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Reports on the Biology of the "Umitaka-Maru" Expedition, Part 2

Planktonic Gastropoda Collected by the Training Vessel "Umitaka-Maru" from the Pacific and Indian Oceans in the Course of Her Antarctic Expedition, 1956*

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(Tables 1–7; Plate 1)

INTRODUCTION

During the Antarctic Expedition in 1956 carried out by the Training Vessel "Umitaka-Maru" of the Tokyo University of Fisheries, a plenty of plankton material was collected from the Pacific and Indian Oceans. The planktonic gastropod specimens then collected were placed under the present authors' disposal by the courtesy of Professor Jirô SENÔ, Tokyo University of Fisheries, who was a biologist in charge on board the T. V. "Umitaka-Maru" on that occasion and managed the present collection.

We wish to express our hearty thanks to Prof. J. SENÔ who kindly offered the valuable material to the present authors for study, and to Mr. Takeda who engaged in tedious work of sorting molluscan samples from the collection.

MATERIAL

The present material was collected by two different types of conical nets (cf. SENÔ, 1959) as follows:

(A) P-net, with a mouth of 45 cm-diameter and with silk of 0.3 mm-mesh; vertically hauled from the depth of 150 m up to the surface, as a rule.

(B) L-net, with a mouth of 130 cm-diameter; horizontally towed on the surface layer for 5 to 18 minutes.

P-net haulings were made at 18 stations in the Pacific region and 38 stations in the Indian Ocean. Among these stations, the planktonic gastropods were found from 15 stations in the Pacific and 33 stations in the Indian Ocean.

While, L-net was towed at 11 stations in the Pacific area and 18 stations in the

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Indian Ocean. The gastropods were found from 5 stations in the Pacific and 15 stations in the Indian Ocean.

Table 1. Pacific stations where planktonic gastropods were collected.

(A) P-Net

St.	Date	Time	Lat. N	Long. E
2	Oct. 31, 1956	—	31°02.6	132°01.0
3	Oct. 31, 1956	2125	29°30.0	129°00.0
4	Nov. 1, 1956	1138	28°01.1	127°02.0
5	Nov. 2, 1956	0422	25°59.8	124°59.6
6	Nov. 2, 1956	1510	25°00.0	123°31.2
9	Nov. 8, 1956	1825	20°39.0	123°24.0
10	Nov. 9, 1956	0438	19°08.0	123°54.0
11	Nov. 9, 1956	1500	17°42.0	124°19.0
12	Nov. 10, 1956	0120	16°18.9	124°41.5
13	Nov. 10, 1956	1030	15°00.0	125°06.0
14	Nov. 10, 1956	2155	13°24.0	125°28.0
15	Nov. 11, 1956	0740	12°00.0	126°00.0
18	Nov. 12, 1956	1535	7°04.0	127°50.0
19	Nov. 13, 1956	0100	5°38.0	128°23.0
20	Nov. 13, 1956	0935	4°14.0	128°55.0

(B) L-Net

St.	Date	Time	Lat. N	Long. E
5	Nov. 2, 1956	1653–1701	25°35.0	124°24.0
9	Nov. 9, 1956	1820–1826	20°39.0	123°24.0
15	Nov. 11, 1956	1830–1835	—	—
18	Nov. 12, 1956	1837–1842	8°11.0	127°08.0
20	Nov. 13, 1956	1907–1925	—	—

SYSTEMATIC RESULTS

1. HETEROPODA (Prosobranchia)

(1) *Oxygyrus keraudreni* (LESUEUR, 1817)

Oxygyrus rangi, TESCH 1906, p. 49, pl. 7, figs. 2–4, 6b;

Oxygyrus keraudreni, SMITH 1888, p. 6; VAYSSIÈRE 1904, p. 56, pl. 5, figs. 71–75; BONNEVIE 1913, p. 2, pl. 1, figs. 1–3; TESCH 1949, p. 10, figs. 1–3, 44; TOKIOKA 1955b, p. 237, figs. 1–2.

Occurrence: Indian Ocean (P-net): St. 2′ (1 specimen), St. 5″ (1), St. 9 (1), St. 13′ (1); (L-net): St. 7′ (1).

All of the present specimens are very young as measured 0.5–0.75 mm in diameter.

(2) *Protatlanta souleyeti* (SMITH, 1888)

Atlanta souleyeti, SMITH 1888, p. 43;

Table 2. Stations in the Indian Ocean where planktonic gastropoda were collected. (P-Net and L-Net)

St.	Date	Time	Lat. S	Long. E
1	Nov. 28, 1956	—	—	—
* 1′	Nov. 28, 1956	0631	8°10.0	99°05.0
2	Nov. 29, 1956	1000	8°59.5	95°48.0
* 2′	Nov. 29, 1956	1830	9°05.0	95°17.0
3	Nov. 30, 1956	—	9°52.0	92°11.0
* 3′	Nov. 30, 1956	1830	10°14.5	90°35.5
4	Dec. 1, 1956	0900	10°55.0	87°30.0
* 4′	Dec. 1, 1956	1831	11°14.7	86°08.1
5	Dec. 2, 1956	0940	11°52.0	83°10.0
5′	Dec. 2, 1956	1835	12°18.7	81°19.0
5″	Dec. 2, 1956	1850	12°18.7	81°19.0
6	Dec. 3, 1956	—	12°50.0	78°26.0
6′	Dec. 3, 1956	1837	18°07.3	76°31.5
7	Dec. 4, 1956	0930	13°46.0	73°17.5
* 7′	Dec. 4, 1956	—	14°05.2	71°45.5
8	Dec. 5, 1956	1005	14°32.5	68°51.0
* 8′	Dec. 5, 1956	1840	14°53.9	67°01.0
9	Dec. 6, 1956	1825	15°16.6	63°52.5
* 9′	Dec. 6, 1956	1850	15°16.6	63°52.5
10′	Dec. 7, 1956	1830	15°11.7	61°03.3
11	Dec. 8, 1956	1220	14°48.0	59°26.0
12	Dec. 9, 1956	1300	15°19.5	61°56.0
*12′	Dec. 9, 1956	1904	16°13.7	61°26.0
*13	Dec. 10, 1956	1200	17°55.3	59°45.0
13′	Dec. 10, 1956	1900	—	—
14	Dec. 11, 1956	0900	19°47.04	57°04.4
*14′	Dec. 11, 1956	1855	20°33.5	55°41.0
15	Dec. 12, 1956	0925	22°00.0	52°50.0
*15	Dec. 12, 1956	1840	22°48.3	51°19.0
*16	Dec. 13, 1956	0915	24°39.9	48°26.8
*16′	Dec. 13, 1956	1932	25°26.0	46°38.0
18	Dec. 15, 1956	0920	29°13.2	39°09.8
*18′	Dec. 15, 1956	1907	29°51.5	37°20.8
19	Dec. 16, 1956	0910	31°35.5	34°04.1
20	Dec. 16, 1956	1935	32°17.8	32°17.2

*: L-net towing was made.

Protatlanta souleyeti, TESCH 1949, p. 13, figs. 4–6.

Occurrence: Indian Ocean (L-net): St. 7′ (1 specimen), St. 15′ (1).

This is a rather rare Atlantid species with a quite transparent shell and keel. TESCH (1949) mentioned that this species has never been found 'in swarm'.

(3) *Atlanta peroni* LESUEUR, 1817

Atlanta peroni, SMITH 1888, p. 5; VAYSSIÈRE 1904, p. 49, pl. 6, figs. 86–89; TESCH 1906, p. 52, pl. 7, figs. 1, 7, 8; 1949, p. 16, fig. 9; BONNEVIE, 1913, p. 4, pl. 1, figs. 4–7; TOKIOKA 1955a, p. 228, pl. 15, figs. a–d, f–h; 1955b, p. 238, fig. 3.

Occurrence: Indian Ocean (P-net): St. 14′ (2 specimens); (L-net): St. 3′ (1), St. 4′ (1).

Though this is the commonest Atlantid species in the Indo-Pacific area, only 4 specimens measuring 2.1 to 2.5 mm in diameter were found from the present collection.

(4) *Atlanta gaudichaudi* SOULEYET, 1852

Atlanta gaudichaudi, SMITH 1888, p. 5; TESCH 1906, p. 54, pl. 7, figs. 11–13; 1949, p. 17, fig. 10; TOKIOKA 1955a, p. 229, pl. 15, fig. e, tf. 2; 1955b, p. 247, pl. 18, figs. h, i, tf. 10.

Occurrence: Pacific Ocean (L-net): St. 18 (1 specimen); Indian Ocean (L-net): St. 1′ (6), St. 3′ (3), St. 14′ (8).

(5) *Atlanta inflata* SOULEYET, 1852

Atlanta inflata, SMITH 1888, p. 5; TESCH 1906, p. 55, pl. 8, figs. 19–21; 1949, p. 19, fig. 13; TOKIOKA 1955a, p. 233, fig. 4.

Occurrence: Pacific Ocean (L-net): St. 15 (17 specimens); Indian Ocean (P-net): St. 1′ (1).

(6) *Atlanta inclinata* SOULEYET, 1852

Atlanta inclinata, SMITH 1888, p. 6; TESCH 1906, p. 9, pl. 1, fig. 27; 1949, p. 18, fig. 12; TOKIOKA 1955a, p. 230, pl. 56; 1955b, p. 239.

Occurrence: Indian Ocean (L-net): St. 2′ (3 specimens), St. 14′ (1).

This species is clearly discriminated from the others by its inclinated spires.

(7) *Atlanta lesueuri* SOULEYET, 1852

Atlanta lesueuri, SMITH 1888, p. 5; VAYSSIÈRE 1904, p. 48, pl. 5, fig. 77; TESCH 1949, p. 17, fig. 11; TOKIOKA 1955a, p. 231, fig. 3; 1955b, p. 240, fig. 4.

Occurrence: Pacific Ocean (L-net): St. 5 (2 specimens), St. 15 (3), St. 18 (4); Indian Ocean (P-net): St. 15′ (1), St. 18 (1); (L-net): St. 4′ (2), St. 9′ (1), St. 14′ (1).

The specimens found in the present material measure 0.9 to 1.25 mm in diameter.

(8) *Atlanta turriculata* d'ORBIGNY

Atlanta turriculata, TESCH 1906, p. 58, pl. 8, fig. 25; 1949, p. 20, fig. 16; TOKIOKA 1955a, p. 234, fig. 5; 1955b, p. 241, fig. 5.

Occurrence: Indian Ocean (P-net): St. 1′ (1 specimen), St. 4 (1).

Though the present specimens are as small as about 0.55 mm in diameter, they

are never confused with others by their turriform protoconchs.

(8a) *Atlanta* spp., broken specimens

Occurrence: Pacific Ocean (P-net); St. 5 (1 specimen), St. 18 (2);
Indian Ocean (P-net): St. 1′ (1), St. 2 (1), St. 9′ (1), St. 14′ (2), St. 15 (1), St, 18′ (1); (L-net): St. 1′ (7), St. 2′ (4), St. 3′ (8), St. 4′ (2), St. 7′ (1), St. 12′ (1), St. 13 (3), St. 16 (1).

2. PTEROPODA (Opisthobranchia)

(9) *Limacina trochiformis* (d'ORBIGNY, 1836)

Limacina trochiformis, PELSENEER 1888, p. 29; TESCH 1904, p. 13; MEISENHEIMER 1905, p. 10; TESCH 1946, p. 8, pl. 1, fig. 3; TOKIOKA 1955c, p. 60, pl. 7, figs. 1–4.

Occurrence: Pacific Ocean (P-net): St. 12 (1 specimen); (L-net): St. 5 (3);
Indian Ocean (P-net): St. 14′ (9), St. 18′ (2), 20 (19); (L-net): St. 3′ (1).

This is one of the commonest Limacinid species in the warm water region. TOKIOKA (*l.c.*) gave some biometric accounts on the species. The average height of the present material is assumed to be 0.65 mm.

(10) *Limacina inflata* (d'ORBIGNY, 1836)

Limacina inflata, PELSENEER 1888, p. 17; TESCH 1904, p. 11; MEISENHEIMER 1905, p. 4; BONNEVIE 1913, p. 23; TESCH 1946, p. 8, pl. 1, fig. 1; TOKIOKA 1955c, p. 61, pl. 7, figs. 5, 6.

Occurrence: Pacific Ocean (P-net): St. 4 (1 specimen), St. 6 (1), St. 9 (6), St. 13 (4); (L-net): St. 5 (3);
Indian Ocean (P-net): St. 1′ (4), St. 14′ (3), St 18′ (2). St. 20 (25).

This is the dominant pteropods throughout the area under survey. The average-sized specimen measures $0.80 \times 0.65 \times 0.50$ mm. In some specimens preserved in a better condition, a transparent lamella, which TESCH (1946, p. 8) pointed out as SOULEYET's *lame vitree*, was observed on the sinus of the lip.

(11) *Limacina bulimoides* (d'ORBIGNY, 1836)

Limacina bulimoides, PELSENEER 1888, p. 30; TESCH 1904, p. 13; MEISENHEIMER 1905, p. 11; BONNEVIE 1913, p. 23; TESCH 1946, p. 9, pl. 1, fig. 4; TOKIOKA 1955c, p. 26, pl. 8, figs. 9, 10.

Occurrence: Indian Ocean (P-net): St. 18′ (1), St. 20 (4); (L-net): St. 8′ (2), St. 16 (3).

The shell is characterized by the high spire and brown columella and sutures. The present specimens measure 1.9×1.0 mm in average.

(12) *Euclio pyramidata lanceolata* (LESUEUR, 1813)

Clio pyramidata, PELSENEER 1888, p. 36; MEISENHEIMER 1905, p. 21;
Clio (s. str.) *pyramidata*, TESCH 1904, p. 29, pl. 2, figs. 22, 23;

Clio (Euclio) pyramidata, BONNEVIE 1913, p. 28, pl. 3, figs. 22, 23, 27;
Cleodora pyramidata, MASSY 1932, p. 277;
Euclio pyramidata, TESCH 1946, p. 14, pl. 2, fig. 11; 1948, pl. 12;
Euclio pyramidata lanceolata, TOKIOKA 1955c, p. 62, pl. 8, figs. 11–13.

Occurrence: Pacific Ocean (P-net): St. 4 (1), St. 5 (1);
Indian Ocean (P-net), St. 1′ (2), St. 7′ (1); (L-net): St. 4′ (1), St. 8′ (1), St. 12′ (1), St. 14′ (2).

All of the specimens collected by vertical haulings are immature shells. The largest individual measures 2.5 × 1.8 mm; the smallest, 1.45 × 0.55 mm. The drop-shaped protoconch is markedly defined from the metaconch by a constriction. Out of the material taken by the L-net, full-grown specimens measuring about 15.6 × 13.0 mm were found.

(13) *Creseis virgula virgula* RANG, 1828

Clio (Creseis) virgula, PELSENEER 1888, p. 48; TESCH 1904, p. 23;
Creseis virgula, MEISENHEIMER 1905, p. 14; TESCH 1946, p. 20, pl. 2, fig. 5;
Creseis virgula virgula, TOKIOKA 1955c, p. 63, pl. 9, fig. 14.

Occurrence: Pacific Ocean (L-net): St. 5 (3), St. 20 (2);
Indian Ocean (P-net): St. 11 (1).

(14) *Creseis virgula conica* (ESCHSCHOLTZ, 1829)

Clio (Creseis) conica, PELSENEER 1888, p. 50, pl. 2, figs. 1, 2;
Creseis conica, MEISENHEIMER 1905, p. 16;
Creseis virgula f. *conica*, TESCH 1948, p. 9, fig. 5;
Creseis virgula conica, TOKIOKA 1955c, p. 63, pl. 9, figs. 15–17.

Occurrence: Pacific Ocean (P-net): St. 9 (2), St. 14 (1);
Indian Ocean (P-net): St. 1′ (1).

The two forms of *Creseis virgula* are distinguished by the curvature of the shell. TESCH (1948, p. 9) maintained, however, these two forms are transitive. The protoconch is rather elongated oval and is hardly discernible from the metaconch because of the indistinctness of the constiriction. The largest specimen, though immature, measures 2.4 mm in length.

(15) *Creseis acicula acicula* RANG, 1828

Clio (Creseis) acicula, PELSENEER 1888, p. 51; TESCH 1904, p. 24, pl. 2, fig. 21; BONNEVIE 1913, p. 30;
Creseis acicula, TESCH 1946, p. 20; 1948, p. 9; MEISENHEIMER 1905, p. 16;
Creseis acicula acicula, TOKIOKA 1955c, p. 64.

Occurrence: Pacific Ocean (L-net): St. 20 (1).

(16) *Creseis acicula clava* RANG, 1828

Creseis acicula f. *clava*, TESCH 1948, p. 9;
Creseis acicula clava, TOKIOKA 1955c, p. 64, pl. 9, figs. 18, 19.

Occurrence: Pacific Ocean (P-net): St. 3 (1), St. 5 (2), St. 6 (1), St. 20 (1); (L-net): St. 20 (1);
Indian Ocean (L-net): St. 1′ (23), St. 7′ (2), St. 9′ (1), St. 10 (16), St. 13 (10), St. 14′ (2), St. 16 (26), St. 18′ (13).

(17) *Styliola subula* (QUOY et GAIMARD, 1827)

Clio (Styliola) subula, PELSENEER 1888 p. 57; TESCH 1904, p. 28; BONNEVIE 1913, p. 30;
Cleodora (Styliola) subula, MASSY 1932, p. 280;
Styliola subula, MEISENHEIMER 1905, p. 18; TESCH 1946, p. 21, pl. 2, fig. 6; 1948, p. 10; TOKIOKA 1955c, p. 64, pl. 9, fig. 20.

Occurrence: Pacific Ocean (L-net): St. 5 (9), St. 15 (6), St. 18 (3);
Indian Ocean (P-net): St. 14′ (1), St. 15′ (1), St. 18′ (2), 20 (1).

The protoconch is pointed at the extremity in comparison to that of *Creseis*-group. The mature specimens are quite characterized by the longitudinal crest. In the present material, the crest is observed even in 1.3 mm-long shell.

(18) *Hyalocylix striata* (RANG, 1828)

Clio (Hyalocylix) striata, PELSENEER 1888, p. 54, pl. 2, fig. 3; TESCH 1904, p. 27; BONNEVIE 1913, p. 31; MASSY 1932, p. 279;
Hyalocylix striata, TESCH 1946, p. 22, pl. 2, fig. 7; 1948, p. 11; TOKIOKA 1955c, p. 65, pl. 9, fig. 21.

Occurrence: Pacific Ocean (L-net): St. 15 (1);
Indian Ocean (P-net): St. 3′ (1).

The protoconch of the present species is usually lost. The species is rather peculiar among the *Cleodora*-group in having strong transverse ribs.

(19) *Cuvierina columnella columnella* (RANG, 1828)

Cuvierina columnella, PELSENEER 1888, p. 67; TESCH 1904, p. 32, pl. 2, figs. 24–26; 1946, p. 22, pl. 2, fig. 8; MEISENHEIMER 1905, p. 26; BONNEVIE 1913, p. 31; MASSY 1932, p. 280; TOKIOKA 1955c, p. 65.

Occurrence: Pacific Ocean (L-net): St. 5 (2);
Indian Ocean (L-net): St. 13 (1), St. 14′ (1), St. 15′ (1), St. 18′ (2).

The protoconch is seldom preserved.

(20) *Diacria trispinosa* (LESUEUR, 1827)

Cleodora compressa, PELSENEER 1888, p. 87; TESCH 1904, p. 45, pl. 2, fig. 64;
Cavolinia trispinosa, PELSENEER 1888, p. 76; MEISENHEIMER 1905, p. 27; MASSY 1932, p. 276;
Cavolinia (Diacria) trispinosa, TESCH 1904, p. 35, pl. 2, figs. 27–31; BONNEVIE 1913, p. 32, pl. 2, figs. 13–14, pl. 4, figs. 28–34;
Diacria trispinosa, TESCH 1946, p. 24, pl. 3, fig. 14; 1948, p. 22;
Diacria trispinosa trispinosa, TOKIOKA 1955c, p. 65, pl. 10, figs. 23–25.

Occurrence: Pacific Ocean (L-net): St. 5 (1);
Indian Ocean (P-net): St. 1′ (3), St. 14′ (1); (L-net): St. 8′ (1), St. 12′ (1), St. 13 (1).

The immature specimen is very similar to *Creseis* but it differs in having a strongly compressed shell with a spherical protoconch. TESCH (1946, p. 25) gave a good illustration of transitive metamorphoses from the stage of *Cleodora compressa* to the adult.

(21) *Diacria quadridentata quadridentata* (LESUEUR, 1821)

Cavolinia quadridentata, PELSENEER 1888, p. 78; MEISENHEIMER 1905, p. 29;
Cavolinia (Diacria) quadridentata, TESCH 1904, p. 36; BONNEVIE 1913, p. 33;
Diacria quadridentata, TESCH 1946, p. 26, pl. 3, fig. 15b, c; 1948, p. 23;
Diacria quadridentata quadridentata, TOKIOKA 1955c, p. 66, pl. 10, figs. 27, 28, pl. 11, fig. 26.

Occurrence: Pacific Ocean (L-net): St. 5 (1);
Indian Ocean (P-net): St. 1′ (3), St. 14′ (1); (L-net): St. 1′ (6), St. 9′ (1), St. 8′ (1).

The present material is comprised by mature specimens. The young shell, *Cleodora pygmaea* BOAS, somewhat resembles that of the preceding species. In regard to the distinguishing points of them, TOKIOKA (*l.c.*) has given pertinent descriptions along with some biometrical data on the specimens collected from the Mid-Pacific area.

(22) *Cavolinia tridentata tridentata* (FORSKÅL, 1774)

Cavolinia tridentata, PELSENEER 1888, p. 83; TESCH 1904, p. 37, figs. 36–53; 1946, p. 28, pl. 3, fig. 17; 1948, p. 24, fig. 21; SCHIEMENZ 1906, p. 20, pl. 1, figs. 1–7; BONNEVIE 1913, p. 35; VAYSSIÈRE 1915, p. 35;
Pleuropus longifilis, PELSENEER 1888, p. 89; TESCH 1904, p. 46, pl. 2, figs. 66–69;
Cavolinia tridentata tridentata, TOKIOKA 1955c, p. 66, pl. 12.

Occurrence: Pacific Ocean (L-net): St. 20 (1);
Indian Ocean (P-net): St. 1′ (3).

Only two very young specimens are in the present material. They measure 1.1 mm and 1.7 mm in length, respectively.

(23) *Cavolinia tridentata affinis* (d'ORBIGNY, 1836)

Cavolinia tridentata affinis, TESCH 1948, p. 24, figs. 21C, D.

Occurrence: Indian Ocean (L-net): St. 8′ (1), St. 9′ (1).

The full-grown specimen in the present material measures 16.3×10.2 mm.

(24) *Cavolinia uncinata* RANG, 1828

Cavolinia uncinata, TESCH 1904, p. 39; 1946, p. 29, fig. 16, pl. 3, fig. 19; TOKIOKA 1955c, p. 68.

Occurrence: Indian Ocean (L-net): St. 13 (11), St. 14′ (3).

(25) *Cavolinia longirostris longirostris* (LESUEUR, 1821)

Cavolinia longirostris, PELSENEER 1888, p. 79; TESCH 1904, p. 41; 1946, p. 29, pl. 3, fig. 16; 1948, p. 29, fig. 25; MEISENHEIMER 1905, p. 30; BONNEVIE 1913, p. 35; MASSY 1932, p. 273.
Hyalea laevigata, PELSENEER 1888, p. 90; TESCH 1904, p. 46, pl. 2, figs. 72, 73.
Cavolinia longirostris longirostris, TOKIOKA 1955c, p. 67, pl. 9, figs. 22, 22′.

Occurrence: Pacific Ocean (P-net): St. 2 (1), 12 (1), 15 (1); (L-net): St. 5 (1), St. 9 (1), St. 15 (2), St. 18 (2);
Indian Ocean (L-net): St. 16 (3).

This may be the commonest Cavolinid species in the Indo-Pacific area. The adult specimen from St. 15 measures $4.15 \times 2.95 \times 2.10$ mm. An adolescent specimen measures $3.50 \times 2.80 \times 2.00$ mm. Of such an immature specimen, the rostrum is not fully developed and the longitudinal ribs of the upper shell. None of *C. l. angulata* SOULEYET was found in the present material.

(26) *Cavolinia globulosa* (RANG, 1850)

Cavolinia globulosa, PELSENEER 1888, p. 81; TESCH 1904, p. 41; 1946, p. 30, pl. 3, fig. 20; 1948, p. 28, fig. 25; MEISENHEIMER 1905, p. 32; TOKIOKA 1955c, p. 68.

Occurrence: Indian Ocean (P-net): St. 7′ (1), St. 14′ (1).

(27) *Cavolinia gibbosa* (RANG, 1850)

Cavolinia gibbosa, TESCH 1904, p. 40; 1946, p. 29, fig. 15, pl. 3, fig. 18.

Occurrence: Indian Ocean (L-net): St. 8′ (1).

(28) *Cavolinia inflexa labiata* (d'ORBIGNY, 1836)

Cavolinia inflexa, PELSENEER 1888, p. 85; TESCH 1904, p. 43, pl. 2, figs. 54–63; MEISENHEIMER 1905, p. 35; MASSY 1932, p. 274; BONNEVIE 1913, p. 34;
Hyalaea depressa, PELSENEER 1888, p. 90; TESCH 1904, p. 47, pl. 2, figs. 74–77;
Cavolinia inflexa lata, TESCH 1946, p. 30, pl. 3, fig. 21a; 1948, p. 31, fig. 29;
Cavolinia inflexa labiata, TOKIOKA 1955c, p. 68, pl. 11, figs. 29–33.

Occurrence: Pacific Ocean (L-net): St. 20 (1);
Indian Ocean (L-net): St. 3′ (1).

(29) *Corolla intermedia* (TESCH, 1904)

Cymbuliopsis intermedia TESCH 1904, p. 59, pl. 4, figs. 100–104;
Corolla intermedia, MEISENHEIMER 1905, p. 41; TOKIOKA 1955c, p. 71, pl. 13, figs. 8, 8′.

Occurrence: Indian Ocean (P-net): St. 19 (1).

Although a single specimen seems to be identical with this species, it is not still conclusive because the pseudo-conch was lost.

(29a) Pseudothecosomata (probably *Cymbulina*) species

Occurrence: Indian Ocean (P-net): St. 1 (1).

3. LARVAL GASTROPODA OF COILED TYPE

As the result of close examination on the present material, several types of larval gastropods that commonly occurred throughout the surveyed area have been discriminated. However, there are remained a fairly large number of specimens

unidentified because of morphological confusion due to the lack of shelly matter which was already dissolved by the preservative.

(1) Type α (fig. 13): The shell is sinistral, trochid, spire gradual; the last whorl with 2–3 raised spiral cords; aperture with a sutural slit; faint purplish in color; 0.85×0.75 mm (cf. SIMROTH, 1895, pl. 1, fig. 19).

(2) Type β (fig. 14): The shell is dextral, globose, rather thick; the spire ornamented with raised spiral cords which are intercrossed by the raised axial ribs; the intersections of them somewhat notched; the umbilical area is ornamented with oblique cords; 1.1×1.1 mm (cf. SIMROTH, 1895, pl. ix, figs. 1–3).

(3) Type γ (fig. 16): The shell is sinistral, turriform, with a blunt apex, brown in color; 0.49×0.20 mm (cf. SIMROTH 1895, pl. 20, fig. 1).

(4) Type δ (fig. 15): The shell is dextral, helicinoid; the spire gradual; umbilicus large; aperture rhomboidal with an operculum well fitted; yellow in color. This may be a larval shell of a heteropod.

(5) Type ε (fig. 17): The shell is dextral, helicinoid, spire smoothly rounded, columellar lip protruded; faint violet in color; 1.00×1.25 mm. This may be a form of *Janthina*-larva.

(6) Type ζ (fig. 18): The shell is sinistral, globose, spire very depressed; the last whorl very large with semicircular aperture; umbilicus large; apex bright yellow; a black blotch on the left side of the body.

(7) *Echinospira* larva (fig. 19): A single specimen of an *Echinospira*-larva was found from St. 2 of the Indian Ocean. The accessory shell is nautiloid, spire concave, and the keel with very fine indention all over except its involuted part. As a result of referring to various descriptions on this form of larvae, the present specimen is presumably allied to *Echinospira perspicua* LEBOUR (1937) or *E. disciformis* SIMROTH (1911).

SPECIES COMPOSITION AND DISTRIBUTION

On the basis of the results of identification, the occurrences of the species by area and by type of the net are tabulated in the Tables 3 and 4. The collection comprised heteropoda, pteropoda and larval gastropods. None of adult Janthinidae was collected despite that they are very abundant in the oceans.

Although some heteropodan larvae are presumably included in the unidentified coiled larvae, the identified pteropodan and heteropodan species are taken into consideration for discussing the specific composition of the catch.

As is seen in these tables, the species composition and abundance are variable according to collecting gears (size of the net and method of hauling) and covering areas (position of collecting station). The rough composition of the catch may be apprehended by Table 5.

From this table, it becomes clear that the total numbers of species collected by P-net are not so different from those by L-net. On the contrary, the former is only a half or one-third of the latter in number. As regards population, heteropods

Table 3. Occurrence of planktonic gastropods in the Pacific areas under survey.

(A) P-net

Species \ Station	2	3	4	5	6	9	10	11	12	13	14	15	18	19	20	No. Ind.	No. St.
HETEROPODA																	
Atlanta spp.	—	—	—	1	—	—	—	—	—	—	—	—	2	—	—	3	2
PTEROPODA																	
Limacina inflata	—	—	1	—	1	6	—	—	—	4	—	—	—	—	—	12	4
L. trochiformis	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1	1
Creseis acicula clava	—	1	—	2	1	—	—	—	—	—	—	—	—	—	1	5	4
Cr. virgula conica	—	—	—	—	—	2	—	—	—	—	1	—	—	—	—	3	2
Euclio pyramidata lanceolata	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	2	2
Diacria quadridentata quadridentata	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1	1
Cavolinia longirostris longirostris	1	—	—	—	—	—	—	—	1	—	—	1	—	—	—	3	3
OTHERS (larval form)																	
Larva of type α	2	—	—	5	—	—	—	—	2	—	—	—	—	3	1	13	5
β	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	1
γ	1	—	—	—	—	—	—	—	—	1	—	—	—	—	—	2	2
ε	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	1
Other gastropoda	1	—	—	—	1	—	1	1	—	—	1	—	—	—	1	6	6
TOTAL	5	1	2	9	4	8	1	1	5	5	2	1	2	4	3	53	15

(B) L-net

Species \ Station	5	9	15	18	20	No. Ind.	No. St.
HETEROPODA							
Atlanta lesueuri	2	—	3	4	—	9	3
At. gaudichaudi	—	—	—	1	—	1	1
PTEROPODA							
Limacina inflata	—	—	17	—	—	17	1
L. trochiformis	3	—	—	—	—	3	1
Creseis acicula acicula	—	—	—	—	1	1	1
Cr. acicula clava	4	—	—	—	6	10	2
Cr. virgula virgula	3	—	—	—	2	5	2
Styliola subula	9	—	6	3	—	18	3
Hyalocylix striata	—	—	1	—	—	1	1
Cuvierina columnella columnella	2	—	—	—	—	2	1
Diacria trispinosa	1	—	—	—	—	1	1
Diacria quadridentata quadridentata	2	—	—	—	—	2	1
Cavolinia longirostris longirostris	1	1	2	2	—	6	4
Cavolinia inflexa labiata	—	—	—	—	1	1	1
OTHERS (larval form)							
Larva of type α	—	—	—	—	2	2	1
γ	—	—	—	—	1	1	1
ζ	5	—	—	—	—	5	1
Other gastropoda	11	—	—	9	1	21	3
TOTAL	43	1	29	19	14	106	5

Table 4. Occurrence of planktonic gastropoda in the Indian Ocean under survey.

(A) P-net

Species \ Station	1	1′	2	2′	3	3′	4	4′	5	5′	5″	6	6′	7	7′	8	8′	9	9′	10′	11	12	13	13′	14	14′	15	15′	16	18	18′	19	20	No. Ind.	No. St.
HETEROPODA																																			
Oxygyrus keraudreni	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	4	4
Atlanta peroni	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	2	1
At. lesueuri	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	2	2
At. inflata	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
At. turriculata	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
At. spp.	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	2	1	—	—	—	1	—	—	7	6
PTEROPODA																																			
Limacina inflata	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	2	—	25	34	4
L. trochiformis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	—	—	—	—	2	—	19	30	3
L. bulimoides	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	4	5	2
Creseis virgula virgula	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	1
Cr. virgula conica	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Styliola subula	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	2	—	1	5	4
Hyalocylix striata	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Euclio pyramidata lanceolata	—	2	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	2
Diacria trispinosa	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	4	2
D. quadridentata quadridentata	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2
Cavolinia tridentata tridentata	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	1
Cav. globulosa	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Corolla intermedia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1
Cymbulia? sp.	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
OTHERS (larval form)																																			
Echinospira larva	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Larva of type-α	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	3	2
β	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1
γ	—	2	—	—	—	—	—	—	1	—	—	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	6	—	16	5
ζ	—	—	—	—	—	6	—	1	2	—	9	—	—	8	—	1	2	1	—	—	—	—	1	—	4	—	—	—	—	—	—	—	35	10
Other gastropoda	3	2	1	3	9	1	1	4	—	1	—	1	1	1	—	—	3	—	1	1	—	1	—	2	1	1	1	2	1	1	1	—	—	44	23
TOTAL	4	21	4	7	9	8	1	5	2	2	10	1	1	9	8	1	5	2	2	1	1	1	1	4	5	19	2	4	2	2	15	1	49	209	33

(B) L-net

Species \ Station	1′	2′	3′	4′	7′	8′	9′	10′	12′	13	14′	15′	16	16′	18′	No. Ind.	No. St.
HETEROPODA																	
Oxygyrus keraudreni	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1	1
Protatlanta souleyeti	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	2	2
Atlanta peroni	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	2	2
At. lesueuri	—	—	—	2	—	—	1	—	—	—	1	—	—	—	—	4	3
At. inclinata	—	3	—	—	—	—	—	—	—	—	1	—	—	—	—	4	2
At. gaudichaudi	6	—	3	—	—	—	—	—	—	—	8	—	—	—	—	17	3
At. spp.	7	4	8	2	1	—	—	—	1	3	—	—	1	—	—	27	8
PTEROPODA																	
Limacina trochiformis	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	1
Lim. bulimoides	—	—	—	—	—	2	—	—	—	—	—	—	3	—	—	5	2
Creseis acicula clava	23	—	—	—	2	—	1	16	—	10	2	—	26	13	—	93	8
Euclio pyramidata lanceolata	1	—	—	1	—	1	—	—	1	—	2	—	—	—	—	6	5
Cuvierina columnella calumnella	—	—	—	—	—	—	—	—	—	1	1	1	—	—	2	5	4
Diacria trispinosa	—	—	—	—	—	1	—	—	1	1	—	—	—	—	—	3	3
D. quadridentata quadridentata	6	—	—	—	—	1	1	—	—	—	—	—	—	—	—	8	3
Cavolinia tridentata affinis	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	2	2
C. globulosa	—	—	1	—	—	—	—	—	—	—	1	—	—	—	—	2	2
C. gibbosa	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1	1
C. uncinata	—	—	—	—	—	—	—	—	—	11	3	—	—	—	—	14	2
C. longirostris longirostris	—	—	—	—	—	—	—	—	—	—	—	—	3	—	1	4	1
C. inflexa labiata	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	1
OTHERS (larval form)																	
Larva of type α	2	—	—	—	—	—	—	—	—	—	—	—	—	—	1	3	2
ζ	6	—	—	—	—	—	4	—	—	—	1	—	—	—	—	11	3
Other gastropoda	51	11	12	13	—	1	3	—	—	50	36	2	21	—	20	220	11
TOTAL	102	18	27	19	5	8	11	16	3	76	56	4	54	13	24	436	15

Table 5. Frequency of the Occurrence of Heteropoda and Thecosomatous Pteropoda in the present material.

			No. Species	No. Specimen	Mean No. of Specimen per Whole Station	Mean No. of Specimen per Collecting Station
P-net	Pacific	H	1*	3	0. 23	0. 20
		PT	7	27	1. 38	1. 80
	Indian	H	6*	18	0. 44	0. 54
		PT	12	93	2. 42	2. 81
	Total	H	6*	21	0. 37	0. 44
		PT	14	120	2. 14	2. 50
L-net	Pacific	H	2	10	0. 99	2. 00
		PT	12	67	3. 72	4. 47
	Indian	H	7*	66	3. 61	4. 40
		PT	13	146	8. 11	9. 73
	Total	H	7	76	2. 62	3. 80
		PT	18	213	7. 34	10. 65

H: Heteropoda, PT: Pteropoda Thecosomata, * Including injured and unidentified specimens.

are only one-sixth of thecosomatous pteropods by L-net and one-third of those by L-net.

Among the pteropods, the dominant species are observed in either of areas and either of catch. The dominant and sub-dominant species are pointed out from each of collection (Table 6).

Table 6. Dominant and sub-dominant pteropods by area and by type of net.

		Dominant	Subdominant
Pacific	P-net	*Limacina inflata* (44.4%)	*Creseis acicula clava* (18.6%)
	L-net	*Styliola subula* (25.9%) *Limacina inflata* (25.3%)	*Creseis acicula clava* (14.9%)
Indian	P-net	*Limacina inflata* (36.5%)	*Limacina trochiformis* (32.2%)
	L-net	*Creseis acicula clava* (63.7%)	*Cavolinia uncinata* (9.6%)

On the other hand, out of heteropodous specimen, *Oxygyrus keraudreni* is likely a dominant species in P-net collection (18.2%) while *Atlanta gaudichaudi* in L-net collection (25.3%). Although Atlantid gastropods were found in a very small number in the present material, the species compositions by L-net collection are compared to the previous results of different areas (Table 7).

Table 7. Comparison of species compositions of Atlantidae in larval net collections from three different areas.

Species	Area under survey* (Indo-Pacific)	Bikini area (TOKIOKA, 1955a)	Kuroshio area (OKUTANI, 1957a)
A. peroni	4.6%	27%	55.3%
A. lesueuri	29.5	47	14.6
A. gaudichaudi	40.9	2	11.6
A. inclinata	9.2	9	5.8
A. inflata	9.2	4	1.9
A. turriculata	—	10	—
O. keraudreni	2.3	—	2.9
P. souleyeti	4.6	—	—

* In computation injured and unidentified individuals are omitted.

As the surveyed area covers a vast region, no distinct peculiarity of geographical distribution of these groups of animal was present. The apparent differences in species composition and abundance are attributed not to geographical or topographical reasons but to occasional distribution of the collected stations. The horizontal collection by L-net was made mostly at the time of sunset. Therefore, the present material is not appropriate to be discussed from a viewpoint of faunal difference by collecting time.

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海鷹丸探検生物学報告 第2報

練習船海鷹丸が昭和31年南極探検航海中に太平洋及び印度洋で採集した浮游性腹足類

滝　　巌・奥谷喬司

海鷹丸航海中，太平洋で21地点，印度洋で35地点で採集された浮游性腹足類を分類し，各種について文献引照と観察事項を記し，採集地点と標本点数を記録した．又標本保存中，貝殻の溶解した巻貝幼生は種名の同定は不可能であるが，これらに5型を区別し得た．尚 Echinospira 幼生1点も発見された．

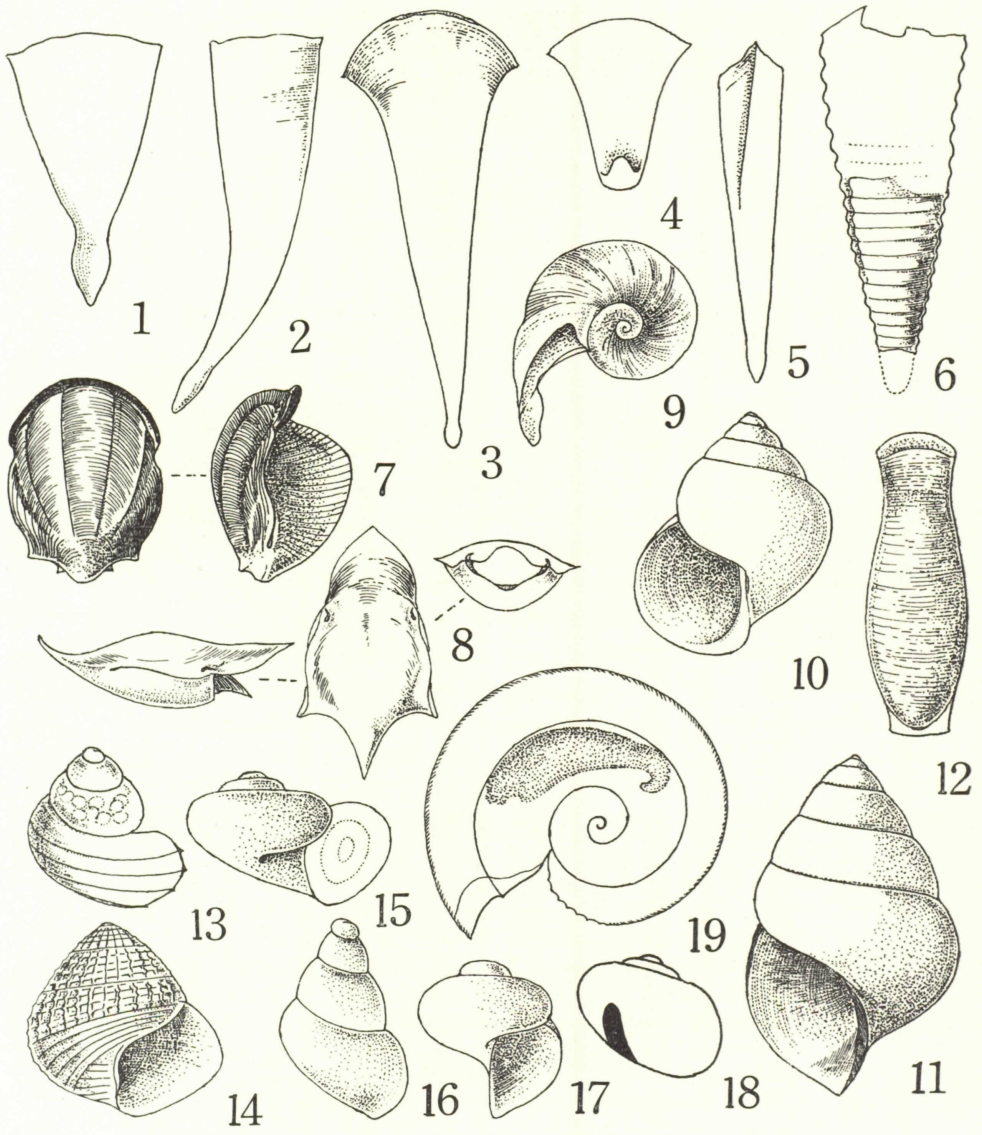
又両海洋における採集地点の経緯度，採集年月日，時刻，各種の各地点における採集個体数を表1—7に表示した．

本文で記録された種名は次の通りである：前鰓亜綱—中腹足目—異足超科：*Oxygyrus keraudreni* ヒレウキガイ，*Protatlanta souleyeti*, *Atlanta peroni* クチキレウキガイ，*A. gaudichaudi* ウスヒラクチキレウキガイ，*A. inflata* ナカダカクチキレウキガイ，*A. inclinata* ネジレクチキレウキガイ，*A. lesueuri* ムラサキクチキレウキガイ，*A. turriculata* トウガタクチキレウキガイ．

後鰓亜綱—翼足目：*Limacina trochiformis*, *L. inflata* ヒラウキマイマイ，*L. bulimoides* タワラナリウキマイマイ，*Euclio pyramidata lanceolata* ウキビシ，*Creseis virgula virgula* ツメウキヅノガイ，*C. virgula conica*, *C. acicula acicula* ウキヅノガイ，*C. acicula clava*, *Styliola subula* スジウキヅノガイ，*Hyalocylix striata*, *Cuvierina columnella columnella* ウキヅツ，*Diacria trispinosa* ヒラカメガイ，*D. quadridentata quadridentata* キヨコカメガイ，*Cavolinia tridentata tridentata* カメガイ，*C. tridentata affinis*, *C. uncinata* クリイロカメガイ，*C. longirostris longirostris* ササノツユ，*C. globulosa* マルカメガイ，*C. gibbosa* シロカメガイ，*C. inflexa labiata* マサコカメガイ，*Corolla intermedia*.

EXPLANATION OF PLATE 1

1. *Euclio pyramidata lanceolata* (LESUEUR), immature: 1.45×0.55 mm
2. *Creseis virgula conica* (ESCHSCHOLTZ), immature: 1.6×0.5 mm
3. *Diacria trispinosa* (LESUEUR), immature: 2.5×0.5 mm
4. *Cavolinia tridentata tridentata* (FORSKÅL), immature: 1.7×1.1 mm
5. *Styliola subula* (Q. et G.), immature: 1.3×0.3 mm
6. *Hyalocylix striata* (RANG), immature: 3.5×1.25 mm
7. *Diacria quadridentata quadridentata* (LESUEUR), adult: 2.0×1.8 mm
8. *Cavolinia inflexa labiata* (d'ORBIGNY), adult: 6.0×4.5 mm
9. *Limacina inflata* (d'ORBIGNY), adult: 0.80×0.65 mm
10. *Limacina trochiformis* (d'ORBIGNY), adult: 0.65×0.50 mm
11. *Limacina bulimoides* (d'ORBIGNY), adult: 1.9×1.0 mm
12. *Cuvierina columnella columnella* (RANG), adult: 6.0×2.0 mm
13. Larval gastropoda, type α: 0.85×0.75 mm
14. Larval gastropoda, type β: 1.1×1.1 mm
15. Larval gastropoda, type δ (*Carinaria* ?): 1.1×1.1 mm
16. Larval gastropoda, type γ: 0.49×0.20 mm
17. Larval gastropoda, type ε: 1.0×1.25 mm
18. Larval gastropoda, type ζ: 0.6×0.5 mm
19. *Echinospira*-larva (*Lamellaria* sp.): 2.4×0.4 mm



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