Tubulariidae Fleming, 1828

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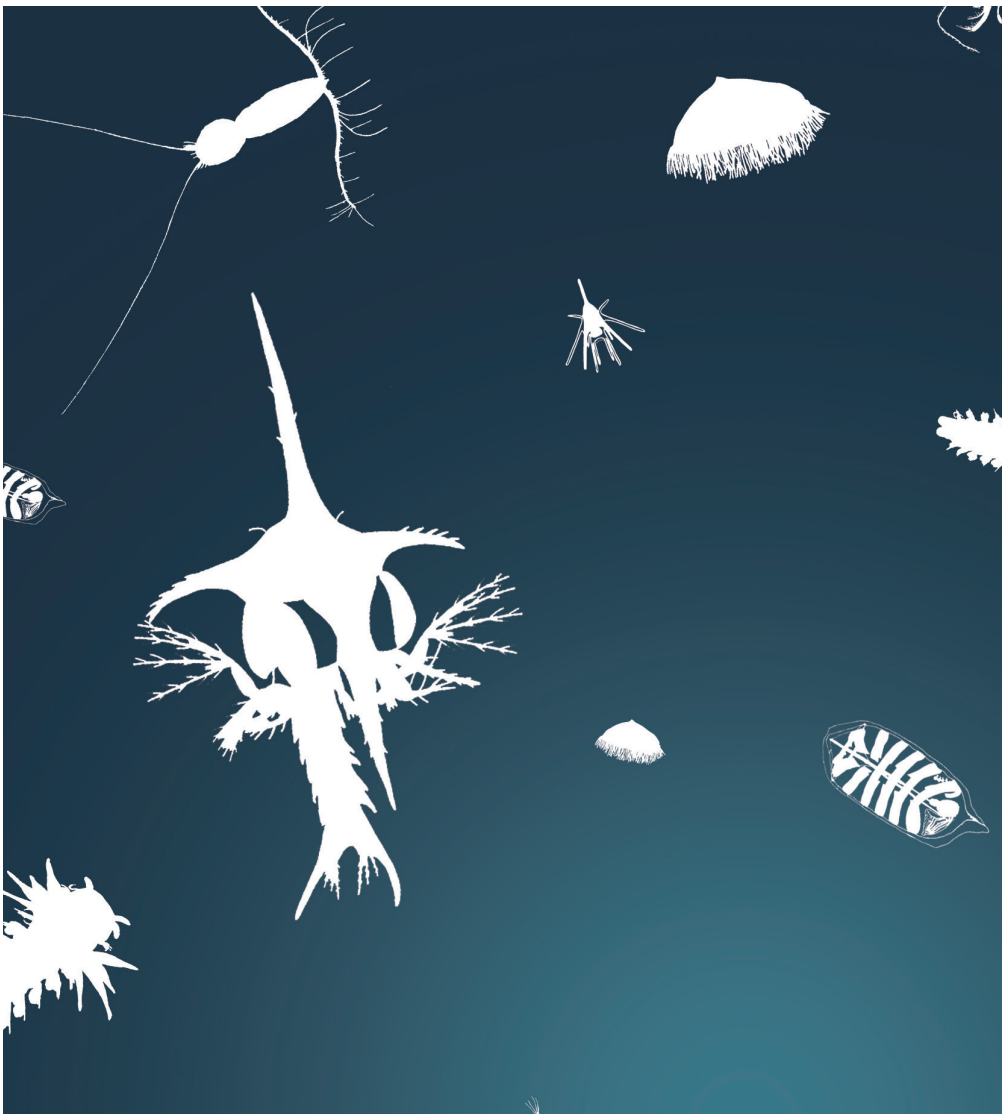

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Contents

Hydrozoa

Order: Anthoathecata

Suborder: Aplanulata

Family: Tubulariidae Fleming, 1828

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1 Summary

The family Tubulariidae belongs to the suborder Aplanulata. This suborder encompasses species of the order Anthoathecata with a life cycle characterized by both the absence of a ciliated planula larva, and a direct development from fertilized eggs into young polyps. The systematics of the group has recently been revised based on new information available from molecular phylogenetic studies. Members of the family Tubulariidae usually live in shallow marine or brackish waters, where polyps are attached to different types of substrata. In some species of Tubulariidae, the planktonic medusa phase does not fully develop and remains attached to the polyp as fixed sporosacs.

This leaflet briefly introduces the family Tubulariidae, describing the taxonomic and ecological characteristics of four *Ectopleura* species and one *Hybocodon* species for which free-living planktonic medusa stages have been reported in the North Atlantic Ocean and/or in the Mediterranean Sea (*E. dumortierii*, *E. minerva*, *E. sacculifera*, *E. wrighti*, and *H. prolifer*). A taxonomic key to distinguish the two genera is also included.

This leaflet is an update of the ICES Identification Leaflets for Plankton No. 2, published by Russell (1939). The revisions of the original leaflet are mainly based on the recent revision of athecate hydroids published by Schuchert (2012), the book of Bouillon *et al*. (2006), and the information provided by the World Register of Marine Species (WoRMS, 2020).

2 Introduction

The family Tubulariidae and its systematic position have recently been revised based on new information available from molecular phylogenetic studies (Marques and Migotto, 2001; Collins *et al*., 2006; Cartwright and Nawrocki, 2010; Schuchert, 2012). Tubulariidae are now part of the Aplanulata clade, which encompasses Anthoathecata species with a life cycle characterized by the absence of a ciliated planula larva, and direct development from fertilized eggs into young polyps.

Tubulariidae benthic polyps, which can either be solitary or colonial, are large and composed of a voluminous, vase-shaped terminal hydranth on a long stem. The hydranth (i) is separated by a stem from the neck region, which has a very thin perisarc; and (ii) has two well-separated sets of tentacles, with more than six aboral, filiform tentacles.

The medusae of the family Tubulariidae have a bell-shaped umbrella with an oblique or straight margin, usually characterized by meridional nematocyst tracks on the outer surface. The four radial canals are simple. The manubrium is short, entirely covered in gonads, and presents a simple circular mouth. Tubulariidae bear one, two, or four marginal tentacles of equal length. These tentacles can end in nematocyst knobs, but not in distinct terminal swelling, or in stalked nematocyst clusters (as seen in the Zancleidae). Marginal tentacle bulbs have no ocelli.

In several Tubulariidae species, the medusa stage is not fully developed and remains attached to the polyp as a fixed sporosac.

This leaflet presents the main taxonomic and ecological characteristics of the five species of Tubulariidae for which free-living planktonic medusa stages have been reported in the North Atlantic Ocean and/or in the Mediterranean Sea.

The five species belong to two genera. The medusa stages of the two genera can be distinguished based on the following characters:

1. Umbrella evenly rounded, with bell opening at right angle to bell axis. Eight lines of nematocyst tracks originating in pairs from tentacular bulb…… …….. ***Ectopleura* L. Agassiz, 1862**

2. Umbrella bilaterally symmetrical with oblique margin. When present, five lines of nematocyst tracks on exumbrella…….. ***Hybocodon* L. Agassiz, 1860**

Ectopleura medusae have a manubrium shorter than or as long as the umbrella cavity. They have two opposite or four perradial tentacles, which are moniliform or end in nematocyst knobs.

At present, 34 species of *Ectopleura* are known. Eight of these have been reported in ICES area and/or in the Mediterranean Sea, of which four are known to have a free-living medusa stage: *E. dumortierii*, *E. minerva*, *E. sacculifera*, and *E. wrighti*.

The diagnostic characters for *Ectopleura* medusae species are: (1) the shape of the umbrella; (2) the shape and length of the manubrium; (3) the number of tentacles; and (4) the number of tentacular nematocyst knobs.

At present, the genus *Hybocodon* includes seven species, of which only one, *H. prolifer*, is reported in ICES area and in the Mediterranean Sea. *Hybocodon* medusae have a cylindrical manubrium on a short peduncle, not extending beyond the umbrella margin. They have one shorter, two medium-sized, and one longer radial canals. One bean-shaped marginal bulb carries a long, moniliform tentacle, while the other three small perradial bulbs do not carry any tentacles.

3 Distribution

Hybocodon prolifer

Medusa 1 mm in height when newly released; 2–4 mm in height when adult.

Habitat and worldwide distribution: Species commonly found in shallow waters of the Atlantic Ocean and very rarely in the Mediterranean Sea. Distributed in the Northeast Atlantic, from the English Channel northwards to the Arctic Sea, across the North Sea and Norwegian Sea. Also present in the cold to temperate waters of the Northwest Atlantic (Chesapeake Bay), North

Pacific (British Columbia, Puget Sound, and Sea of Japan), and Southwest Atlantic.

Ectopleura dumortierii

Medusa 1 mm in height when newly released; 1–4 mm in height when adult.

Habitat and worldwide distribution: Commonly found in shallow waters of the Atlantic Ocean and occasionally reported in the Mediterranean Sea. Distributed from ~36°N to ~83°N (Arctic Ocean), this species has also been reported at lower latitudes in the Northwest Atlantic, from ~36°N to the Equator. Records in the Indian and Pacific Ocean need further confirmation.

Ectopleura minerva

Medusa 2.5 mm in height when adult.

Habitat and worldwide distribution: Species found in shallow waters of the Northwest Atlantic, in the region from Florida to Bermuda. It has also been reported in the South China Sea and in the Indian Ocean. The presence of this species in the Mediterranean Sea is uncertain and should be referred to as *E. wrighti*.

Ectopleura sacculifera

Medusa 3 mm in height when adult.

Worldwide distribution: Distributed in the Pacific Ocean (Ecuador, Papua New Guinea), South China Sea, and in the Indian Ocean (west coast of India). One record in the western Mediterranean Sea.

Ectopleura wrighti

Medusa 0.5–1 mm in height when adult.

Worldwide distribution: Distributed in the whole Mediterranean Sea, it can also be found in the Atlantic Ocean (English Channel, Celtic Sea, and Bay of Biscay).

4 Taxonomic key

1. Medusa with bilateral symmetry, one tentacle and five exumbrellar nematocyst tracks. Medusae budding from tentacular bulbs……. ***Hybocodon prolifer***
Medusa with radial symmetry, two or four tentacles, and eight exumbrellar nematocyst tracks…….. **2**

2. Four tentacles. Round-shaped umbrella. Mature medusa with 15–35 tentacular nematocyst knobs……... ***Ectopleura dumortierii***
Two tentacles and two rudimentary marginal bulbs. Round- or pear-shaped umbrella…….. **3**

3. Manubrium half as long as the height of the umbrellar cavity, with four large perradial sac-like pouches, covered by gonads, hanging down almost to the level of the mouth……. ***Ectopleura sacculifera***
Manubrium without sac-like pouches, covered by gonads……. **4**

4. Round-shaped umbrella. In mature medusa, the two tentacles have up to five tentacular nematocyst knobs…….. ***Ectopleura wrighti***
High and pear-shaped umbrella, with a well developed apical projection …….. ***Ectopleura minerva***

5 Tables

Table. Main morphological features characterizing medusae of *Hybodocon* and *Ectopleura* species presented in this leaflet. Abbreviations are explained in Section 8.

Species	U			M			Ts	Notes
	Shape	Margin	Ne tracks	Shape	Ga_P	Go		
H. prolifer	bell	oblique	5	fusiform, shorter than U	short if present	without pouches	1 from a broad T_Bu	medusa buds from T_Bu
E. dumortierii	round	horizontal	8	thick, broadest in the middle	very short	without pouches	4, each one with 15–35 Ne_knobs	Ts often rolled up into a short spiral
E. minerva	pear, with apical projection	horizontal	8	pear-shaped, 2/3 of the U	none	without pouches	2 fully developed	exumbrellar tracks extend to apical projection
E. sacculifera	slightly conical	horizontal	8	fusiform, 1/2 of the U	none	covering 4 large pouches	2 from a broad T_Bu.	
E. wrighti	round	horizontal	8, can be less in the adult	tubular, 1/2 of the U	none	without pouches	2 opposite	

6 Figures

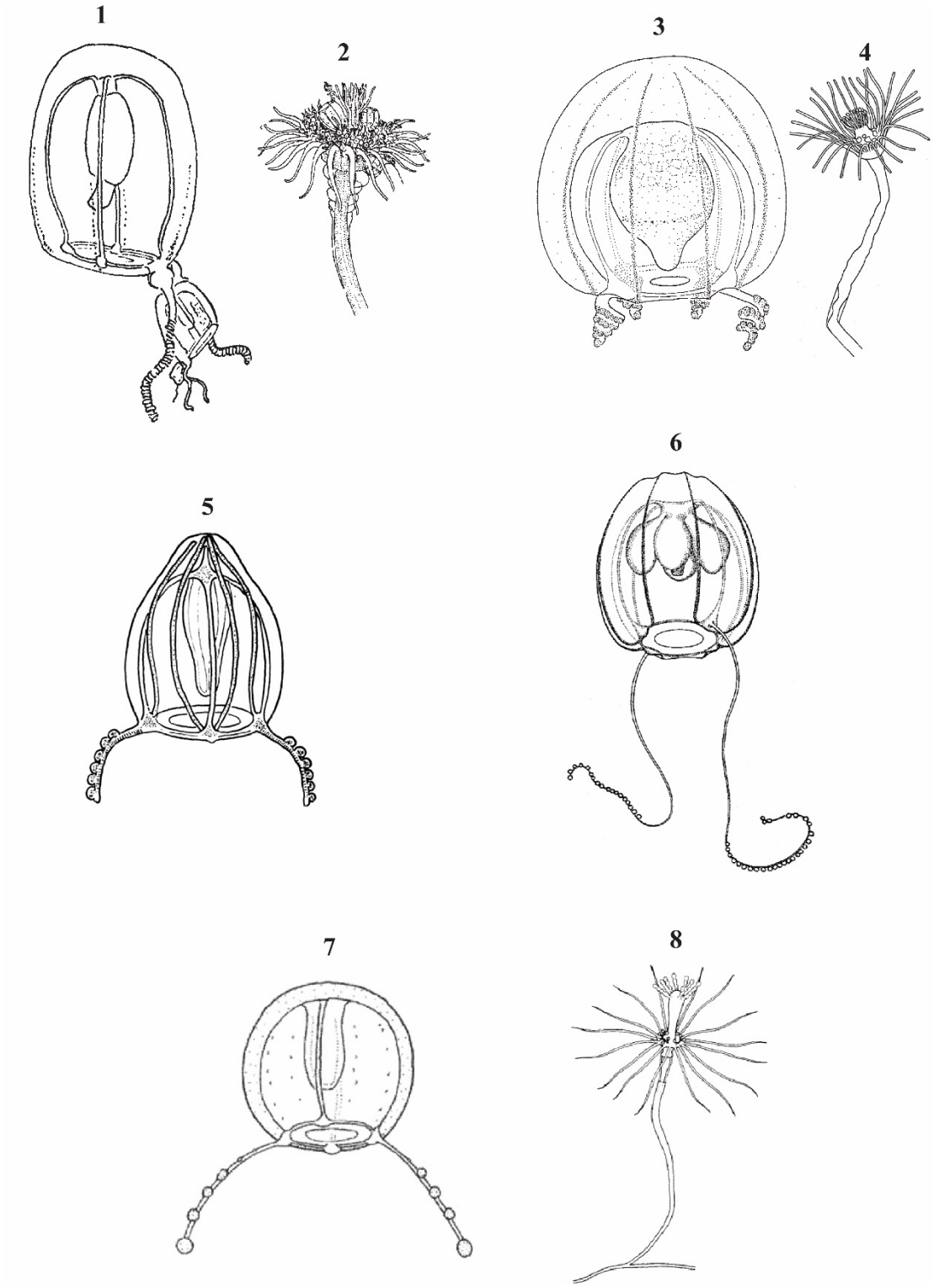

Figure 1. Lateral views of Tubulariidae medusae (1, 3, 5–7) and polyp hydranths (2, 4, 8). 1. and 2. *Hybodocon prolifer*; 3. and 4. *Ectopleura dumortierii*; 5. *E. minerva*; 6. *E. sacculifera*; 7. and 8. *E. wrighti* (young stage medusa). 1: from Kramp, 1959; 2: from Agassiz, 1860; 3: from Schuchert, 2010; 4: from Russel, 1953; 5: from Mayer, 1910; 6: from Bouillon, 1978; 7: from Schuchert, 2012; 8: from Petersen, 1979.

7 Links to further information

WoRMS

H. prolifer	http://www.marinespecies.org/aphia.php?p=taxdetails&id=117988
E. dumortierii	http://www.marinespecies.org/aphia.php?p=taxdetails&id=117982
E. minerva	http://www.marinespecies.org/aphia.php?p=taxdetails&id=117983
E. sacculifera	http://www.marinespecies.org/aphia.php?p=taxdetails&id=117985
E. wrighti	http://www.marinespecies.org/aphia.php?p=taxdetails&id=117986

Molecular information

H. prolifer	https://www.ncbi.nlm.nih.gov/nuccore/?term=Hybocodon+prolifer
E. dumortierii	https://www.ncbi.nlm.nih.gov/nuccore/?term=Ectopleura+dumortierii
E. wrighti	https://www.ncbi.nlm.nih.gov/nuccore/?term=Ectopleura+wrighti

8 Terminology

Ga_P	Gastric peduncle
Go	Gonads
M	Manubrium
Ne	Nematocysts
RC	Radial canals
Ts	Tentacles
T_Bu	Tentacular bulb
U	Umbrella

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