P. Garwood Portaferry June 1995

BRITISH NEPHTYIDAE

In British waters, members of the family Nephtyidae belong to two genera - *Aglaophamus* Kinberg, 1866 and *Nephtys* Cuvier, 1817. There remains the possibility that the genus *Micronephtys* Friedrich, 1939 may be found.

Two species of *Aglaophamus* are known from Britain, and of the twelve north European species of the genus *Nephtys* listed below all but *Nephtys pulchra* have been recorded in our waters.

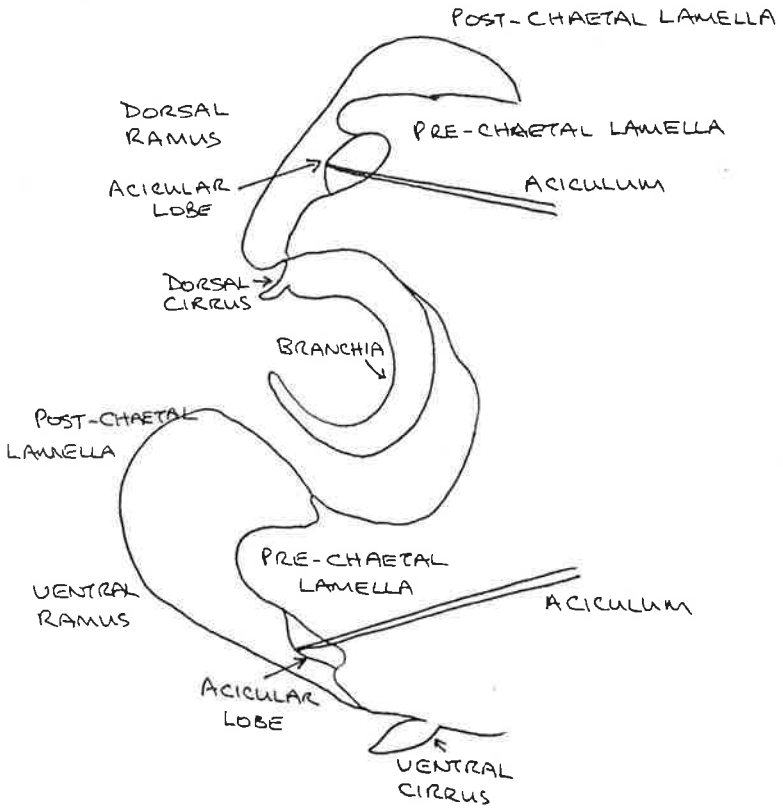
Aglaophamus malmgreni (Theel, 1879)
Aglaophamus rubella (Michaelsen, 1897)
Nephtys assimilis Oersted, 1843
Nephtys caeca (Fabricius, 1780)
Nephtys ciliata (O.F. Muller, 1776)
Nephtys cirrosa Ehlers, 1868
Nephtys hombergii Savigny, 1818
Nephtys hystricis McIntosh, 1900
Nephtys incisa Malmgren, 1865
Nephtys kersivalensis McIntosh, 1908
Nephtys longosetosa Oersted, 1842
Nephtys paradoxa Malm, 1874
Nephtys pente Rainer, 1984
Nephtys pulchra Rainer, 1991

The superficial similarity of all species of Nephtyidae has given rise to much confusion and landed the family with a reputation for being difficult for the identifier. Two, three or even four species may be found in the same habitat, indicating considerable overlap in the ecological requirements of the various species. Nevertheless, there are habitat differences in the sense that some species have a distinct preference for deep water of 80m or more (*Aglaophamus malmgreni, Nephtys ciliata, Nephtys hystricis, Nephtys paradoxa* and *Nephtys pulchra*); of the remaining shallow water/intertidal species, some occur primarily in mobile sand (*Nephtys cirrosa* and *Nephtys longosetosa*); others seem to prefer coarser stony sediment (*Aglaophamus rubella*); finally a group of species found in various combinations of mud and sand (*Nephtys caeca, Nephtys hombergii, Nephtys incisa, Nephtys kersivalensis* and *Nephtys pente*).

TAXONOMICALLY USEFUL CHARACTERS

PARAPODIAL STRUCTURE

The structure of the **parapodia** of species of Nephtyidae is rather complex; each is **biramous**, with equally developed dorsal (notopodial) and ventral (neuropodial) rami, each with its own chaetae and aciculum. In **each ramus** there is an **acicular lobe** (containing the aciculum), an anterior **pre-chaetal lamella** and a posterior **post-chaetal lamella**. The chaetae of each ramus are arranged in two rows, the anterior one between the pre-chaetal lamella and the acicular lobe and a posterior row between the acicular lobe and the post-chaetal lamella. A short **ventral cirrus** occurs on the ventral side of each parapodium.



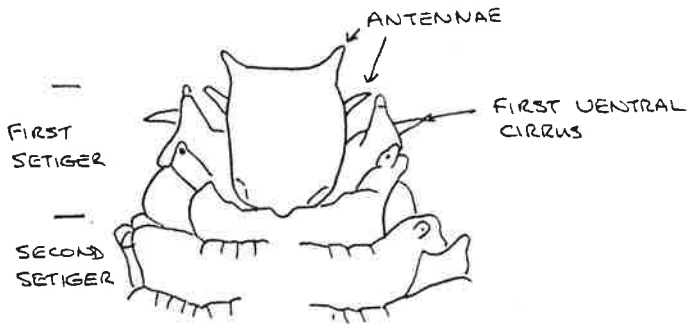
The shapes, degrees of development and sizes of the various parapodial elements are of great value in the identification of species. Generally, their examination requires removal from the specimen and mounting on a slide for viewing on either a dissecting or compound microscope. It is essential that they are correctly orientated so that they can be viewed from the anterior, and for consistency it is advisable always to remove parapodia from the same side of all specimens. Removal of parapodia can be achieved either by use of a scalpel or by pulling with forceps. Parapodial structure does vary along the body length, so that for routine purposes it is advisable to select a parapodium from setiger 20-30. It should also be borne in mind that the degree of development of the various parapodial elements does change with the size of specimens, and in most cases it is not feasible to identify specimens of body length less than about 2cm.

INTER-RAMAL CIRRI or BRANCHIAE

Between the parapodial **rami** on most mid-body segments are found the **inter-ramal cirri** or **branchiae** (gills). These are curved structures occupying the space between the parapodial rami, and with a small **dorsal cirrus** situated close to where they attach to the dorsal ramus. In the genus ***Aglaophamus*** the **branchiae curve inwards**, whilst in ***Nephtys*** they **curve outwards**. The branchiae are absent from a number of anterior of anterior and posterior segments. Each species has a **characteristic segment** on which the **first branchiae** are found (with certain exceptions), in all but the smallest specimens. The first setiger to bear branchiae is consequently of considerable value in the identification of species, and can most conveniently be recognised by judicious use of a mounted needle with the specimen lying ventral side uppermost, and slightly on one side.

PROSTOMIUM AND ANTERIOR SEGMENTS

A typical nephtyid **prostomium** is approximately **rectangular** in shape, with a **pair** of **short antennae** at the anterior corners. A **second pair of antennae** (sometimes termed palps) are present on the **ventral** side of the prostomium, and may or may not be visible dorsally. The **first setiger** is **reduced**, though distinct and composed of two rami. The dorsal cirrus of this first setiger is situated above the dorsal ramus (in contrast to its position in the other setigers, where it occur on the ventral side of the dorsal ramus, associated with the branchia, where present). The **first dorsal cirrus may be reduced** to a small mound **or elongate** and cirriform in shape.



The shape of the prostomium and its relative size varies between species, but the differences are small. The whole anterior end is considerably distorted if the pharynx is everted. For these reasons, little attention is paid to the anterior end, although with practice its appearance can be very useful in the recognition of certain species.

SEGMENT NUMBERS

Counts of **segment number** against **body length** in fixed specimens shows that nephtyids grow to reach a species specific **final segment number** at relatively small body size. Growth thereafter is by enlargement of segment size. The final number of segments for any one species is, of course, not exact, but falls within a relatively small range. This range, whilst presumably reflecting real differences between individuals, is also complicated by the processes of regeneration to some extent, and also by counting errors on the part of those masochistic enough to resort to segment counting.

Nevertheless, it is apparent that by the time nephtyids have reached a body length of approximately 6cm, species are often separable using segment counts. Whilst not advocating the routine counting of segment numbers, it can, on occasion, be a useful additional character for species recognition, particularly for species with characteristically small segment numbers.

INTERTIDAL AND SHALLOW SUBTIDAL SPECIES

Aglaophamus rubella (Michaelsen, 1897)
Nephtys assimilis Oersted, 1843
Nephtys caeca (Fabricius, 1780)
Nephtys cirrosa Ehlers, 1868
Nephtys hombergii Savigny, 1818
Nephtys incisa Malmgren, 1865
Nephtys kersivalensis McIntosh, 1908
Nephtys longosetosa Oersted, 1842
Nephtys pente Rainer, 1984

1	Branchiae incurved, beginning on setiger 2	*Aglaophamus rubella*
-	Branchiae recurved, beginning on setiger 3 or later	2
2	Branchiae beginning on setiger 8 or 9	*Nephtys incisa*
-	Branchiae beginning on or before setiger 6	3
3	Mid-body parapodia with outer margin of dorsal post-chaetal lamella meeting point of dorsal aciculum	4
-	Mid-body parapodia with outer margin of dorsal post-chaetal lamella extending down beyond the point of the dorsal aciculum	6
4	Branchiae beginning on setiger 3; ventral post-chaetal lamella with sinuous ventral margin	*Nephtys longosetosa*
-	Branchiae beginning on setiger 4; ventral post-chaetal lamella evenly curved	5
5	Dorsal and ventral post-chaetal lamellae well developed; branchiae always much longer than the dorsal cirrus	*Nephtys caeca*
-	Dorsal and ventral post-chaetal lamellae relatively poorly developed; dorsal cirri of posterior segments as long as branchiae	*Nephtys cirrosa*
6	Dorsal and ventral post-chaetal lamellae poorly developed; acicular lobes distinctly bilobed; pre-chaetal lamellae poorly developed, rounded dorsally and tending towards being bilobed ventrally; branchiae beginning on setiger 5	*Nephtys pente*
-	Dorsal and ventral post-chaetal lamellae well developed; acicular lobes either conical or with a distinct rounded 'medial bulb' distal to the acicular tip in both rami of anterior segments; pre-chaetal lamellae well developed and bilobed; branchiae beginning on setiger 4, 5 or 6	7
7	Ventral post-chaetal lamella showing a vascular pattern; inter-ramal areas of posterior parapodia with cilia arranged on small discrete raised pads; branchiae beginning on setiger 4	*Nephtys assimilis*
-	No pattern obvious on ventral post-chaetal lamellae; inter-ramal region of parapodia with cilia no grouped together on raised pads; branchiae beginning on setiger 4,5 or 6	8
8	Acicular lobes with distinct rounded 'medial bulb' situated distal to the acicular tip in both rami of anterior parapodia, visible dorsally as distinct balls to the outside of the acicular tip; ventral post-chaetal lobe very well developed; branchiae beginning on setiger 4 or 5 (intertidal specimens) or 5or 6 (subtidal specimens)	*Nephtys hombergii*
-	No 'medial bulb' present; ventral post-chaetal lobe, though distinct, is relatively small; branchiae beginning on setiger 4	*Nephtys kersivalensis*

DEEP WATER SPECIES

Aglaophamus malmgreni (Theel, 1879)
Nephtys ciliata (O.F. Muller, 1776)
Nephtys hystricis McIntosh, 1900
Nephtys paradoxa Malm, 1874
Nephtys pulchra Rainer, 1991

1	Branchiae incurved ..... *Aglaophamus malmgreni*
-	Branchiae recuved 2
2	Acicular lobes distinctly bilobed ..... *Nephtys ciliata*
-	Acicular lobes conical 3
3	Branchiae beginning on setiger 8 or later, initially very small and difficult to see; fully developed branchiae foliaceous; post-chaetal lamellae very poorly developed ..... *Nephtys paradoxa*
-	Branchiae beginning on setigers 5,6 or 7; branchiae all cirriform; post-chaetal lamellae relatively well devloped 4
4	Pre-chaetal lamellae well developed and obvious, tending to be bilobed both dorsally and ventrally; branchiae beginning on setiger 6 or 7 . *Nephtys hystricis*
-	Pre-chaetal lobes poorly developed; branchiae beginning on setiger 5 or 6 .... *Nephtys pulchra*

F. Garwood Portaferry D Lee

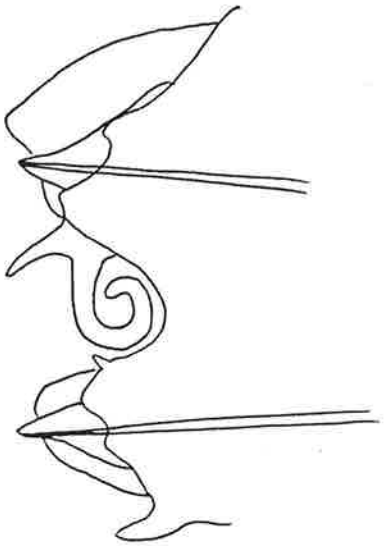
BRITISH NEPHTYIDAE

FIRST BRANCHIAE		
2	*Aglaophamus rubella*	Subtidal coarse sediment
3	*Nephtys longosetosa*	Intertidal; shallow subtidal
4	*Nephtys assimilis*	Intertidal; subtidal
	Nephtys caeca	Intertidal; subtidal
	Nephtys cirrosa	Intertidal; shallow subtidal
	Nephtys hombergii (part)	Intertidal
	Nephtys kersivalensis	Subtidal
5	*Nephtys hombergii* (part)	Subtidal
	Nephtys pente	Intertidal; subtidal
	Nephtys pulchra	Deep water
6	*Nephtys hombergii* (part)	Subtidal
	Nephtys hystricis (part)	Deep water
7	*Nephtys hystricis* (part)	Deep water
	Nephtys ciliata (part)	
8	*Nephtys incisa* (part)	Subtidal
	Nephtys ciliata (part)	Deep water
	Nephtys paradoxa (part)	Deep water
	Aglaophamus malmgreni (part)	Deep water
9	*Nephtys incisa* (part)	Subtidal
	Nephtys ciliata (part)	Deep water
	Nephtys paradoxa (part)	Deep water
	Aglaophamus malmgreni (part)	Deep water
10	*Nephtys ciliata* (part)	Deep water
	Nephtys paradoxa (part)	Deep water
	Aglaophamus malmgreni (part)	Deep water
11 +	*Nephtys paradoxa* (part)	Deep water
	Aglaophamus malmgreni (part)	Deep water

Intertidal: beaches of clean sand, muddy sand or sandy mud, including estuarine situations.
Shallow subtidal: down to 30m.
Subtidal: down to 80m.
Deep water: deeper than 100m.

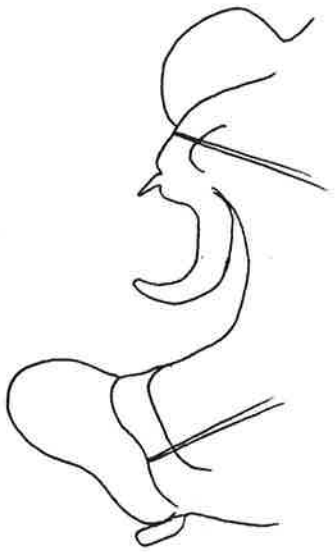
Aglaophamus rubella (Michaelsen, 1897)

A southern species, occurring in the English Channel, the Irish Sea, off the west coast of Ireland and probably off western Scotland, extending into the northern North Sea. Known from southern Norway (Fauchald 1963). Seems to prefer rather coarse sediment.
Incurved branchiae characteristic of the genus, beginning on setiger 2.
Up to 120 setigers according to Rainer (1991).
Medium sized species.



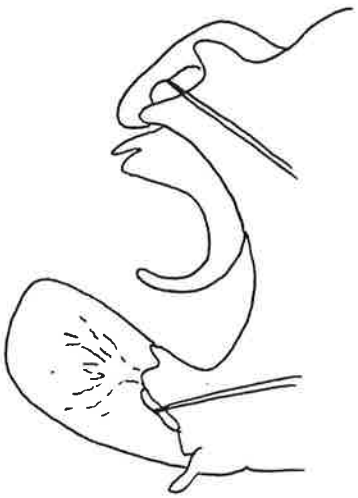
Nephtys longosetosa Oersted, 1842

Apparently widely distributed from the Mediterranean to the Arctic. Known from all around the British Isles. Found intertidally and in relatively shallow water sublittorally, usually associated with clean sand.
Recurved branchiae beginning on setiger 3.
A large species with a maximum of approximately 120 setigers; maximum length seen 17cm.
Parapodia with low rounded pre-chaetal lamellae; post-chaetal lamellae moderately well developed, the ventral with a sinuous lower edge; acicular lobes rounded, or with a slight tendency towards being bilobed. This species is most readily confused with *Nephtys caeca*, both species having a prominent elongate dorsal cirrus on setiger 1. It can be distinguished from Nephtys caeca by having branchiae beginning on setiger 3 instead of setiger 4, and the sinuous lower edge to the ventral post-chaetal lamella. Whilst it has the long chaetae suggested by its name, this is not a character exclusive to the species (see Garwood and Olive 1981).



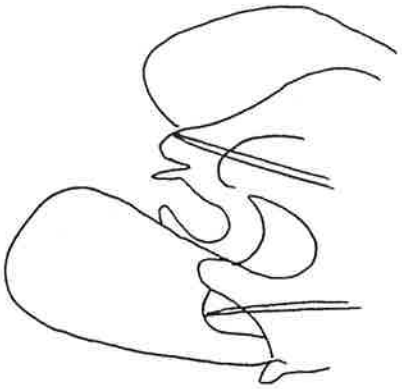
Nephtys assimilis Oersted, 1843

Previously synonymized with *Nephtys hombergii*, Rainer (1989) redescribed the species and established it as valid.
The species has a southerly distribution, known in British waters from the North and Irish Seas. Found in muddy sand, sublittorally around Britain, though intertidally further south in its range.
Recurved branchiae beginning on setiger 4.
110-120 setigers; maximum size seen 11.4cm.
Characteristic vascularisation of ventral post-chaetal lamella and cilia on raised pads in the inter-ramal area of posterior parapodia (the latter only visible in well preserved material). Very similar to *Nephtys hombergii* and *Nephtys kersivalensis*, with which it may be found.



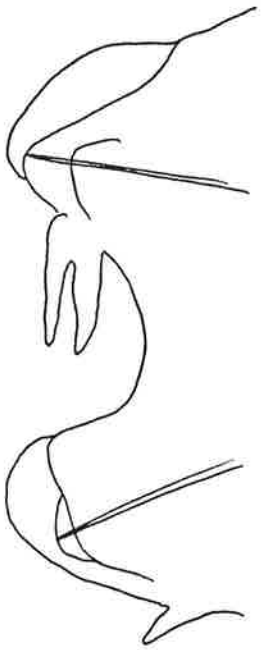
Nephtys caeca (Fabricius, 1780)

A northern species, though its distribution is not well known. Occurs subtidally in the North Sea, and occasional substantial intertidal populations are known. English Channel. Capable of living in areas of fluctuating salinity
Recurved branchiae beginning on setiger 4.
A large species, reaching approximately 150 setigers; maximum length seen 18cm (up to 25 according to Rainer 1991).
Parapodia with well developed post-chaetal lamellae, but with pre-chaetal lamellae reduced to simple low ridges.



Nephtys cirrosa Ehlers, 1868

A southern species, known from the English Channel , North Sea and Irish Sea. Often found in clean sand, intertidally or in the shallow subtidal.
Recurved branchiae beginning on setiger 4.
A medium sized species with 90-100 setigers; maximum length seen 9cm.
Parapodia with poorly developed pre-chaetal lamellae and short post-chaetal lamellae. Chaetae include geniculate forms. Readily identified by the relatively long dorsal cirri of posterior segments, equalling the length of the branchiae. The prostomium is yellow in life, often retaining a brownish colour in preserved material. It is relatively large, with long ventral antennae and long ventral cirri on the first setiger.



POSTERIOR PARAPODIUM

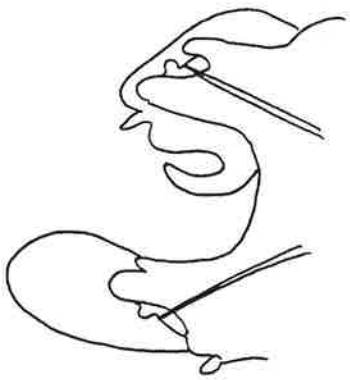
Nephtys hombergii Savigny, 1818

Rainer (1989) has recently restricted the definition of this species by removing *Nephtys assimilis* and *Nephtys kersivalensis* from synonymy. Nevertheless, there still appear to be further problems that require attention. There are differences between intertidal specimens which have branchiae beginning on setiger 4 and those where they begin on setiger 5 (see Garwood 1992), and the status of subtidal specimens needs to be addressed.

A widely recorded species, but little can be said of its true distribution until there is progress on the taxonomic front. Intertidally, it is capable of living in conditions of fluctuating salinity.

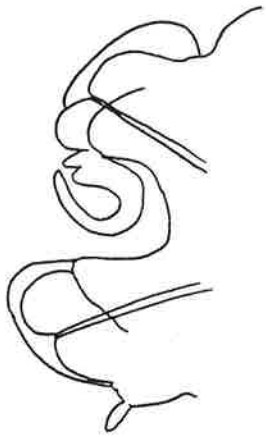
A large species with a maximum of 130-135 setigers for intertidal animals with branchiae beginning on setiger 4 and subtidal specimens, or 110-115 for intertidal specimens with branchiae beginning on setiger 5; maximum length seen 14cm (20cm according to Rainer 1991).

Parapodia with well developed post-chaetal lamellae, the dorsal extending well beyond the tip of the aciculum; pre-chaetal lamellae also well developed, and both bilobed, the ventral with a distinct notch just below its dorsal point of origin; acicular lobes with distinct medial bulbs, immediately distal to the tips of the acicula, at least in anterior segments. Subtidally it may occur with *Nephtys assimilis* and *Nephtys kersivalensis*, from which it may be distinguished by parapodial characteristics and branchiae beginning on setiger 5 or 6 as opposed to setiger 4 for the other two species.



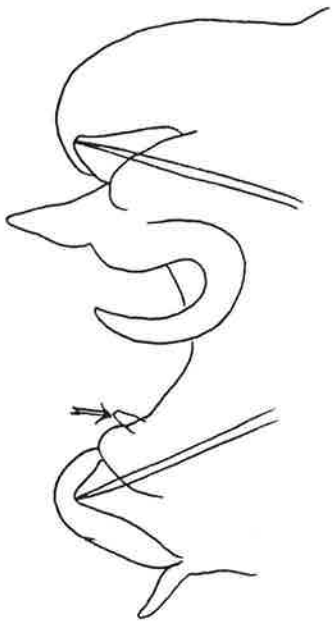
Nephtys pente Rainer, 1984

This species, only recently described, has been separated from *Nephtys ciliata* to which it is very similar morphologically. Its geographical distribution is not certain, but it occurs in both the Irish and North Seas, and many (if not all) of the records of *Nephtys ciliata* from British waters almost certianly refer to this species.
Recurved branchiae beginning on setiger 5.
A large species with up to 90 setigers; maximum body length 14cm.
Parapodia with pre-chaetal lamellae poorly developed; post-chaetal lamellae reasonably well developed, extending beyond the acicular lobes; acicular lobes distinctly bilobed.
This species can be confused with *Nephtys ciliata*, from which it is distinguished by having branchiae beginning on setiger 5 as opposed to 7-10 in *Nephtys ciliata*, and by the fact that *Nephtys ciliata* appears to be restricted to deep water.

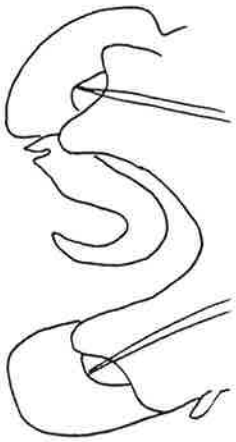


Nephtys pulchra Rainer, 1991

The latest species of the genus to be described from European waters, it is presently not known from British waters. It has been found in deep water off Norway and Iceland.
Recurved branchiae beginning on setiger 5 or 6.
A medium sized species, with up to 93 setigers; maximum length 6cm.
Parapodia with pre-chaetal lamellae poorly developed; post-chaetal lamellae moderately developed though extending only just beyond acicular lobes in mid-body segments; acicular lobes conical; a short lobe is present dorally on the ventral ramus of some anterior parapodia.

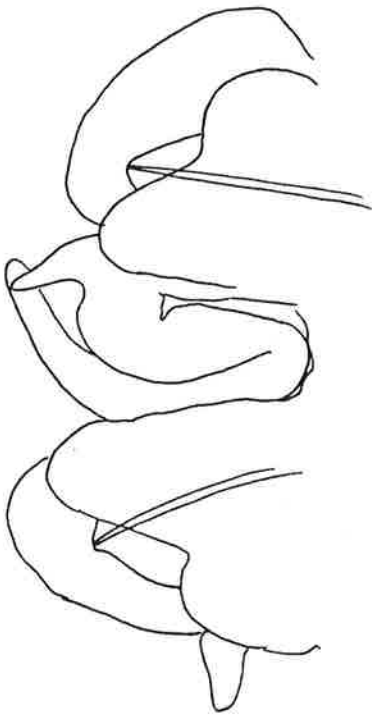


Nephtys kersivalensis McIntosh, 1908
Only recently shown to be a distinct species (Rainer 1989), having been originally described as a variety of *Nephtys hombergii*.
Known to occur in the Irish and North Seas, but records are, of course, scanty. Lives sublittorally.
Recurved branchiae beginning on setiger 4.
A medium-sized species with a maximum of 80-85 setigers; maximum length seen 5cm.
Parapodia with well developed bilobed pre-chaetal lamellae; quite well developed post-chaetal lamellae; conical acicular lobes. Rainer (1989) describes a roughened area distal to the tips of the acicula, in the position of the medial bulbs seen in *Nephtys hombergii*. These areas are not very obvious, but may be seen under a compound microscope. *Nephtys kersivalensis* may occur with *Nephtys hombergii* and *Nephtys assimilis;* it may be distinguished from the former by having branchiae beginning on setiger 4 rather than setiger 5, and its lack of medial bulbs on the acicular lobes; it may be separated from *Nephtys assimilis* by its lack of vascularisation of the ventral post-chaetal lamella, which is much smaller in *Nephtys kersivalensis*.



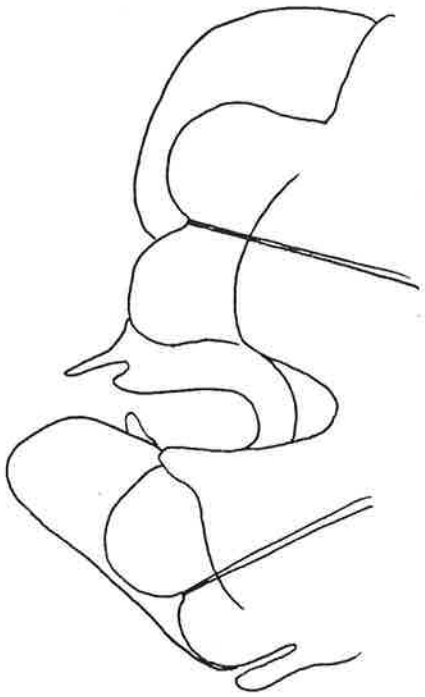
Nephtys hystricis McIntosh, 1900

Rainer (1990) has redescribed this species, and has demonstrated that it has become confused with *Nephtys incisa* in the literature to such an extent that Fauvel (1923) has the two names swapped over. Consequently most records of *Nephtys hystricis* refer to *Nephtys incisa* and *vice versa*.
A southern species, known from the North and Irish Seas. It prefers deep water.
Recurved branchiae beginning on setiger 6 or 7.
A small species with a maximum of approximately 70 setigers; maximum size seen 3.7cm.
Parapodia with pre-chaetal lamellae well developed and bilobed; post-chaetal lamellae relatively well developed anteriorly, reduced in posterior segments; acicular lobes conical.



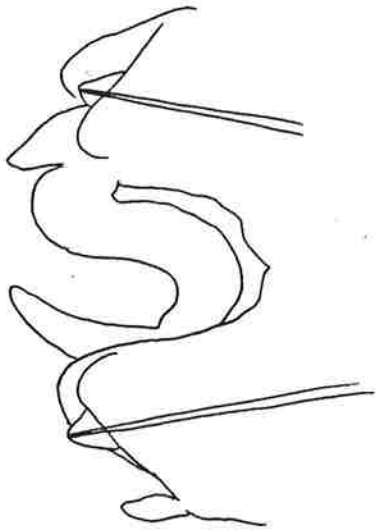
Nephtys ciliata (O.F. Muller, 1776)

A northern species occurring in deep water, and probably unlikely to occur in British waters. Records prior to Rainer's (1984) description of the very similar *Nephtys pente* from our waters are very likely to refer to this species.
Recurved branchiae beginning on any setiger between 7 and 10.
A large species with up to 90 setigers; maximum size seen 12cm (up to 30cm according to Rainer 1991).
Characteristically bilobed acicular lobes, whilst pre-chaetal lamellae are poorly developed and post-chaetal lamellae, though quite prominent, do not extend out beyond the acicular lobes. Parapodia are very similar to *Nephtys pente*, from which it is readily separable by the first setiger to bear branchiae - 7-10 in *Nephtys ciliata*, 5 in *Nephtys pente*.



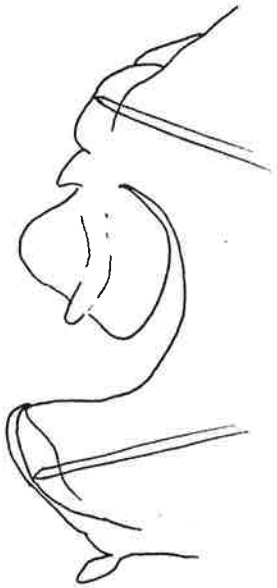
Nephtys incisa Malmgren, 1865

Redescribed by Rainer (1990) and shown the confusion in the literature between it and *Nephtys hystricis*.
Distribution requires confirmation, but the species is known from the North and Irish Seas, and off the west coast of Scotland. It occurs sublittorally.
Recurved branchiae beginning on setiger 8 or 9 (possibly 10 according to Rainer 1991).
A medium-sized species with a maximum of approximately 70 setigers; maximum length seen 7.5cm.
Parapodia with pre- and post-chaetal lamellae poorly developed; acicular lobes conical.
Posterior parapodia with widely divergent rami and no branchiae.



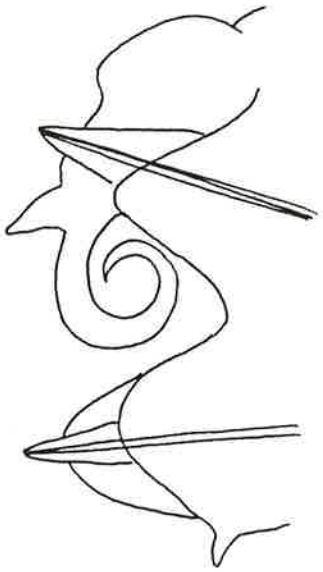
Nephtys paradoxa Malm, 1874

An essentially arctic species, found in deep water, and likely to be found in the northern North Sea.
Recurved branchiae beginning somewhere after setiger 8 and very small in anterior segments. By the mid-body, the branchiae have developed their characteristic foliaceous flattened form.
A large species, with up to 150 setigers; maximum length 20cm.
Parapodia with pre- and post-chaetal lamellae poorly developed; acicular lobes rounded, the ventral tending more towards being conical. There remains some confusion as to whether *Nephtys brachycephala* Moore, 1903 should remain as a separate species or be synonymized with *Nephtys paradoxa*.



Aglaophamus malmgreni (Theel, 1879)

An arctic species, perhaps likely to be found in deep water in the northern North Sea.
Incurved branchiae characteristic of the genus, beginning anywhere between setiger 9 and 19.
Up to 75 setigers (90 according to Rainer 1991).
Medium sized species, maximum length seen 5.7cm.



REFERENCES

Fauchald, K., 1963. Nephtyidae (Polychaeta) from Norwegian waters. **Sarsia**, 13: 1-32.

Garwood, P.R., 1992. Segment counting in the genus *Nephtys*: its relevance to *N. hombergii*. **Polychaete Research Newsletter**, 14: 7-8.

Garwood P.R. & P.J.W. Olive, 1981. The significance of the long chaetal form of *Nephtys caeca* (Polychaeta: Nephtyidae) and its relationship to *N. longosetosa*. **Sarsia**, 66: 195-202.

Rainer, S., 1984. *Nephtys pente*, sp. nov. (Polychaeta: Nephtyidae) and a key to *Nephtys* from northern Europe. **J. mar. biol. Ass. U.K.**, 64: 899-907.

Rainer, S., 1989. Redescription of *Nephtys assimilis* and *Nephtys kersivalensis* (Polychaeta: Phyllodocida) and a key to *Nephtys* from Northern Europe. **J. mar. biol. Ass. U.K.**, 69: 875-889.

Rainer, S., 1990. The genus Nephtys (Polychaeta: Phyllodocida) of northern Europe: redescription of *N. hystricis* and *N. incisa*. **J. Nat. Hist.**, 24: 361-372.

Rainer, S. 1991. The genus *Nephtys* (Polychaeta: Phyllodocida) of northern Europe: a review of species, including the description of *N. pulchra* sp. n. and a key to the Nephtyidae. **Helg. Meeresunters.**, 45:65-96.