

## **Guide to identification of Lumbrineridae (Polychaeta) in Norwegian and adjacent waters**

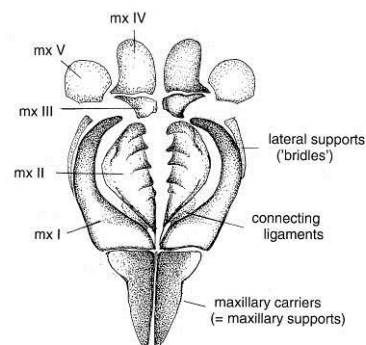
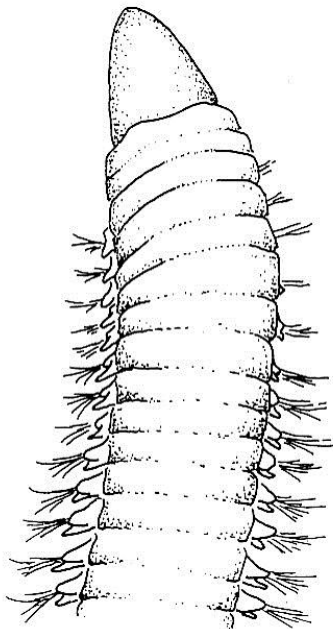
**Eivind Oug**

Norwegian Institute for Water Research, Regional Office Sorlandet,  
Jon Lilletuns vei 3,  
NO-4879 Grimstad, Norway

*eivind.oug@niva.no*

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## Introduction

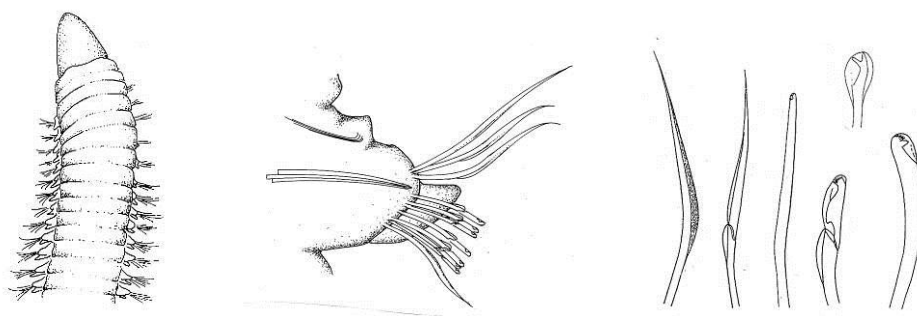
The lumbrinerids are generally long cylindrical bristle worms of small to medium size with rather simple external morphology. The largest species in northern waters may reach a length of about 35 cm, but most species are 2-10 cm in length. They are mostly found in soft-sediment environments where they burrow into the substrate. The lumbrinerids are largely considered to be carnivores, but some species have been reported to feed on plant fragments or detritus (Fauchald & Jumars 1979).

The lumbrinerids belong in the eunicid group of polychaetes which is characterised by the presence of a complicated jaw apparatus in the pharynx. The jaw apparatus is of the 'labidognath' type (Orensanz 1990) and is basically similar to the jaws found in Eunicidae and Onuphidae. In traditional faunal works the eunicid group has been treated as an order (e.g. Fauchald 1977, Hartmann-Schröder 1996), whereas in newer taxonomy the group has been placed without particular rank within the main division Aciculata (Rouse & Pleijel 2001).

The most important taxonomic characters are found in jaw structures, types and shapes of chaetae, and shape of respiratory lobes. Jaw characters have been extensively used for definition of genera in recent years, which has lead to a more stable and consistent system for species classification in the family. As a consequence, several new genera have been erected whereas extant genera have been redefined (see Orensanz 1973, 1990; Frame 1992; Carrera-Parra 2006a). Orensanz (1990), Frame (1992) and Hilbig (1995) have accounted for the taxonomic history of the family and have discussed the importance of the diagnostic characters.

## Morphology

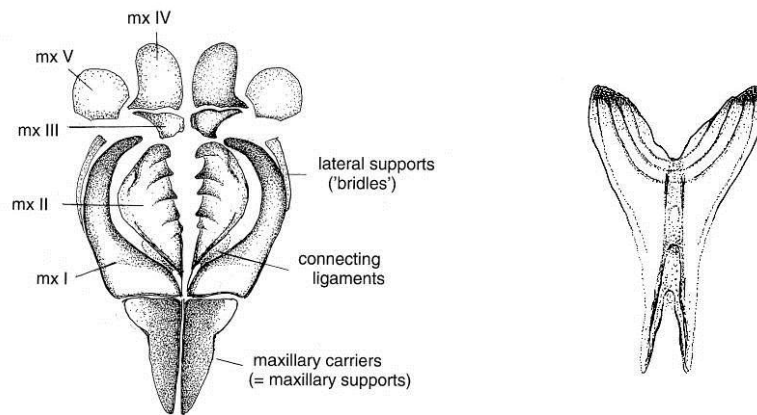
The lumbrinerids have a long cylindrical body with generally similar segments (Figure 1). In most species the width is gradually tapering towards the pygidium. The prostomium is well-developed and is usually without eyes and appendages, but in some genera small occipital antennae may be found in the fold between prostomium and peristomium. The peristomium consists of two rings (not true segments) without parapodia and chaetae. Tentacular cirri are absent. The following chaetigers carry parapodia which are mostly uniramous, but often a bundle of thin notoacaculae and a short knoblike notopodium are found. Ventral cirri are absent. Chaetae include simple limbate chaetae, composite spinigers, and simple and composite hooded hooks (Figure 1).



**Figure 1.** Lumbrineridae: anterior body (*Lumbrineris*), parapod from anterior body (*Lumbrineris*), chaetae (limbate chaeta, composite spiniger (*Lumbricalus*), long-bladed simple hook, multidentate composite hook, bidentate hook (*Lumbrinerides*), simple multidentate hook)

The maxillae consist of a pair of posterior carriers and four or five pairs of maxillary plates (Figure 2). The carriers are broad, mostly short, and are attached to the most posterior pair of maxillae (mx I) by a firm 'click-joint' connection (labidognath arrangement). The maxillary plates are usually referred to by numbers (roman numerals) from I to V (note that different numbering systems may be found in the

older literature). In addition to the numbered plates other more or less well-developed structures may be found, variously referred to as ligaments, bridles or attachment lamellae. The mandibles generally are of simple structure and formed as rods with flared anterior ends (Figure 2).

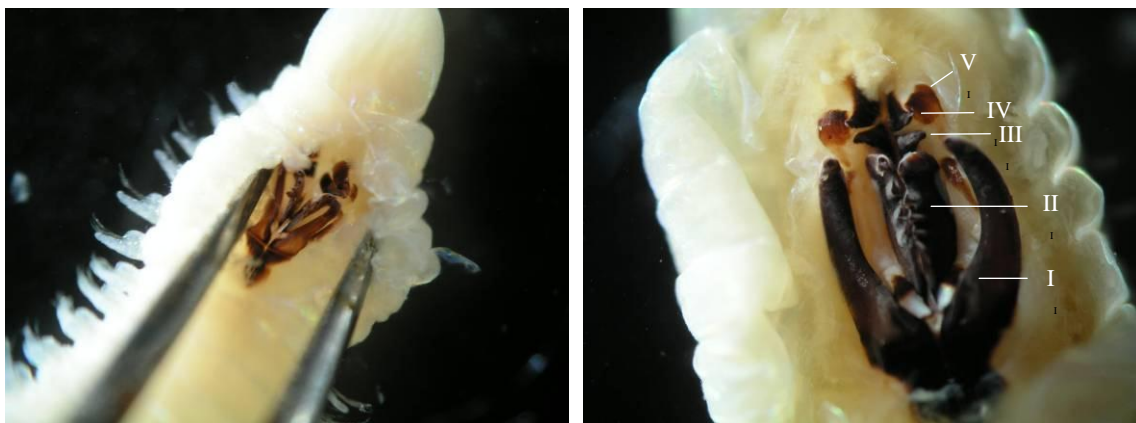


**Figure 2.** Jaw apparatus Lumbrineridae. Left: maxillae (from *Lumbrineris*). Right: mandibles (from *Lumbrineris*). Roman numerals indicate established numbering system for maxillary elements.

## Identification

Maxillary structures (mx) can most conveniently be examined by making a dorsal incision in the region of chaetiger 1-2 to 5-6 (Figure 3). The most important structures, mx III and IV, are usually oriented more or less vertically with teeth projecting upwards just in front of the tip of mx I (Figure 3 right). In cases when the pharynx is partly protruded and maxillae appear in the mouth opening, a ventral incision at the side of the midline may be made instead of a dorsal incision. However, it is then usually necessary to break off the anterior part of the mandibles to examine mx III and IV.

Chaetae should be examined using compound microscope (400 x). In small specimens, chaetae can be viewed directly from specimens placed with the ventral side uppermost under a cover-slip. In larger specimens it is usually necessary to remove a parapodium for such examination. This also applies for examining the colour of aciculae.



**Figure 3.** A. Dorsal incision to expose maxillae. Left: *Lumbrineris* near *coccinea*, western Greenland. Right: *Lumbrineris latreilli*, east of Iceland. Numbering of maxillae indicated. Photo: Eivind Oug

## Geographical area

The area covered by this guide encompasses Norwegian coastal waters, Skagerrak, Kattegat, the North Sea, the Norwegian Sea, the Barents Sea and the fishery zones (200 nautical miles) around Svalbard and the island of Jan Mayen. This covers shallow coastal waters, deep sea areas in the Norwegian Sea as well as polar areas north and east of Svalbard. In addition, species reported from nearby areas (the English Channel, the Iceland Sea and the Greenland Sea, eastern Barents Sea) have been included.

About 20 lumbrinerid species are known from the area. The highest number of species is reported from the North Sea and shelf areas of the Faroes and Iceland. The number of species appears to be less than 10 in the inner Skagerrak, the Kattegat, the Barents Sea and Norwegian Sea deep-water.

General faunistic works treating lumbrinerids in North East Atlantic waters include Fauvel (1923), Hartmann-Schröder (1971, 1996), Miura (1980), Winsnes (1980), George & Hartmann-Schröder (1985) and Kirkegaard (1992). Several of the species found in the area are not included in the ‘standard’ works used for species identification.

Data for the distribution of the species have been assembled from i.a. Eliason (1962), Winsnes (1980), Mackie & Erséus (1997), Hansson (1998), Oug (2000, 2005), Brattegard & Holthe (2001), Dauvin et al. (2003), and Carrera-Parra (2006a, b). In addition, own observations on material from the North Sea, Skagerrak and Kattegat, the Norwegian Sea deep water, and Norwegian coastal waters have also been taken into account.

## Status of the taxonomy

Several of the species in the area are insufficiently characterised. In some cases, present descriptions in ‘standard’ identification literature may seem to mix characters from several similar species making species identification problematical. In addition, specimens with specific characters that do not fit with the present species descriptions are regularly found. Whether such specimens represent intraspecific variants or separate species is not known. The genera with most problems are *Abyssoninoe*, *Augeneria* and *Lumbrineris*. The present guide mostly comprises named species with good diagnostic characters, but some regularly found forms of uncertain status also are included (referred to as ‘cf’ or ‘near’ related species). A few currently un-named forms also are included.

## Explanation of terms

*Acicula* – supporting bristle imbedded in the parapodium

*Attachment lamellae* – additional pieces of the maxillary apparatus, usually situated lateral to or below the individual maxillae. Rod-shaped attachment lamellae situated lateral to mx I are by some authors referred to as “bridles”.

*Bidentate hook* – hook with two strong distinctly separated teeth

*Branchial lobe* – cylindrical to short digitiform process extending from the parapodium and equipped with capillary blood vessels for gas exchange. Present in some genera and species.

*Carrier* – part of the maxillary apparatus situated posterior to the first maxillae (mx I) and connected to it by a ‘click-joint’

*Chaetiger* – segment bearing chaetae

*Composite hooded hook* – hook with a distinct subdistal joint separating the outer part (blade) from the shaft. Hood with a more or less distinct constriction at the position of the joint.

*Composite spiniger* – simple gradually tapering chaeta provided with a joint

*Connecting ligament* – additional piece placed between and connecting the bases of mx I and mx II. Also referred to as connecting lamella.

*Limbate chaeta* – simple gradually tapering chaeta provided with a brim along most of the length, often gently curved. Found in anterior body of all species.

*Maxillae* – paired and usually the most prominent elements of the maxillary apparatus. Maxillae are generally numbered from I to V from behind and forwards (different numbering systems may be found in older literature).

*Maxillary apparatus* – dorsal part of the jaws consisting of several individual elements: four or five pairs of maxillae, carrier, connecting ligaments and attachment lamellae

*Maxillary teeth* – well-defined projections on the maxillae directed inwards or upwards. In some genera knoblike projections or swellings may be found in addition to defined teeth, by some authors also referred to as teeth.

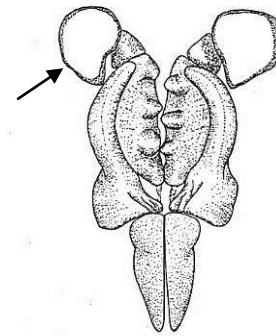
*Multidentate hooded hook* – hook with a rounded apex with several small teeth encapsulated by a transparent hood. Only type of chaetae in posterior body of most species.

*Occipital antennae* – small antennae placed posterior on the prostomium; in lumbrinerids in the fold between prostomium and peristomium. May also be referred to as nuchal antennae or nuchal papillae.

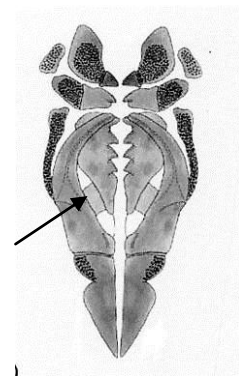
*Pseudocomposite hooded hook* – hook with an incomplete separation between the outer part (blade) and shaft. Usually with a constriction of the hood as in composite hooks.

## Key to genera

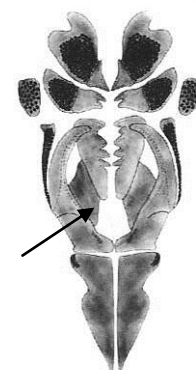
1. Composite or pseudocomposite hooded hooks present in anterior part of body..... 2
  - All hooded hooks simple, anterior body may have limbate chaetae only ..... 4
2. Mx IV forming a squarish plate with whitish central area and black margins. Mx V absent. Occipital antennae may be present at posterior border of prostomium ..... ***Augeneria***



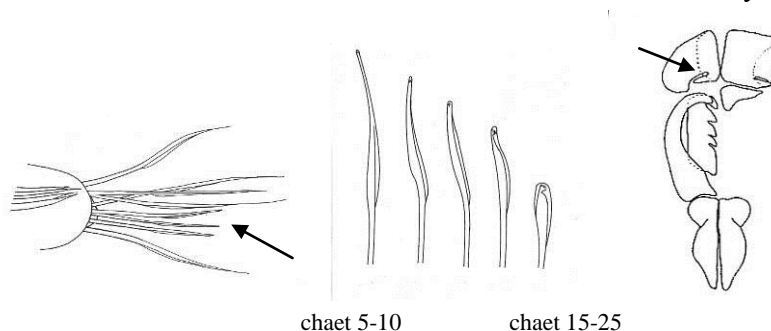
- Mx IV a triangular to oblong evenly black or brown plate with a marked tooth. Mx V present, rounded ..... 3
3. Mx II almost as long as mx I (about 2/3 or 3/4 of the length), connected to mx I with narrow to moderately wide connecting ligament. Aciculae pale, brown or black ..... ***Lumbrineris***



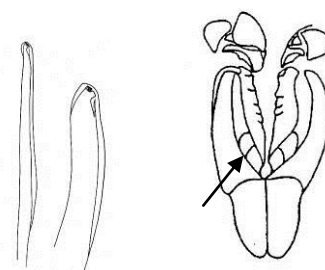
- Mx II about half as long as mx I, connected to mx I by wide connecting ligament. Aciculae yellow ..... ***Hilbigneris***



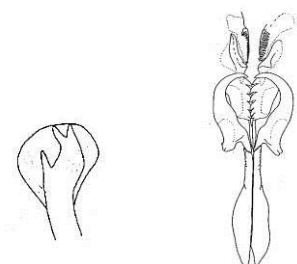
4. Anterior body with limbate chaetae and modified long hooded hooks. Most anterior hooks extremely slender, resembling limbate chaetae in outline, gradually becoming shorter through following chaetigers and developing into regular hooded hooks at chaetiger 15-25. Aciculae yellow. Mx IV and V fused forming a hemisphaerical structure, with a strong dorsal tooth at posterior border ..... ***Abyssoninoe***



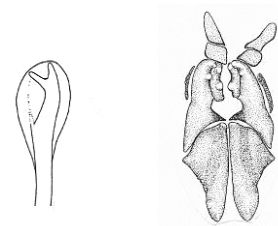
- Anterior body with limbate chaetae and regular hooded hooks or with limbate chaetae only ..... 5
5. Hooded hooks bidentate ..... 6
- Hooded hooks multidentate, maxillae with free rounded mx V; mx I and mx II connected by short posterior ligament ..... ***Scoletoma***



6. Hooded hooks with a subdistal tooth or spur. Mx IV with a fringe of denticles on inner margin. Carriers long and slim, with narrow anterior part ..... ***Lumbrineriopsis***



- Hooded hooks without subdistal tooth. Mx IV without teeth or denticles. Carriers wide, with arcuate anterior border ..... ***Lumbrinerides***



**Abyssoninoe** Orensanz, 1990

**Characteristics.** Prostomium conical. Parapodia uniramous, with simple limbate chaetae and simple, multidentate hooded hooks. Anterior hooks extremely long, tapering, resembling limbate setae, becoming shorter backwards and gradually developing into clearly defined hooks. Aciculae yellow. Mx III unidentate. Mx IV and V fused, mx IV with a tooth protruding from posterior border.

**Taxonomy.** The genus is rather well-defined by the specialised hooded hooks in anterior chaetigers and the fusion of mx IV and V. Species discrimination is problematical, however. Characters which have been used for species separation include the most anterior position of 'normal-shaped' hooded hooks and the development of prolonged digitiform vascularised lobes in far posterior segments.

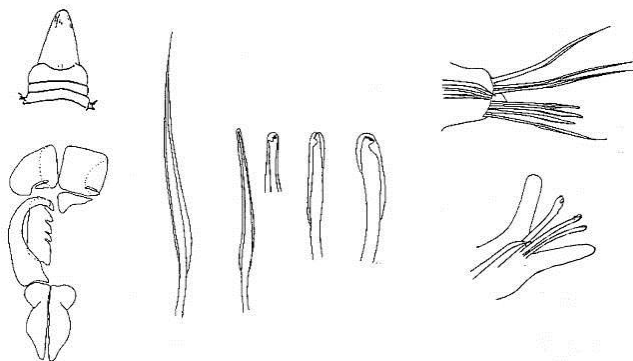
*Abyssoninoe hibernica* was redescribed by Parapar et al. (1994). *Abyssoninoe scopa* was synonymised with *A. hibernica* by Parapar et al. (1994), but is here considered to be a separate species. The number of species in the region is uncertain.

1. Anterior body with prolonged tapering hooks at least to chaetiger 15, posterior parapodia with prolonged digitiform lobes ..... 2
- Anterior body with prolonged tapering hooks to chaetiger 9-15, posterior parapodia without prolonged lobes ..... 3
2. Clearly defined hooded hooks appear at chaetiger 15-20, far posterior parapodia with prolonged digitiform prechaetal and postchaetal lobes .....

..... ***Abyssoninoe hibernica*** (McIntosh, 1903)

[= *A. scopa aequilobata* (Winsnes, 1981); = *A. pseudofragilis* Amoureux, 1977].

Irish Sea, North Sea, Skagerrak, Norwegian coast, moderate depths.

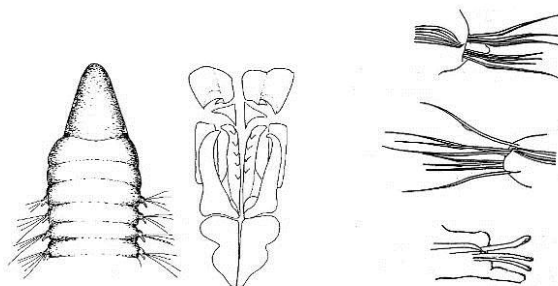


Figs from left: Anterior end; maxillae (left mx III and right mx I, II omitted); limbate chaeta; modified slender hooded hook chaetiger 8; detail of same; hooded hook chaetiger 25; posterior hooded hook; parapodium 15; far posterior parapodium. From Winsnes (1980, 1981) and Parapar et al. (1994)

- Clearly defined hooded hooks appear at about chaetiger 25 or further back, far posterior parapodia with digitiform postchaetal lobe, prechaetal lobe small .....

..... ***Abyssoninoe scopa*** (Fauchald, 1974)

Fjords in western and northern Norway, >200 m. Possibly also NE Atlantic deep water

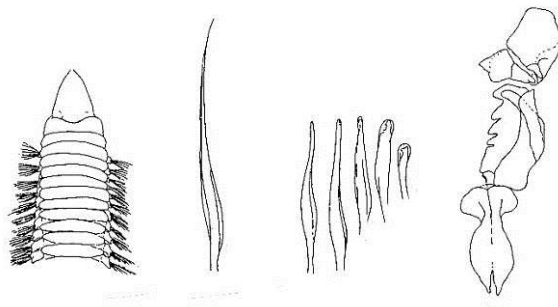


Figs from left: Anterior end; maxillae; parapodium 2; parapodium 15; far posterior parapodium. From Fauchald (1974) and Winsnes (1980)



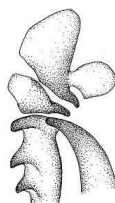
3. Clearly defined hooded hooks appear at chaetiger 10-15, posterior parapodia with short rounded prechaetal and short conical postchaetal lobes .....  
 ..... *Abyssoninoe* cf *abyssorum* (McIntosh, 1885)

Atlantic deep water, Norwegian Sea,  
 500-1100 m; ?Norwegian fjords



Figs from left: Anterior end; limbate  
 chaeta; modified hooded hooks  
 chaetiger 3,7,8,10; posterior hooded  
 hook; maxillae (left parts omitted).  
 From Orensanz (1990)

- Prolonged tapering hooks present in most anterior chaetigers, clearly defined hooks appear at chaetiger 9-12, mx IV and V nearly separate with a narrow dorsal fusion zone only  
 ..... *Abyssoninoe* sp.



Norwegian Sea deep-water, 2000 -  
 3500 m

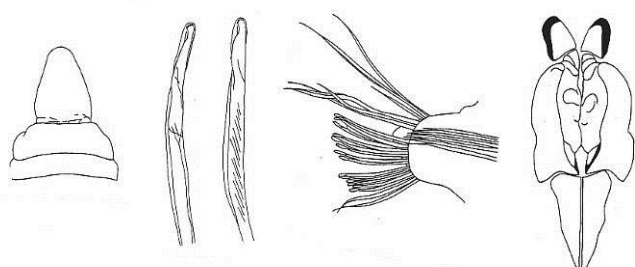
Figure: Right maxillae (original)

**Augeneria** Monro, 1930

**Characteristic.** Prostomium conical or broadly rounded, with or without small occipital antennae dorsally at border to peristomium. Parapodia with simple and composite multidentate hooded hooks. Mx IV squarish, with whitish central and dark peripheral areas. Mx V absent.

**Taxonomy.** The genus is characterised by the shape of mx IV. The number of species in the area is uncertain. Only one species, *A. algida*, is well diagnosed. Most specimens from shelf and inshore waters agree reasonably well with *Augeneria tentaculata* from southern Atlantic and Antarctic waters (Monro 1930). *Augeneria algida* was redescribed by Winsnes (1987).

1. Anterior parapodia with long pseudocomposite to composite more or less twisted hooded hooks. Simple hooks present from about chaetiger 20 ..... ***Augeneria algida*** (Wirén, 1901)

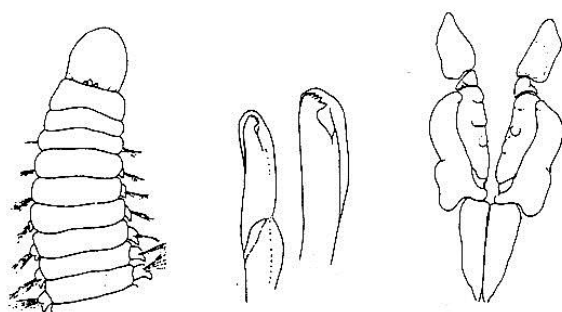


Norwegian Sea, Arctic, in deep water with temperatures  $< 0^{\circ}\text{C}$ ; ?Bay of Biscay

Figs from left: Anterior end; pseudocomposite hooks; parapodium 15; maxillae. From Winsnes (1987).

- Anterior parapodia with straight distinctly composite hooded hooks ..... 2

2. Composite hooded hooks with short blades (length: width = about 5:1). Simple hooded hooks present from about chaetiger 15 ..... ***Augeneria cf tentaculata*** Monro, 1930



N Atlantic, North Sea, Norwegian coast

Figs from left: Anterior end; composite hooded hook chaetiger 5; posterior hooded hook; maxillae. From Orensanz (1990).

- Composite hooded hooks with long blades (length: width = about 8:1). Simple hooded hooks from chaetiger 15-20 ..... 3

3. Mx II with two teeth. Mx III and IV brownish with pale central area and somewhat darker margins ..... *Augeneria sadko* (Annenkova, 1952)

Norwegian Sea, in deep water (1000-1800 m) with temperatures  $< 0^{\circ}\text{C}$ ; ?Kara Sea

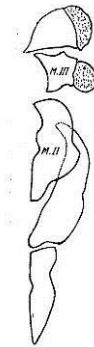


Figure: Right maxillae. From Annenkova (1952)

- Mx II with three teeth. Mx III and IV white with clearly marked dark margins ..... *Augeneria* sp.

Norwegian Sea, in deep water (1000-2000 m) with temperatures  $< 0^{\circ}\text{C}$ .

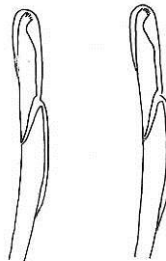


Figure: Composite hooded hooks from anterior chaetiger (original)

Remarks: *Augeneria sadko* and *Augeneria* sp. are poorly known and may represent morphological variants of the same species. Winsnes (1987) indicated that *A. sadko* could be synonymous with *A. algida*. They are here considered to be separate species. The taxonomy of *Augeneria* in Nordic and Arctic waters is unclear and needs to be further studied.

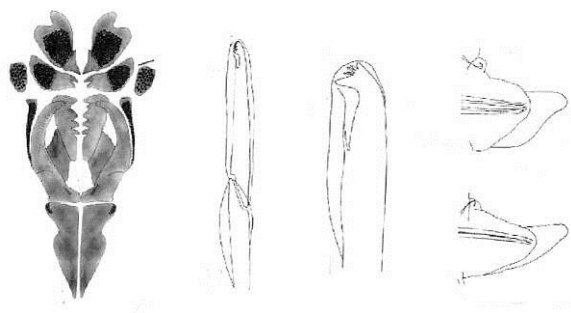
**Hilbigneris** Carrera-Parra, 2006

*Characteristics.* Parapodia uniramous, with simple limbate chaetae and composite and simple multidentate hooded hooks. Mx II distinctly shorter than mx I, connected to mx I by wide connecting ligament.

*Taxonomy.* The genus has been recently established to incorporate species previously included in *Lumbrineris*. Only one species is known from the area. The species is recently described from specimens previously identified as *L. latreilli* (Carrera-Parra 2006a).

Anterior parapodia with tongue-shaped, obliquely conical postchaetae lobes. Composite multidentate hooded hooks in chaetiger 1- ca. 25, with long blades. Aciculae yellow. Mx III bidentate ..... ***Hilbigneris pleijeli*** Carrera-Parra, 2006

NW France, English Channel, British Isles



Figs from left: maxillae; composite hooded hook; simple hooded hook; parapodium 16; parapodium 136. From Carrera-Parra (2006a).

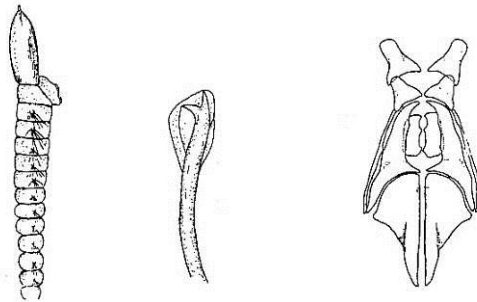
**Lumbrinerides** Orensanz, 1973

*Characteristics.* Prostomium long, distally pointed. Parapodia uniramous, with simple limbate chaetae and simple bidentate hooded hooks. Aciculae yellow or black. Mx I usually with 1-2 accessory teeth on inner margin. Mx III with two aliform expansions. Mx IV without teeth. Mandibles usually fused for entire length.

*Taxonomy.* The genus is characterised by the presence of bidentate hooded hooks and the shape of the maxillae. The species may be separated on the presence and position of small accessory teeth at the inner rim of mx I and the position of bidentate hooks. The genus was revised by Miura (1980) who reported three species from NE Atlantic waters.

One species recorded in the area..... ***Lumbrinerides crassicephala*** (Hartman, 1965)

North Atlantic, Faroe Islands, deep water



Figs from left: Anterior end with pharynx slightly everted; bidentate hook; maxillae.  
From Hartman (1965)

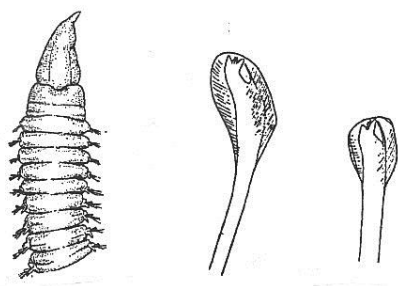
**Lumbrineriopsis** Orensanz, 1973

*Characteristics.* Parapodia uniramous, with simple limbate chaetae and simple bidentate hooded hooks. Aciculae yellow or black. Mx III with two aliform expansions. Mx IV finely denticulate. Pygidium rounded.

*Taxonomy.* The genus is characterised by the presence of bidentate hooded hooks and the shape of the maxillae. The genus was revised by Miura (1980). Four species are known from NE Atlantic waters.

1. Black aciculae, hooded hooks with 2-5 needle-shaped denticles between the two main teeth ..... *Lumbrineriopsis tsushimaensis* Imajima & Higuchi, 1975

North Sea

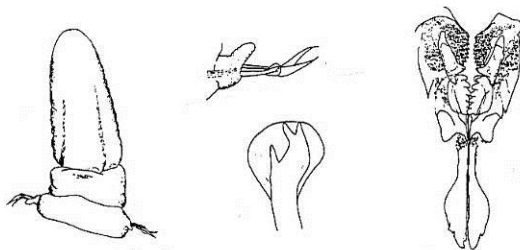


Figs from left: anterior end; bidentate hook chaetiger 8; bidentate hook posterior chaetiger. From Imajima & Higuchi (1975).

- Yellow aciculae, hooded hooks with an open space between the teeth ..... 2

2. Prostomium prolonged ..... *Lumbrineriopsis paradoxa* (Saint-Joseph, 1888)

France, English Channel, shallow water

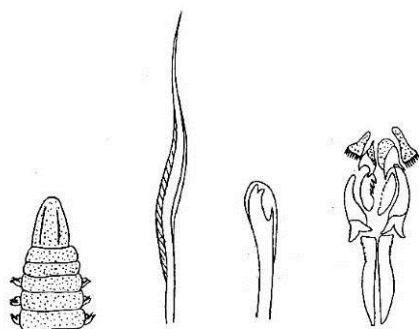


Figs from left: anterior end; parapodium from middle body; bidentate hook; maxillae. From Miura (1980).

- Prostomium short, slightly longer than wide .....

- ..... *Lumbrineriopsis* sp. (*L. paradoxa* sensu Fauvel 1923)

France, English Channel, shallow water



Figs from left: anterior end; limbate chaeta; bidentate hook; maxillae. From Fauvel (1923).

**Lumbrineris** Blainville, 1828

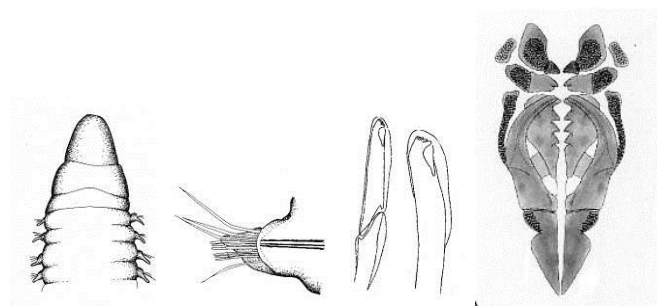
**Characteristics.** Prostomium conical or globular. Parapodia uniramous, with limbate chaetae and simple and composite multidentate hooded hooks. Aciculae yellow or black. Maxillary apparatus with five pairs of maxillae, mx I and II of about equal size, mx III and IV with 1-2(4) teeth. Mx V free standing, displaced outward to mx IV.

**Taxonomy:** The genus *Lumbrineris* was previously (e.g. Fauvel 1923) rather widely defined, but has gradually become more restricted as new genera have been erected for species with particular characteristics (Orensanz 1973, 1990; Frame 1992, Carrera-Parra 2006a, b). Several of the early described species have been imperfectly diagnosed and reported from world-wide areas (e.g. *L. latreilli*) due to confusion with similar species. The genus was revised by Carrera-Parra (2006b) who provided a new description of *Lumbrineris latreilli* based on type material. He also synonymised *L. agastos* with *L. futilis*. The number of species in the region is uncertain. Small specimens with yellow aciculae and unidentate mx III may represent a species complex.

1. Yellow or light brown aciculae ..... 2
- Black aciculae, mx III unidentate with a subdistal knob or swelling. Composite hooded hooks with long blades on chaetiger 1-20(23) ..... ***Lumbrineris futilis*** (Kinberg, 1865)

[= *L. agastos* Fauchald, 1974; fide Carrera-Parra 2006b]

North Sea, Norwegian coast, Faroe Islands, Bay of Biscay

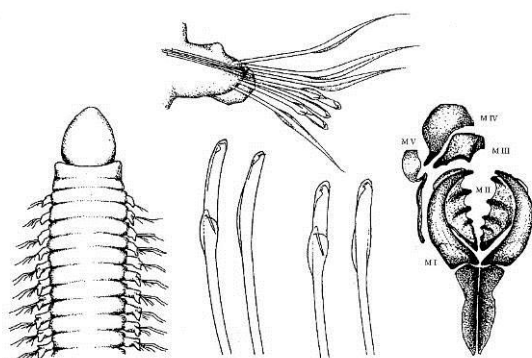


Figs from left: anterior end; paropodium 6; composite hooded hook; simple hooded hook; maxillae. From Fauchald (1974; as *L. agastos*) and Carrera-Parra (2006b).

2. Mx III unidentate ..... 3
- Mx III bidentate ..... 5

3. Anterior parapodia with a variable number (0-4) of composite and/or pseudocomposite hooded hooks among simple hooded hooks; blade of hooks moderately long (length: width = 5-7:1) ..... ***Lumbrineris mixochaeta*** Oug, 1998

Northern Norway, Barents Sea, Spitsbergen

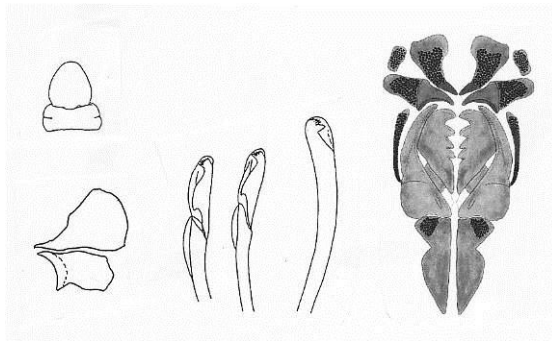


Figs from left: Anterior end; parapod 5; composite and simple hooded hook chaetiger 6 (Barents Sea), composite and simple hooded hook chaetiger 5 (Balsfjord, N Norway); maxillae, right mx III-V omitted. From Oug (1998).

- All anterior hooded hooks composite, with short blades (length: width = 4-5:1)..... 4
4. Middle and posterior simple hooded hooks with 4-8 small teeth; mx III with arcuate cutting edge leading to a ventral expansion approaching the shape of a tooth (giving the impression of a plate with two widely separated teeth) ..... *Lumbrineris* near *cingulata* (Ehlers, 1897)

(= *Lumbrineris gracilis* sensu Hartmann-Schröder 1996, George & Hartmann-Schröder 1985; non Ehlers, 1868)

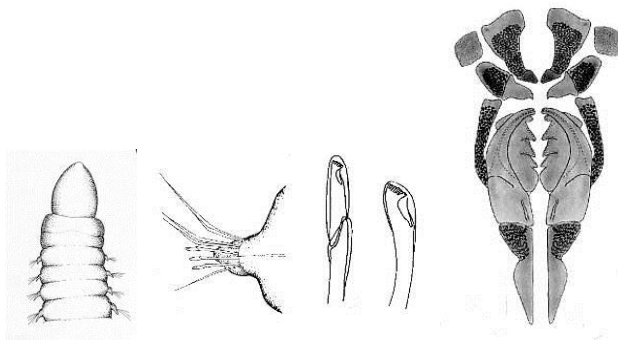
Shelf and coastal waters in southern and western Norway, North Sea, British waters



Figs from left: Anterior end; mx III-IV; composite hooded hooks chaetiger 4; simple hook chaetiger 15; maxillae (from type of *L. cingulata*). From Winsnes (1980; as *L. gracilis*) and Carrera-Parra (2006b).

- Middle and posterior simple hooded hooks with 6-10 small teeth; mx III with slightly curved cutting edge ..... *Lumbrineris aniara* Fauchald, 1974

Southern and western Norway, North Sea, ?Bay of Biscay

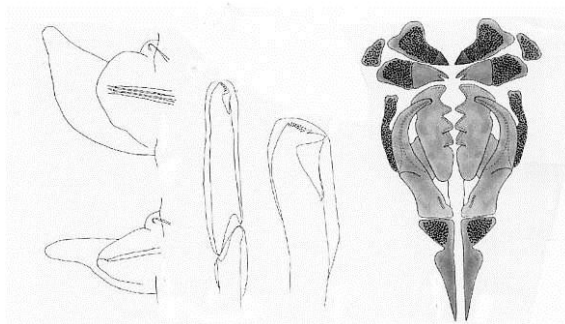


Figs from left: anterior end; anterior parapodium; composite hooded hook; simple hooded hook; maxillae. From Fauchald (1974) and Carrera-Parra (2006b).

Remarks: Specimens with characters in between *L. aniara* and *L. near cingulata* are regularly found in the area.

5. Prostomium conical. Composite hooded hooks on chaetigers 1-20(24), with long blades in anterior setigers ..... *Lumbrineris latreilli* Audouin & Milne-Edwards, 1834

France, British Isles, North Atlantic to Iceland, North Sea, Skagerrak

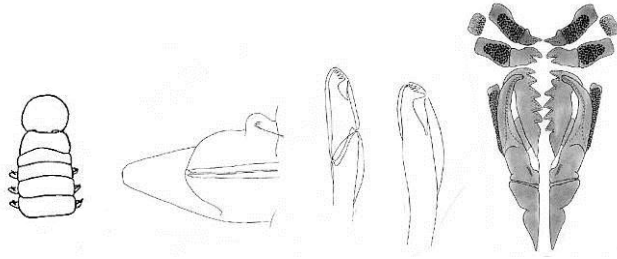


Figs from left: Parapodium 18; parapodium 150; composite hooded hook; simple hooded hook; maxillae. From Carrera-Parra (2006b).



- Prostomium round, globular. Parapodia with well-developed postchaetal lobe. Blades of composite hooded hooks short, of similar length throughout .....  
..... *Lumbrineris* cf *coccinea* (Renier, 1804)

W France, English channel



Figs from left: Anterior end; parapodium 12; composite hooded hook; simple hooded hook; maxillae. From Fauvel (1923) and Carrera-Parra (2006b).

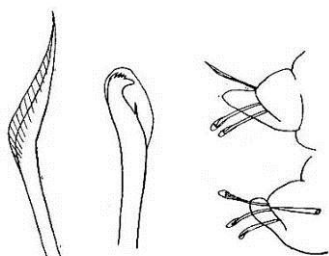
**Scoletoma** Blainville, 1828

*Characteristics.* Prostomium conical or globular, occasionally with a single occipital antenna. Parapodia uniramous, with simple limbate chaetae and simple multidentate hooded hooks. Aciculae yellow or black. Mx III unidentate or bidentate. Mx V free standing, displaced outward to mx IV.

*Taxonomy:* Frame (1992) resurrected *Scoletoma* as a valid genus to encompass species with simple hooded hooks and simple limbate chaetae, which previously had been referred to *Lumbrineris*. As currently defined, *Scoletoma* and *Lumbrineris* are rather close, and are essentially distinguished only by the lack and presence of composite hooded hooks, respectively (Frame 1992, Carrera-Parra 2006a). *Scoletoma impatiens* (Claparède) has been synonymised with *Lumbrineris tetraura* (Schmarda) by various authors. Winsnes (1980) and Orensanz (1990), however, have clearly indicated that the two species are different. *Scoletoma funchalensis* (Kinberg) is poorly known and possibly confused. *Scoletoma zatsepini* (Averincev) may possibly belong in the genus *Abyssoninoe*. The maxillae of this species have not been described.

Note: Juvenile specimens of *Lumbrineris* and *Hilbigneris* may lack composite hooded hooks and key out as *Scoletoma*.

1. Yellow or golden aciculae ..... 2
- Black or dark brown aciculae, chaetae often golden ..... 5
  
2. Anterior parapodia with long hooded hooks ..... 3
- Anterior parapodia with short hooded hooks, limbate chaetae limited to most anterior 12-20 chaetigers ..... *Scoletoma funchalensis* sensu Fauvel (1923)

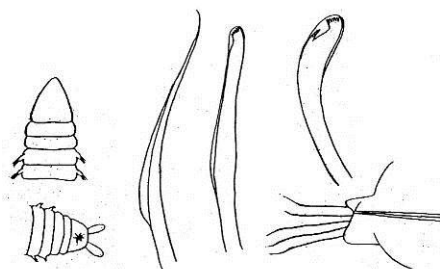


Bay of Biscay, English channel,  
British waters

Figs from left: limbate chaeta;  
hooded hook; anterior parapod,  
middle parapod. From Fauvel (1923).

Remarks: This form could possibly represent juveniles of several species, also including species with composite hooks (*Hilbigneris pleijeli*)

3. Anterior parapodia with 2-6(8) hooded hooks and numerous limbate chaetae. Short hooded hooks posterior to chaetiger 20-40 ..... 4
- Anterior parapodia with 1-2 very long and narrow hooks, short hooks from about chaetiger 10 ..... *Scoletoma zatsepini* (Averincev, 1989)



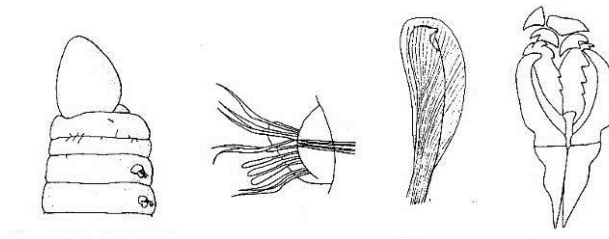
Arctic, shallow water

Figs from left: anterior end; posterior  
end; limbate chaetae; hooded hook;  
hooded hook from posterior body;  
parapodium. From Averincev (1989).

4. Limbate chaetae extending backwards to chaetiger 50-90, mx III bidentate .....  
 ..... *Scoletoma impatiens* (Claparède, 1868)

(= *Lumbrineris tetraura*: Hartmann-Schröder 1996, non Schmarda, 1861)

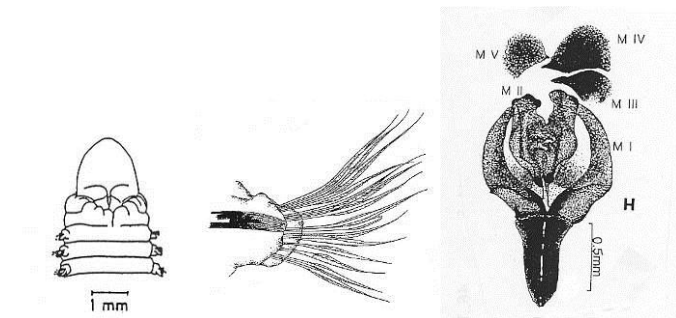
North Atlantic, widely distributed



Figs from left: anterior end; parapodium 18; posterior hooded hook; maxillae (left mx IV and right mx V omitted). From Hartmann-Schröder (1996; as *L. tetraura*).

- Limbate chaetae extending to chaetiger 20-40, mx III unidentate .....  
 ..... [*Lumbrineris mixochaeta*; specimens without composite hooks]

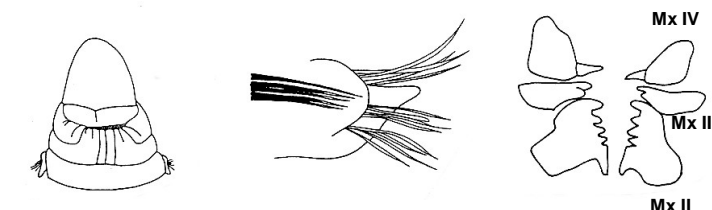
5. Mx III unidentate, anterior parapodia with short flap-like postchaetal lobes, occasionally with 1-2 long hooded hooks, usually with limbate chaetae only .....  
 ..... *Scoletoma fragilis* (O.F. Müller, 1776)



North Sea, Norwegian Coast, Arctic

Figs from left: anterior end ventral; parapodium 9; maxillae (left mx III-V omitted). From Winsnes (1980) and Frame (1992).

- Mx III unidentate with a subdistal knob or swelling, anterior and middle parapodia with tongue-shaped, obliquely conical postchaetae lobes, usually with one, occasionally with 2-6 long hooded hooks ..... *Scoletoma magnidentata* (Winsnes, 1981)



North Sea, Norwegian coast to Lofoten, Faroe Islands

Figs from left: anterior end ventral; parapodium 25; mx II-IV. From Winsnes (1981).

Remarks: Very close to *S. acicularum* (Webster & Benedict, 1887) from NW Atlantic

## Species of uncertain status

### *Lumbrineris minuta* (Théel, 1879).

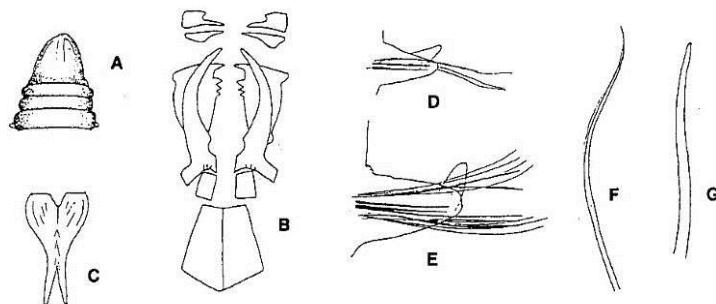
The species was described from Novaya Zemlya. The original description is comprehensive and well illustrated (Théel 1879), but apparently mixes characters from several species. Oug (1998) examined parts of the original material and confirmed that it consists of two or more species. In faunal surveys the species name appears to have been used for several small species from Arctic waters belonging in *Abyssoninoe*, *Scoletoma* and *Lumbrineris*. Oug (1998) concluded that the species is indeterminate and needs to be re-examined to assess its status.

### *Lumbrineris labrofimbriata* (Saint-Joseph, 1888)

The species was described from Brittany, France. Comments to the species and description of characters have been given by Laubier (1959) and Ramos (1976). The main characteristics are a denticulate inner margin of the mandibles and presence of both composite and simple hooded hooks in anterior chaetigers. Carrera-Parra (2006b), however, noted that these features occur during ontogenetic development in *Lumbrineris* and considered the species as invalid.

### *Lumbrineris cluthensis* (Clark, 1953)

The species was described from Firth of Clyde, west coast of Scotland. Several specimens have later been found in British coastal waters (O'Reilly & Mackie, pers. commn). It is characterised by having blunt spine-like hooks and limbate chaetae in all chaetigers. Hooded hooks are absent. The maxillary apparatus is supported by two pairs of carriers, of which the posterior is the largest (Clark 1953, George & Hartmann-Schröder 1985). The species does not conform to the description of the Lumbrineridae due to its lack of hooded hooks and is possibly more closely affiliated to Oeonidae.



Figs from left: Anterior end; mandibles; maxillae; parapodium 1; parapodium 85; chaetae. From Clark (1953)

## Acknowledgements

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