angular with a terminal opening. The frontal surface is convex, often slightly grained at the sides, sometimes with prominent bulges. Polypide with 8 tentacles. Embryos light yellow.

Occurence:
Belgium: no records.
The Netherlands: In Zeeland at Wemeldinge, Yerseke and Westkapelle (Faasse & De Blauwe, 2004; Jebram, 1968). Rarely observed due to its small size. Grows on hydroids such as *Halecium*, *Hydrallmania*, erected bryozoans and rarely on rocks and small algae. The colony shown is growing on a Pacific oyster.
Germany: Collected at Helgoland (pers. comm. B. Kind).

Buskia nitens:



Part of a colony, Yerseke, 2006 (HD)



Part of a colony, Yerseke, 2006 (HD)

Glossary of special terms

Ancestrula: first zooid of a colony formed by metamorphosis of a free-swimming larva.
Autozooid: nourishing zooid with tentacles.
Basal: the side opposite to the frontal side (of the autozooid)
Brood sac: uncalcified ovicell in *Penetrantia*, *Aetea* and *Eucratea*.
Distal: toward the growth end of the colony, away from the ancestrula.
Frontal: the top surface, which contains the opening.
Gonozooid: zooid modified as a brood chamber (Cyclostomatida).
Heterozooid: individual that is not a feeding zooid (stolonial kenozooid, spinous kenozooid (*Flustrellidra*), avicularium and vibraculum (Cheilostomatida)).
Intertentacular organ: tubular organ between the tentacles that plays a role in the secretion of eggs. It is only present during the reproductive season in species that secrete eggs.
Kenozooid: individual that is not a feeding zooid (stolonial kenozooid, spinous kenozooid (Flustrellidra), usually without either orifice or muscles.
Lateral: the side walls.
Marginal: around the opesia (marginal spines).
Operculum: flap that closes the opening in Cheilostomatida.
Opesia: the opening below the frontal membrane in Cheilostomatida.
Orifice: opening in the autozooid wall through which the tentacles are exserted.
Ovicell: globular brood chamber in Cheilostomatida.
Peristome: In Ctenonostomatida, an erect part of the autozooid in which the orifice lies, in Cyclostomatida, the tubular erect part with the orifice, in Cheilostomatida, an elevated part in relation to the orifice.
Polypide: tissue and organs in the autozooid (tentacles, tentacle sheath, alimentary canal, muscles and nerve ganglion).
Proximal: toward the origin of the colony.
Rhizooids: root-like structures that attach established colonies to the substrate.
Stolon: root-like connection between zooids, attached to the substrate or not.
Zooid: single bryozoan individual.
Zoecium: protective wall of a zooid, membranous or calcified.

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