

CONSEIL INTERNATIONAL POUR L'EXPLORATION DE LA MER

Zooplankton

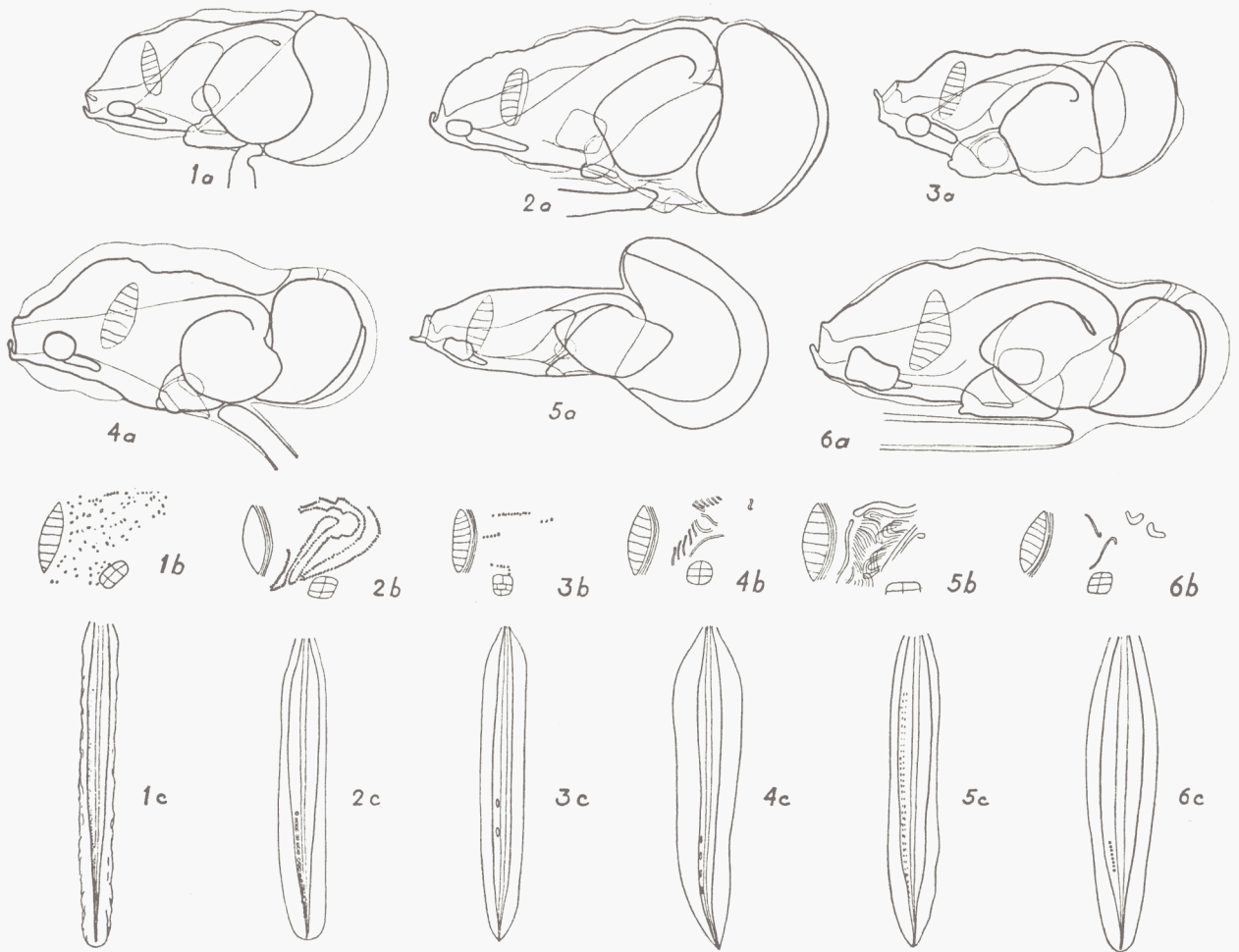
No. 7

(Revised 1969)

APPENDICULARIA

(By A. BÜCKMANN)

1969



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|----------------------------------|----------------------------|
| 1. <i>Oikopleura vanhoeffeni</i> | 4. <i>Oikopleura parva</i> |
| 2. - <i>labradoriensis</i> | 5. - <i>albicans</i> |
| 3. - <i>dioica</i> | 6. - <i>cophocerca</i> |

a. Body, left side view.
 b. Etchings in the germ of the house. Fol's and Eisen's oikoplasts are indicated in order to show the position on the body
 c. Tail, frontal view, with subchordal cells.

Genus OIKOPLEURA Me:rens

Body compact. Organs within it tightly packed. Oikoplast epithelium extends dorsally over the coil of the gut, ventrally to the anus. External gill openings on both sides of rectum. Stomach a broad transversal sack, in the posterior part divided into a right and a left lobe by an aboral notch. Oesophagus leads into the dorsal edge of the left stomach lobe. Intestine arises from the ventral edge of the right lobe. Rectum in the median plane below or in front of the unpaired middle part of the stomach.

A. Subgenus VEXILLARIA Lohmann

Buccal glands on both sides of the endostyle, characteristic etchings in the germ of the house, and subchordal cells in the tail – Figures 1–6, b and c. (In badly preserved specimens etchings frequently cannot be seen).

Species	Contour of left stomach lobe	Tail musculature	Additional characters	Max. body length (mm)
1. <i>O. vanhoeffeni</i> Lohm.	Roundish	Broad but delicate	Luminescent	7
2. <i>O. labradoriensis</i> Lohm.	Bluntly pentagonal somewhat indented at the cardia	Broad and strong	Anus not far in front of stomach	2.4
3. <i>O. dioica</i> Fol	Rectangular. Posterior edge falls off straightly behind the cardia	Narrow	Dioicic. Right stomach lobe forms a coecal sac behind entrance of intestine. Rectum in front of stomach	
4. <i>O. parva</i> Lohm.	Round. Posterior edge protrudes only slightly beyond the cardia	Broad, delicate, transparent above the chorda	Subchordal cells inconspicuous. Anus not far in front of stomach.	0.8
5. <i>O. albicans</i> (Leuck)	Pouch forming a large coecal sac pointing backwards behind the cardia	Broad and strong	Endostyle and front of stomach far apart	5.0
6. <i>O. cophocerca</i> (Gegenb.)	Pouch strongly protruding forward and dorsal. Coecal part behind the cardia small	Broad and strong	Distance between endostyle and front of stomach small	1.4
7. <i>O. rufescens</i> Fol*)	Semicircular, ventral edge straight	Narrow. One sub-chordal cell inconspicuous	Coecal sac in right stomach lobe. Rectum in a steep position. Anus below the stomach	1.9

*) *O. rufescens* Fol may occur in the region (No figure).

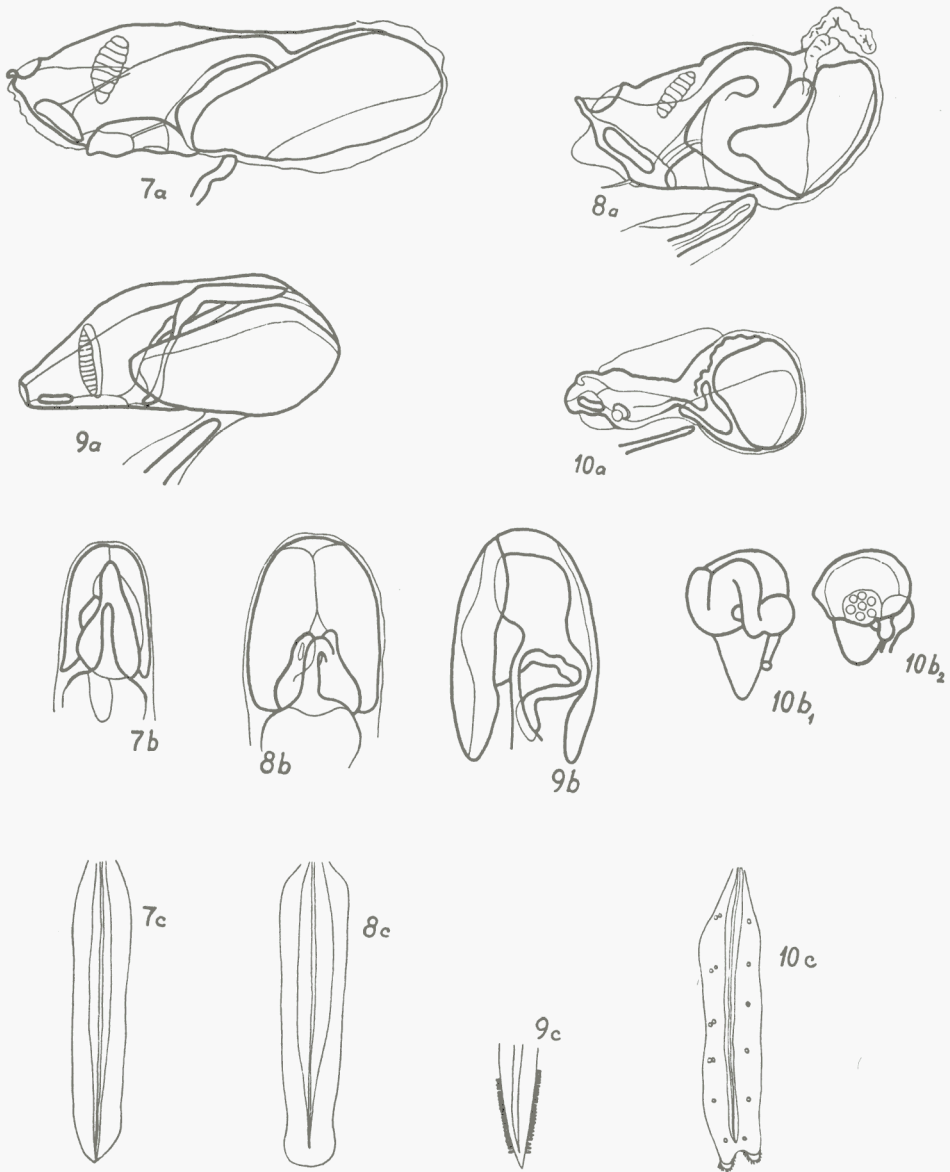
REFERENCES

Identification of species: LOHMANN and BÜCKMANN 1926, p. 130.

Descriptions and illustrations of species:

1. *Oikopleura vanhoeffeni*: LOHMANN 1896 a, p. 33, pl. II, Figures 2, 8. LOHMANN 1896 b, pl. XIV, Figures 1, 3, 6, 7, 10; pl. XV, Figures 3, 4.
2. *O. labradoriensis*: LOHMANN 1896 a, p. 31, pl. II, Figures 3, 4, 5. LOHMANN 1896 b, pl. XIV, Figures 2, 4, 5, 8, 9. Pl. XV, Figures 1, 2.
3. *O. dioica*: FOL 1872, p. 28, pl. IV, Figures 1–6. LOHMANN 1896 b, p. 76, pl. XVI, Figure 1, pl. XVII, Figures 4, 5.
4. *O. parva*: LOHMANN 1896 b, p. 70, pl. XIII, Figures 1–4, 6–9, LOHMANN and BÜCKMANN 1926, Figure 30, No. 3, p. 107.
5. *O. albicans*: LOHMANN 1896 b, p. 68, pl. XI, Figures 1 and 3, pl. XII, Figures 1 a, 4–8. FOL 1872, pl. I (as *O. cophocerca*).
6. *O. cophocerca*: LOHMANN 1896 b, p. 66, pl. XI, Figures 2, 4, pl. XII, Figures 1 b, 2, 3.
7. *O. rufescens*: FOL 1872, p. 27, pl. X, Figure 3. LOHMANN 1896 b, p. 74, pl. XVI, Figures 2, 4, pl. XVII, Figures 1–3, 6.

Additional reference and data on the distribution of species see p. 8.



7. *Oikopleura fusiformis*
8. — *longicauda*

9. *Althoffia tumida*
10. *Appendicularia sicula*

- a. Body, left side view.
b. Dorsal view of gut and gonads, 10 b₁ without, 10 b₂ with gonads.
c. Frontal view of tail.

B. Subgenus COECARIA Lohmann

Without buccal glands, without etchings in the germ of the house, without subchordal cells in the tail. Gonads, when ripe, embrace laterally the posterior part of the stomach.

Species	Contour of left stomach lobe	Tail musculature	Additional characters	Max. body length (mm)
7. <i>O. fusiformis</i> Fol.....	Elongated. Large coecal sac behind the cardia protracted into a slightly curved tip backward and dorsad	Narrow	Rectum in front of stomach	1.5
8. <i>O. longicauda</i> (Vogt)....	Shortly pouch-formed. Postcardial coecal sac finger-shaped, directed dorsad, touching posterior wall of oesophagus	Broad and strong	Eisens's oikoplast wanting. Hood present, arising from posterior edge of oikoplast epithel	1.2
<i>O. gracilis</i> Lohm.*)	Trapezoid. Postcardial coecal part not extended dorsad	Narrow, delicate	Upper lip with ciliated cells present	0.5

*) *O. gracilis* Lohm. may occur in the region (No figure).

Genus ALTHOFFIA Lohmann

Body depressed. Gonads cup-shaped, close to the wall of posterior part of the body. Gut lies free within the body. Oikoplast epithelium extends dorsally only to the anterior end of the stomach. Gut forms a simple bow, open in front and arranged in a horizontal plane. The stomach forms the hindmost part of the bow.

Species	Stomach	Tail	Gonads	Max. body length (mm)
9. <i>A. tumida</i> Lohm.....	Cardia to the left, pylorus to the right in the anterior wall of stomach, which, in advanced stages, is depressed dorso-ventrally	A dense row of amphichordal cells near to the end of the tail. Muscles broad and strong	Ovary in form of a ribbon following the dorsal edge of the cup-shaped testis	1.2

Recently one specimen of *Pelagopleura australis* (Bückmann) has been found in the area (no figure).

Genus APPENDICULARIA Fol

Body compact. Oikoplast epithelium extends dorsally above the stomach, but ends ventrally just behind the endostyle. Gill openings much in front of the anus. Oesophagus opens into the front wall of the stomach, which is composed of only a few cells. Intestine to the right of the stomach, both located upon the large pear-shaped rectum.

Species	Gut	Tail	Gonads	Max. body length (mm)
10. <i>A. sicula</i> Fol.....	Stomach spherical. Intestine forms 3 coils. Spheroid glandular appendix behind the pylorus	Small and delicate. Fin with a broad notch at the end, proximally tapering towards the base	Testis touches the posterior wall of the gut. Ovary disciform, rests upon the testis	0.5

REFERENCES

7. *Oikopleura fusiformis*: FOL 1872, p. 29, pl. III, Figures 5–8. LOHMANN 1896 b, p. 63, pl. XVI, Figure 3, pl. XVII, Figures 5, 7, 8.
 8. *O. longicauda*: LOHMANN 1896 b, p. 59, pl. IX, pl. X, Figure 7. FOL 1872, p. 26, pl. II, Figure 1–4, as *O. spissa*.
O. gracilis: BÜCKMANN 1967, p. 221, Figure 2. LOHMANN 1896 b, p. 65, pl. XIII, Figures 5, 6.
 9. *Althoffia tumida*: LOHMANN 1896 b, p. 83, pl. XX. LOHMANN and BÜCKMANN 1926, p. 156, Figure 27 on p. 103, Figure 30, No. 14 on p. 107.
Pelagopleura australis: Lohmann and Bückmann 1926, p. 155, Figure 44.
 10. *Appendicularia sicula*: FOL 1874, p. XLIX–LIII, pl. XVIII, Figures 1–5. LOHMANN 1896 b, p. 20, pl. I, Figures 5–13.

Additional references and data on the distribution of species see p. 8.

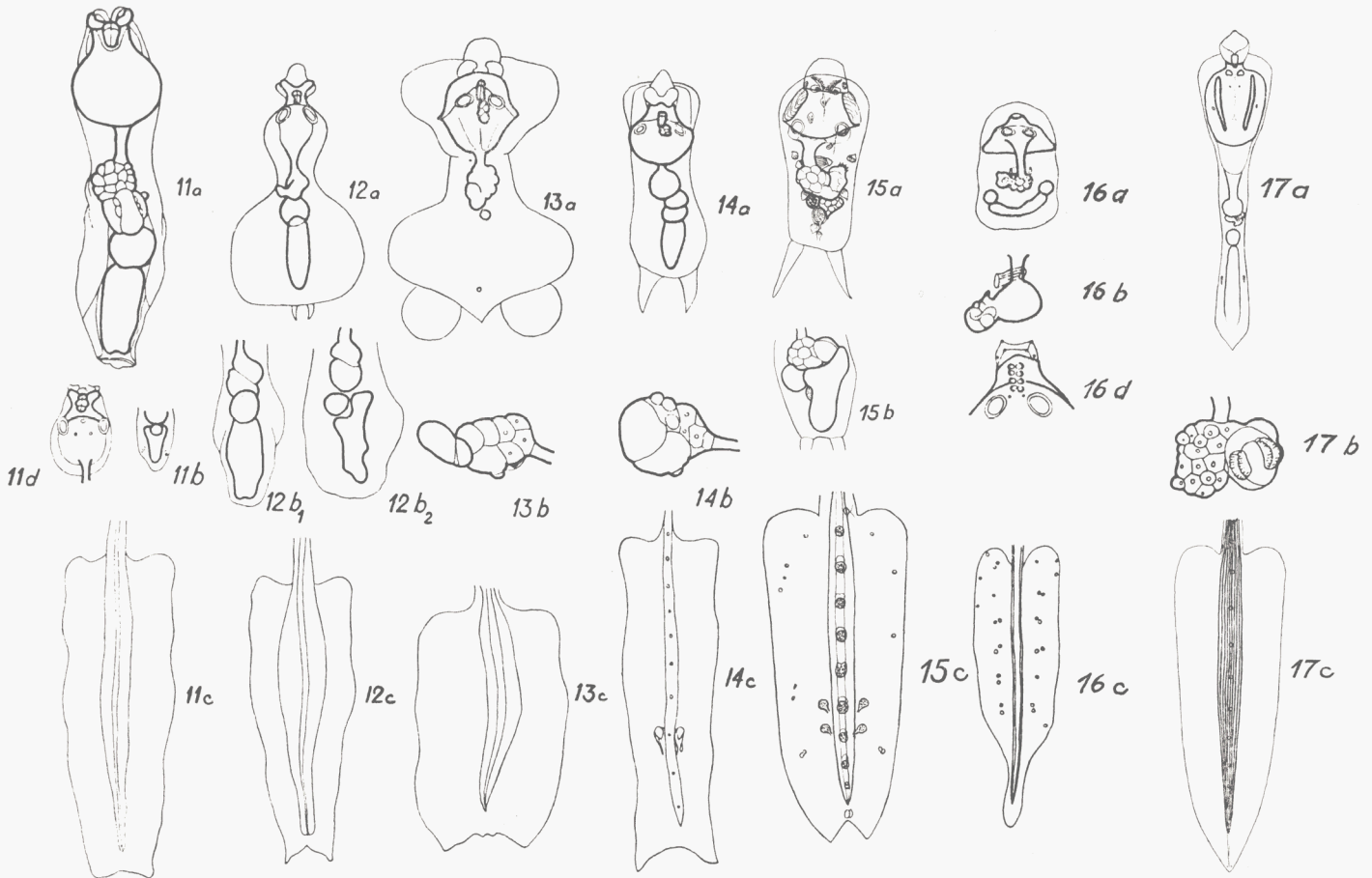
Genus FRITILLARIA Quoi et Gaimard

Body either elongated or sac-shaped. Organs more or less free within the jelly of the body cavities. Oikoplast epithelium covers dorsally only the branchial cavity and is ventrally restricted to a narrow zone below the endostyle. Its posterior edge rises to form the hood, an epidermoidal duplicature bent orally. Gill openings behind the endostyle, much in front of the anus. Oesophagus runs straight into the anterior wall of the stomach, which is spheroid and composed of only a few cells. Intestine to the right of, or behind the stomach. Rectum small.

Subgenus EURYCERCUS Lohmann

Fin of the tail at the end broad and notched. Oikoplast epithelium divided on each side into 3 zones. Branchial openings always circular.

Species	Pharyngeal cells	Amphichordal cells	Tailmusculature	Additional characters	Max. body length (mm)
11. <i>F. borealis acuta</i> Lohm.	3, inconspicuous	Absent	Broad and strong, pointed at the end	Plasmatic mouth plates, directed laterally, pointed	1.3
12. <i>F. borealis truncata</i> Lohm.	3, inconspicuous	Absent	Broad and strong, cut square at the end	Mouth plates directed frontally, rounded	0.9
13. <i>F. venusta</i> Lohm.....	Forming a packet	One pair, elongated, inconspicuous	Broad but delicate	Ovary forms a seam on front of testis, which when ripe develops horn-shaped lateral lobes	1.1
14. <i>F. tenella</i> Lohm.	Forming a packet	One pair, jug-shaped	Narrow and delicate	Ovary spheroid, testis coniform both in the median plane	1.2
15. <i>F. pellucida</i> (Busch) ...	Forming a packet which touches the left gill opening	Two pairs, spherical, conspicuous	Broad and strong	Ovary spherical, situated behind the stomach. Testis hammer-shaped, behind the intestine	2.2



11. *Fritillaria borealis acuta*

12. — — *truncata*

13. — — *venusta*

14. — — *tenella*

15. *Fritillaria pellucida*

16. — — *gracilis*

17. — — *aberrans*

a. Body (dorsal view in 11a, 14a, 15a. Ventral view in 12a, 13a, 16a, 17a).

b. Coil of gut and gonads (11a *forma prolifera*, 12b₁ *f. allongata*, 12b₂ *f. sargassi*. Dorsal view). Right side view 13b and 14b, ventral view 15b, 16b. 14b, 15b, 17b only coil of gut.

c. Tail, front view.

d. 11d anterior part of body, ventral view. 16d, oral region and gill openings, ventral view.

B. Subgenus ACROCERCUS Lohmann

Fin of tail pointed at the end. Oikoplast epithelium arranged in three zones from front to rear. Gill openings of various form.

Species	Pharyngeal cells	Amphichordal cells	Tail musculature	Additional characters	Max. body length (mm)
16. <i>F. gracilis</i> Lohm.....	Absent	Absent	Very delicate and narrow	2 spherical pyloric appendices. Gill openings small and round. Testis a transversal band. At both ends a spherical ovary	0.5
17. <i>F. aberrans</i> Lohm.....	One pair between anterior ends of gill openings	Absent	Composed of 10-14 broad bands	2 bladder-like appendices on intestine. Gill openings large and oblong	2.5

Additional diagnostic data and references:

Identification of species by Lohmann and Bückmann 1926, p. 164 ff.

Descriptions and illustrations of species:

- 11 and 12. *Fritillaria borealis*: *F. borealis* (Lohmann 1896 b, p. 49, pl. VIII, fig. 2, 3-7, 9, 11) and *F. sargassi* (ibid., p. 51, pl. VIII, fig. 1, 8, 10, 12) were later united by Lohmann as *F. borealis*. Lohmann 1931, p. 135 ff discriminates two subspecies: *F. borealis acuta* and *F. borealis truncata*. In the area two forms of each subspecies are found, which differ in form and position of the gonads: *F. borealis acuta typica* (ovary spherical; testis spindle-shaped, behind the ovary in the median axis; *loc. cit.* p. 136, fig. 14 a and b), *F. borealis acuta prolifera* (testis coniform, embracing the spherical ovary laterally; *loc. cit.* p. 137, fig. 14 c). *F. b. truncata intermedia* (Ovary spherical, testis spindle-shaped, both median; *loc. cit.* p. 137, fig. 15) and *F. b. truncata allongata* (ovary and testis cylindrical, median), *F. b. truncata sargassi*, not expected in our area, is characterized by the ovary lying to the left, and the testis with a right side asymmetrical proximal protuberance, see this sheet, Figure 12b₂.
13. *F. venusta*: Tokioka 1951, p. 14, fig. 10, shows the species not to be specifically different from *F. bicornis* (Lohmann 1896 b, p. 47, pl. II, fig. 5-8, ibid., p. 46, pl. VII, fig. 1, 6, 10, 11, Lohmann and Bückmann 1926, p. 171, fig. 48).
14. *F. tenella*: Lohmann 1896 b, p. 46, pl. VII, Fig. 2, 3, 8. Tokioka 1951, p. 12, fig. 8, 9.
15. *F. pellucida*: Fol 1872, p. 32, pl. V, fig. 1, 2, pl. VI, fig. 1-5. Lohmann 1896 b, p. 32, pl. IV, fig. 1-7.
16. *F. gracilis*: Lohmann 1896 b, p. 31, pl. III, fig. 3, 5-10.
17. *F. aberrans*: Tokioka 1958, p. 4-11, fig. 3, 4, shows this species not to be specifically different from *F. magna* (Lohmann 1896 b, p. 36, 37, pl. V, fig. 4-9).

Literature on the biology of the appendicularians:

Bückmann 1926. Fenaux 1963. Fol 1872. Ihle 1913. Lohmann 1899, 1905, 1914, 1933.

Distribution	Species	Distribution	Species
Gulf of Bothnia	(11)	Southern North Sea	2, 3, 11
Gulf of Finland	(3), (11)	English Channel	3, 11, (12)
Southern Baltic	(3), 11	Bristol Channel, Irish Sea	3, 11, (12)
Belt Sea	3, 11	S. and W. of Ireland	} 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,
Kattegat	3, 11	W. of Scotland	
Skagerak	2, 3, 11	Northern Atlantic	} 13, 14, 15, 16, 17
Northern North Sea	} 1, 2, 3, 4, 7, 10	Iceland, Norwegian Sea	
Norwegian Deep		} 11, 12, 13, 14, 16, 17	Barents Sea
West coast of Norway			Greenland

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