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Nine Unrecorded Mesogastropodous Species (Gastropoda : Mollusca) from Korean Waters

—Superfamilies Turritellacea, Calyptraeacea, Cypraeacea, and Tonnacea—

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=국문요약=

한국 해산 중복족류(연체동물 문 : 복족 강) 미기록 9종

—나사고둥 상과, 배고둥 상과, 개오지 상과, 위고둥 상과—

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최 병 래 · 박 중 기

한국 해산 중복족류에 대한 분류학적 연구의 일환으로 1971년 9월부터 1991년 10월까지 전국 해안 34개 지점으로부터 채집된 나사고둥 상과, 배고둥 상과, 개오지 상과, 위고둥 상과에 속하는 표본들을 대상으로 동정, 분류한 결과 다음과 같은 9종의 한국 미기록종을 얻었기에 도판과함께 이들 종을 새로이 재기재하였다: *Kurosioia fascialis* (Menke, 1828), *Neohaustator andenensis* (Otuka, 1934), *Iphinoe unicarinatus* (Broderip & Sowerby, 1829), *Turritropis turrita* Habe, 1962, *Calyptraea morbida* (Reeve, 1859), *Crepidula onyx* (Sowerby, 1824), *Primovula frumentum* (Sowerby, 1828), *Erosaria helvora* (Linné, 1758), *Reticutriton tenuiliratus* (Lischke, 1873).

INTRODUCTION

With regard to the taxonomic studies on Korean mesogastropods belonging to superfamilies Turritellacea, Calyptraeacea, Cypraeacea and Tonnacea, 10 species of 3 families in the superfamily Turritellacea, 4 species of 2 families in the superfamily Calyptraeacea, 9 species of 3 families in the superfamily Cypraeacea and 12 species of 4 families in the superfamily Tonnacea were fragmentarily reported up to date by many previous investigators (Nomura and Hatai, 1928; Shiba, 1934; Kotaka, 1951; Lee, 1956a, 1956b, 1958; Kang *et al.*, 1971, Kim and Rho, 1971; Kuroda *et al.*, 1971; Higo, 1973; Yoo, 1976; Kim and Choe, 1988; Choe and Kim, 1989; Lee, 1990).

As a series of taxonomic studies on the Korean mesogastropods, the specimens belonging to the above-mentioned 4 superfamilies were collected along the Korean sea coasts, and

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taxonomically identified.

From this study, 9 species in 6 families, were turned out to be new to Korean fauna, reported. Redescriptions and illustrations for those species were provided in this paper.

MATERIALS AND METHODS

The materials examined in this study were collected from 34 localities of Korean sea coasts in August 1971 through October 1991 (Fig. 1). Collections were fixed and preserved in 95% ethanol solution.

RESULTS

1. Description of species

Superfamily Turritellacea 나사고둥 상과
Family Turritellidae 나사고둥 과
Genus *Kurosioia* Ida, 1952 처마나사고둥 속

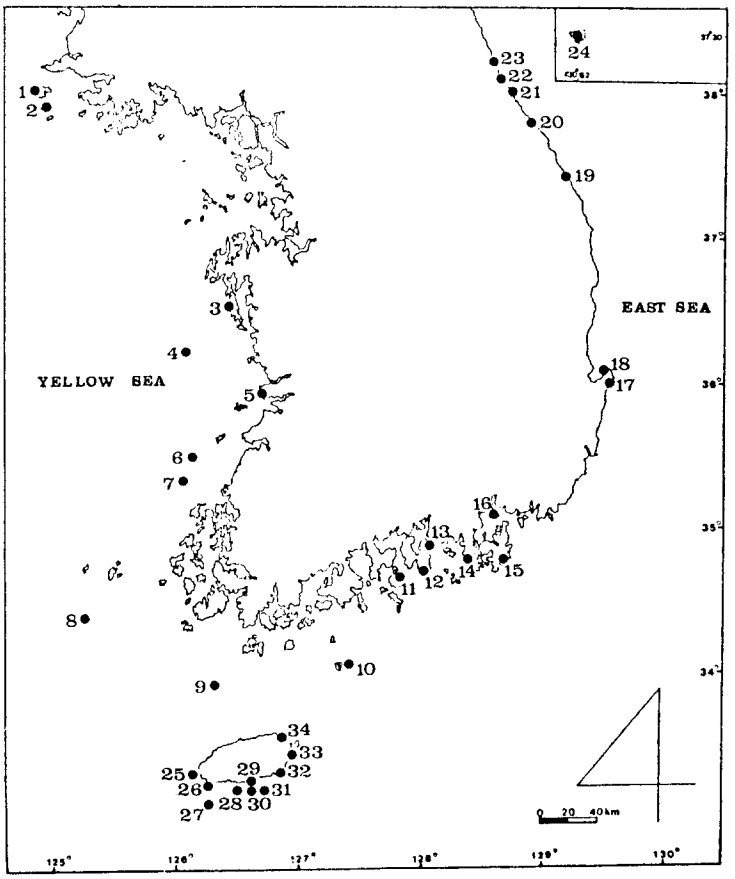


Fig. 1. A map showing the localities where materials in the present study were collected
1, Tumuchin(Paengnyŏng I.); 2, Okchukp'o(Taech'ŏng I.); 3, Pangp'o(Anmyŏn I.); 4, Oeyŏn I. (Oeyŏn Is.); 5, Surae; 6, Sŏkman I. (Anma Is.); 7, O I. (Anma Is.); 8, Kukhŭl I.; 9, Hoengkan I. (Ch'uja Is.); 10, Taesampu I.; 11, Tolsan I.; 12, Mijo(Namhae I.); 13, Shinsu I.; 14, Chŭngmu; 15, Kuchora; 16, Suchŏng; 17, Kuryongp'o; 18, Kuman; 19, Hujin; 20, Chumunjin; 21, Yangyang; 22, Taep'o; 23, Ayajin; 24, Ullŭng I.; 25, Ch'akwi I.; 26, Mosŭlp'o; 27, Mara I.; 28, Pŏmsŏm; 29, Sŏgwip'o; 30, Munsŏm; 31, Sup'sŏm; 32, Pyŏsŏn; 33, Sŏngsan; 34, Sehwa.

1) *Kurosioia fascialis* (Menke, 1828)

처마나사고둥 (신칭)

(pl. 1, fig. 5)

Turritella fascialis Menke, 1828, Synopsis Meth. Moll., p. 83 (cited from Kuroda *et al.*, 1971).

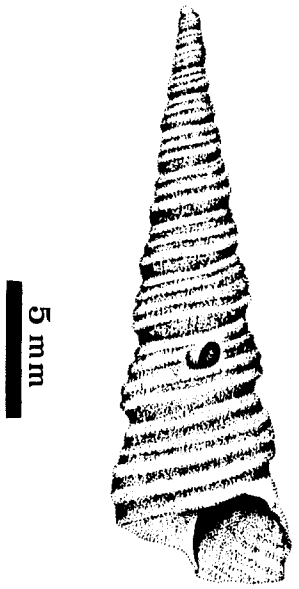
Turritella fascialis: Reeve, 1849, *Turritella*, sp. 47; E. A. Smith, 1875, p. 107; Tryon, 1886, 8, p. 197, pl. 59, fig. 36 (not 37); Kotaka, 1951, p. 78, pl. 11, figs. 10-11; Yokoyama, 1931, p. 30.

Turritella gracillima Gould, 1861, Proc. Boston Soc. Nat. Hist., 7, p. 386 (cited from Kuroda *et al.*, 1971).

Turritella (*Haustator*) *fascialis:* Otuka, 1938, p. 38, fig. 5.

Turritella (*Kurosioia*) *fascialis fascialis:* Ida, 1952, p. 45, pl. 1, fig. 11.

Kurosioia fascialis: Kira, 1954, p. 26, pl. 12, fig. 3; Kira, 1962, p. 24, pl. 13, fig. 3; Kuroda *et al.*, 1971, 96 (J), 63 (E), pl. 16, figs. 25-28; Higo, 1973, p. 56; Inaba, 1982, p. 87.



Textfig. 1. *Kurosioia fascialis* (Menke, 1828)

Haustator (*Kurosioia*) *fascialis:* Okada *et al.*, 1967, p. 56.

Type locality: North Australia (*T. fascialis*); Kagoshima, Kyushu (*T. gracillima*).

Material examined: 1 ind., Taep'o Harbour (Sokch'o), Aug. 19, 1988 (B.L. Choe). (ind.: abbreviation of individual)

Description: Shell screw shaped and medium in size. Shell color translucently pale-yellow and thin in thickness. Spire very high and occupies almost part of shell in height. Each whorl strongly constricted by deep suture and approximately 12 in number (sometimes attain to about 20 in adult). Each whorl surface ornamented with 3 strong spiral ribs and 1-2 thin spiral threads intervened between them. Body whorl with 4 stout spiral ridges low and amount to less than 1/5 of shell in height. Numerous growth lines longitudinally waved on surface of whorl. Base flat, without umbilicus. Aperture quadrilateral in shape and outer lip marginated with spiral cords on surface.

Measurement: 21 mm height, 6.2 mm breadth

Distribution: Korea, Japan [Honshu (Boso Peninsula and Noto Peninsula as north limit), Shikoku, Kyushu, Sagami Bay], Taiwan and the Tropical Pacific Region.

Genus *Neohaustator* Ida, 1950 큰나사고둥 속

2) *Neohaustator andenensis* (Otuka, 1934)

가는줄나사고둥 (신칭)

(pl. 1, fig. 6)

Turritella (Haustator) andenensis Otuka, 1934, Bull. Earthq. Inst., 12 (3), pp. 622-623, pl. 51, figs. 113, 100 (cited from Otuka, 1938); Otuka, 1938, p. 41, figs. 1, 9.

Turritella andenensis: Kotaka, 1951, p. 75, pl. 11, figs. 5-6.

Neohaustator andenensis: Higo, 1973, p. 56.

Type locality: Anden, Oga Peninsula.

Material examined: 1 ind., Hujin (Samch'ŏk), May 15, 1990 (B.L. Choe).

Description: Shell moderate in size and high screw form in appearance. Merely 13 whorls visible in this specimen for erosion of upper whorls. Spire very high and occupies almost part of shell in height, which sharply attenuating towards top. Each whorl evenly convex and rather finely excavated at suture. Surface sculpture consists of many thick and thin spiral ribs, which arranged alternatively, and compactly waving growth lines. Base slightly convex and incised with many fine spiral striae and waving growth lines. Aperture roundly ovated in shape, without siphonal canal.

Measurement: 62 mm height, 16.2 mm breadth

Distribution: Korea, Japan (Hokkaido, Japan sea).

Superfamily Calyptraeacea 배고등 상과
Family Trichotropidae 모자고등 과
Genus *Iphinoe* H. and A. Adams, 1854
투구고등 속

3) *Iphinoe unicarinatus* (Broderip & Sowerby, 1829) 투구고등(신칭)

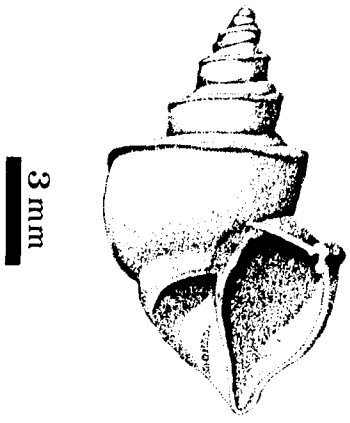
(pl. 1, fig. 3)

Trichotropis unicarinata Broderip & Sowerby, 1829, Zool. Jour., 4, p. 376 (cited from Kuroda *et al.*, 1971); Sowerby, 1874, *Trichotropis*, sp. 8; Dunker, 1882, p. 105, pl. 1, figs. 11, 12; Uchiyama, 1902, Zool. Mag. (Tokyo), 14, p. 310, pl. 24, figs. 7-9 (cited from Kuroda *et al.*, 1971).

Iphinoe unicarinata: A. Adams, 1863, p. 93; Kira, 1954, p. 31, pl. 13, fig. 12; Kuroda *et al.*, 1971, 132 (J), 86 (E), pl. 23, fig. 2.

Trichotropis (Iphinoe) unicarinata: Smith, 1875, p. 103; Yokoyama, 1931, p. 33.

Iphinoe unicarinatus: Kira, 1962, p. 29, pl. 14, fig. 12; Habe, 1962, Bull. Nat. Sci. Mus., 6, p. 69 (cited from Kuroda *et al.*, 1971); Higo, 1973, p. 79.



Textfig. 2. *Iphinoe unicarinatus* (Broderip & Sowerby, 1829).

Neoiphinoe unicarinatus: Inaba, 1982, p. 93.

Type locality: Japan.

Material examined: 1 ind., (No data).

Description: Shell small, turret-shaped, thin, and pale-brown in ground color. Exterior surface usually covered with dirty-brown periostracum layer, which forming spinous protrusions on shoulder in living specimen. Whorls with finely depressed suture 6 in number and carinated perpendicularly with a fine spiral cord on shoulder of each whorl. Many thin growth lines densely compacted in broadened subsutual region and reaching to body whorl. Body whorl bears somewhat roundly inflated periphery and occupies approximately 2/3 of shell in height. Aperture with sharply peaked canal inverted-triangular in shape and becomes narrow towards lower part of it. Both lips very thin in thickness. Umbilicus deeply excavated and semicircular in shape.

Measurement: 11.7 mm height, 9.8 mm breadth

Distribution: Korea, Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Sagami Bay], Yellow Sea.

Genus *Turritropis* Habe, 1961 장군고둥 속

4) *Turritropis turrita* Habe, 1962
장군고둥 (신칭)
(pl. 1, fig. 4)

Turritropis turrita Habe, 1962, Bull. Nat. Sci. Mus., 6 (2), p. 72, pl. 7, fig. 12 (cited from Habe, 1977); Habe, 1961, p. 36, pl. 15, fig. 26; Habe, 1964, p. 55, pl. 15, fig. 26; Higo, 1973, p. 80; Habe, 1977, p. 127.

Trichotropis (*Turritopis*) *turrita:* Springsteen & Leobrera, 1986, p. 56, pl. 12, fig. 8.

Type locality: Off Cape Ashizuri, Kôohi Pref., Shikoku (Japan).

Material examined: 1 ind., Tumuchin (Paengnyŏng I.), Jul. 25, 1987 (H.S. Kim).

Description: Shell small, rather solid and turreted with 5 whorls upwardly. Shell surface covered with dark-brown periostracum, which forming hairy projections on shoulder. Each whorl definitely distinguished by suture and perpendicularly carinated on account of strong spiral cord on shoulder. 2 stout spiral cords give angles on body whorl and 2 thin spiral lines inserted between them. Base obliquely inclined and incised with 6 spiral ribs. Aperture large in size and angulated due to stout prominent spiral cords on body whorl surface. Umbilicus deeply excavated and narrow cleft-like in shape.

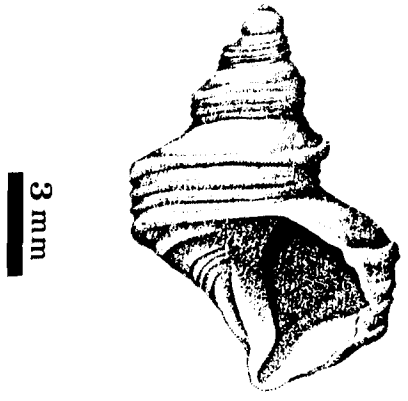
Measurement: 11.0 mm height, 8.5 mm breadth

Distribution: Korea, Japan (Honshu, Shikoku, Enshŭnada), Philippines.

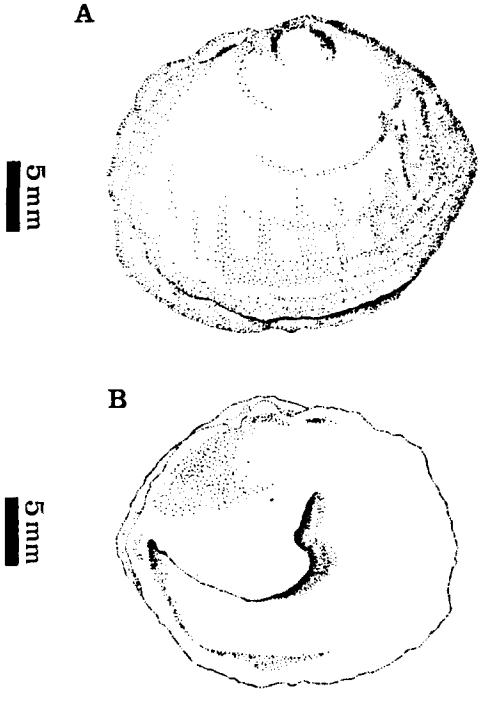
Family Calyptraeidae 배고둥 과
Genus *Calyptraea* Lamarck, 1799 배고둥 속

5) *Calyptraea morbida* (Reeve, 1859)
흰배고둥 (신칭)
(pl. 1, fig. 1a, b)

Calyptraea morbida: Habe & Kosuge, 1965, p. 26; Higo, 1973, p. 81.



Textfig. 3. *Turritropis turrita* Habe, 1962.



Textfig. 4. *Calyptraea morbida* (Reeve, 1859). A, Dorsal side; B, Ventral side

Type locality: Unknown.

Material examined: 1 ind., Changchaeyŏ (Anma I.), Aug. 18, 1989 (B.L. Choe).

Description: Shell low dome-shaped with irregular elliptic base, rather solid and white in color. Dorsal side of shell roundly convexed. Apex with somewhat left-coiled tip situated posteriorly near marginal end. Anteri-posterior part of shell wider than left-right side in diameter. Aperture marginated irregularly and serrated in outline. Inner side of shell white in color, strongly lustered and with thin, translucent septum.

Measurement: 7.6 mm height, 21.5 mm length, 24.8 mm breadth

Distribution: Korea, Formosa and widely ranging in Pacific region.

Genus *Crepidula* Lamarck, 1799 짚신고둥 속

6) *Crepidula onyx* (Sowerby, 1824)

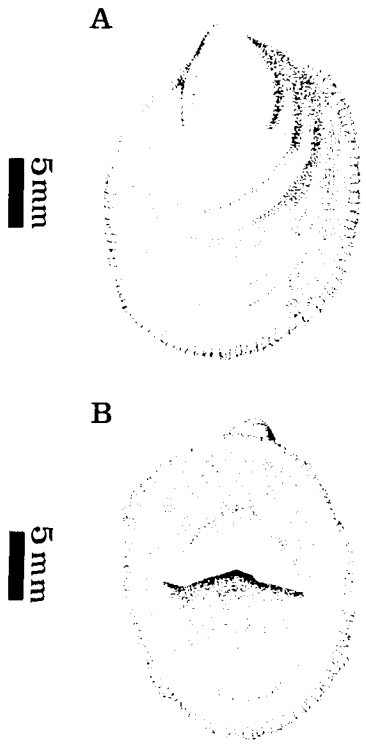
뚱뚱이짚신고둥 (신칭)

(pl. 1, fig. 2)

Crepidula onyx Sowerby, 1824, Gen. Shells (23) (cited from Sherborn, 1929); Higo, 1973, p. 82; Inaba, 1982, p. 94; Okutani & Habe, 1983, pp. 71, 216.

Type locality: Unknown.

Material examined: 2 inds., Kuryongp'o, Aug. 11, 1982 (B.L. Choe); 1 ind., Sŏngsanp'o (Cheju I.), Aug. 8, 1983 (B.L. Choe); 1 ind., Suchŏng (Masan), Jun. 19, 1985 (B.L. Choe); 1 ind., Kuchora (Changsŭngp'o), Jul. 20, 1985 (B. L. Choe); 10 inds., Kuchora (Changsŭngp'o), Jul. 20, 1985 (B.L. Choe); 1 ind., Kuchora (Changsŭngp'o), Jul. 20, 1985 (B.L. Choe); 2 inds., Kuchora (Changsŭngp'o), Jul. 20, 1985 (B. L. Choe); 2 inds., Kuchora (Changsŭngp'o), Jul. 20, 1985 (B.L. Choe); 1 ind., Ayachin, May 12, 1990 (J.R. Lee); 1 ind., Mijo (Namhae I.), May 12, 1991 (B.L. Choe); 1 ind., Sangju (Namhae I.), May 14, 1991 (B.L. Choe).



Textfig. 5. *Crepidula onyx* (Sowerby, 1824). A, Dorsal side; B, Ventral side

Description: Shell slipper-shaped in appearance, with elliptic base. Shell surface uneven, compactly arranged with many thin growth lines and usually covered with brown epidermal layer. Apex posteriorly placed at end of shell margin and tip of apex bending left. Inner side of aperture lustered, dark-brown in color, and bearing rather light-brown band around margin. Translucent milky-white septum with densely compacted growth lines sigmoid-shape and covering nearly 1/2 of inner side of aperture.

Remarks: This species is parasitic, lives adherently on the shell surface or operculum of marine gastropods such as *Rapana venosa*, *Batillus cornutus*, *Kelletia lischkei* and takes advantage of them as a host.

Measurement: 6 mm height, 19.6 mm length, 13.7 mm breadth

Distribution: Korea, Japan (Honshu, Tokyo Bay, Sagami Bay).

Superfamily Cypraeacea 개오지 상과
Family Ovulidae 개오지붙이 과
Genus *Primovula* Thiele, 1925 토끼고둥 속

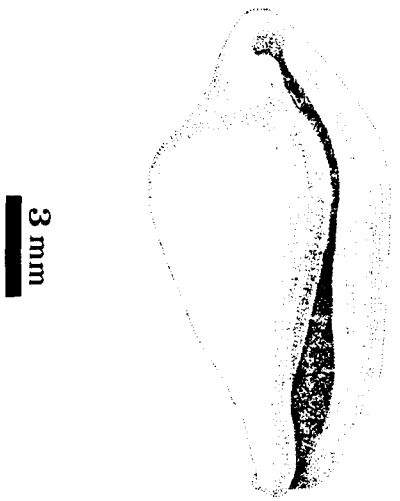
7) *Primovula frumentum* (Sowerby, 1828)
어깨토끼고둥 (신칭)
(pl. 2, fig. 1a, b)

Ovulum frumentum Sowerby, 1828, Zool. Jour. 4 (14), p. 155 (cited from Kuroda *et al.*, 1971); Reeve, 1865, *Ovulum*, sp. 25.

Primovula frumentum: Habe, 1964, p. 63, fig. 5, pl. 19; Kuroda *et al.*, 1971, 148 (J), 97 (E), pl. 24, figs. 17, 18; Higo, 1973, p. 87; Inaba, 1982, p. 96.

Crenavolva frumentum: Habe, 1961a, p. 41, pl. 19, fig. 5.

Crenavolva (*Crenavolva*) *frumentum:* Cate, 1973, Veliger, 15, Supplement, p. 53, fig. 110 (cited from Azuma, 1974); Azuma, 1974, p. 101, textfig. 8, pl. 5, fig. 4.



Textfig. 6. *Primovula frumentum* (Sowerby, 1828).

Type locality: Not mentioned by the author.

Material examined: 1 ind., Sŏkman I., Aug. 20, 1989 (B.L. Choe).

Description: Shell small in size, rather solid and spindle-shaped. Exterior surface glossy-smooth and light-pink in color. Dorsal side of shell steeply sloped at 1/3 point from anterior end and smoothly inclined towards posterior end. Ventral side relatively whitish-pink in color and slightly inflated. Aperture with thickened outer lip, very long and narrow like a slit, which becomes wide along posterior canal. Anterior end of aperture sharply tapered and forms beak-like canal. Both lips lacking denticles on it.

Measurement: 14.4 mm height, 7.0 mm breadth

Distribution: Korea, Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Sagami Bay], Tropical Pacific region.

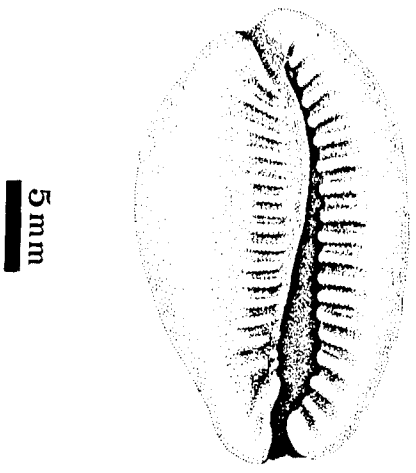
Family Cypraeidae 개오지 과
Genus *Erosaria* Troschel, 1863 처녀개오지 속

8) *Erosaria helvola* (Linné, 1753)
처녀개오지 (신칭)
(pl. 2, fig. 3)

Cypraea helvola Linné, 1758, Syst. Nat., ed. 10, p. 724 (cited from Kuroda *et al.*, 1971); Kiener, 1844, Icon. Coq. 9., *Cypraea*, pl. 28, fig. 1, pl. 43, fig. 4 (cited from Kuroda *et al.*, 1971); Sowerby, 1870, Thes. Conch., 4, pl. 316, figs. 214-216 (cited from Kuroda *et al.*, 1971); Dunker, 1882, p. 100; Yokoyama, 1931, p. 34; Lai, 1987, p. 11, pl. 4, fig. 3.

Luponia helvola: A. Adams, 1863, p. 94.

Erosaria helvola: Kira, 1954, p. 47, pl. 19, fig. 14; Kira, 1962, p. 48, pl. 20, fig. 14; Okada *et al.*, 1967, p. 83; Kuroda *et al.*, 1971, 160 (J), 106 (E), pl. 26, figs. 1-2; Higo, 1973, p. 91; Ma, 1982, p. 73; Qi *et al.*, 1983, p. 40.



Textfig. 7. *Erosaria helvola* (Linné, 1758).

Type locality: Not mentioned by the author.

Materials examined: 1 ind., Pŏmsŏm (Cheju I.), Aug. 10, 1989 (J.G. Park); 1 ind., Pŏmsŏm (Cheju I.), Aug. 15, 1990 (J.G. Park); 2 inds., Sup'sŏm (Cheju I.), Oct. 13, 1990 (J.R. Lee); 1 ind., Munsŏm (Cheju I.), Oct. 14, 1990 (J.R. Lee); 1 ind., Pŏmsŏm (Cheju I.), Oct. 14, 1991 (J. G. Park); 1 ind., Pŏmsŏm (Cheju I.), Oct. 22, 1992 (B.L. Choe); 1 ind., Pŏmsŏm (Cheju I.), Oct. 22, 1991 (B.L. Choe); 1 ind., Ch'akwi I. (Cheju I.), Oct. 23, 1991 (SCUBA).

Description: Shell medium in size, solid and well inflated dorsally. Dorsal surface glossy-smooth, brown in color, and many small yelowish spots marked on it. Milky-white longitudinal crease placed on left of dorsal surface. Both ends of canal colored in whitish purple and 23~24 small denticles faintly traced on left margin of base. Ventral side of shell rather even and dark-brown in color. Aperture narrowly opened like a slit and bears many small denticles on both sides (outer lip 17 and inner lip 14 in number, respectively).

Measurement: 25.5 mm height, 14.9 mm transverse breadth, 11.8 mm dorso-ventral breadth

Distribution: Korea, Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Amami, Okinawa, Sagami Bay], China. Also widely ranging in the Indo-Pacific region.

Superfamily Tonnacea 위고등 상과

Family Cymatiidae 수염고등 과

Genus *Reticutriton* Habe and Kosuge, 1966

털보고등 속

9) *Reticutriton tenuiliratus* (Lischke, 1873)

털보고등 (신칭)

(pl. 2, fig. 2)

Triton tenuiliratus Lischke, 1873, Malak. Blätt., 21, p. 20 (cited from Lischke, 1874).; Lischke, 1874, p. 30, pl. 2, figs. 18, 19.

Reticutrion tenuiliratus: Habe, 1964, p. 71, pl. 22, fig. 8.

Type locality: China.

Material examined: 1 ind., Kuryongp'o, Aug. 11, 1982 (B.L. Choe).

Description: Shell small or moderate in size, dirty-brown in color and spindle-shaped with elongated both ends. Whorls with deeply impressed suture 7-8 in number, which well-convexed. Shell sculpture finely reticulated with many thin spiral ribs and thick longitudinal cords, which forming hairy lamellate varices in penultimate and body whorl. Body whorl occupies 2/3 of shell in height and bears nodules around periphery. Aperture with rather long, narrowly opened canal, ovate shaped and inner side of aperture white in color. Outer lip lacks denticles on margin and hairy lamellate varices present near outer lip. Operculum ovate shaped with anterior terminal nucleus, and dark-brown in color.

Measurement: 43.8 mm height, 20.2 mm breadth

Distribution: Korea, Japan [Honshu (Boso Peninsula as north limit), Shikoku, Kyushu, Amami, Okinawa, Sagami Bay), Taiwan, China.

CONCLUSIONS

To clarify the mesogastropodous fauna of Korean waters, the turritellacean, calyptraeacean, cypraeacean, and tonnacean specimens were collected from 34 localities of Korean sea coast and identified as a series of studies.

As a result of this study, a total of 44 species in 13 families were recognized (including the species confirmed by references), of which following 9 species in 6 families were newly reported to the Korean mesogastropodous fauna in this paper: *Kurosioia fascialis*, *Neohaustator andenensis* (Turritellidae), *Iphinoe unicarinatus*, *Turritropis turrita* (Trichotropidae), *Calyptraea morbida*, *Crepidula onyx* (Calyptraeidae), *Primovula frumentum* (Ovulidae), *Erosaria helvora* (Cypraeidae), *Reticutriton tenuiliratus* (Cymatiidae).

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PLATE 1

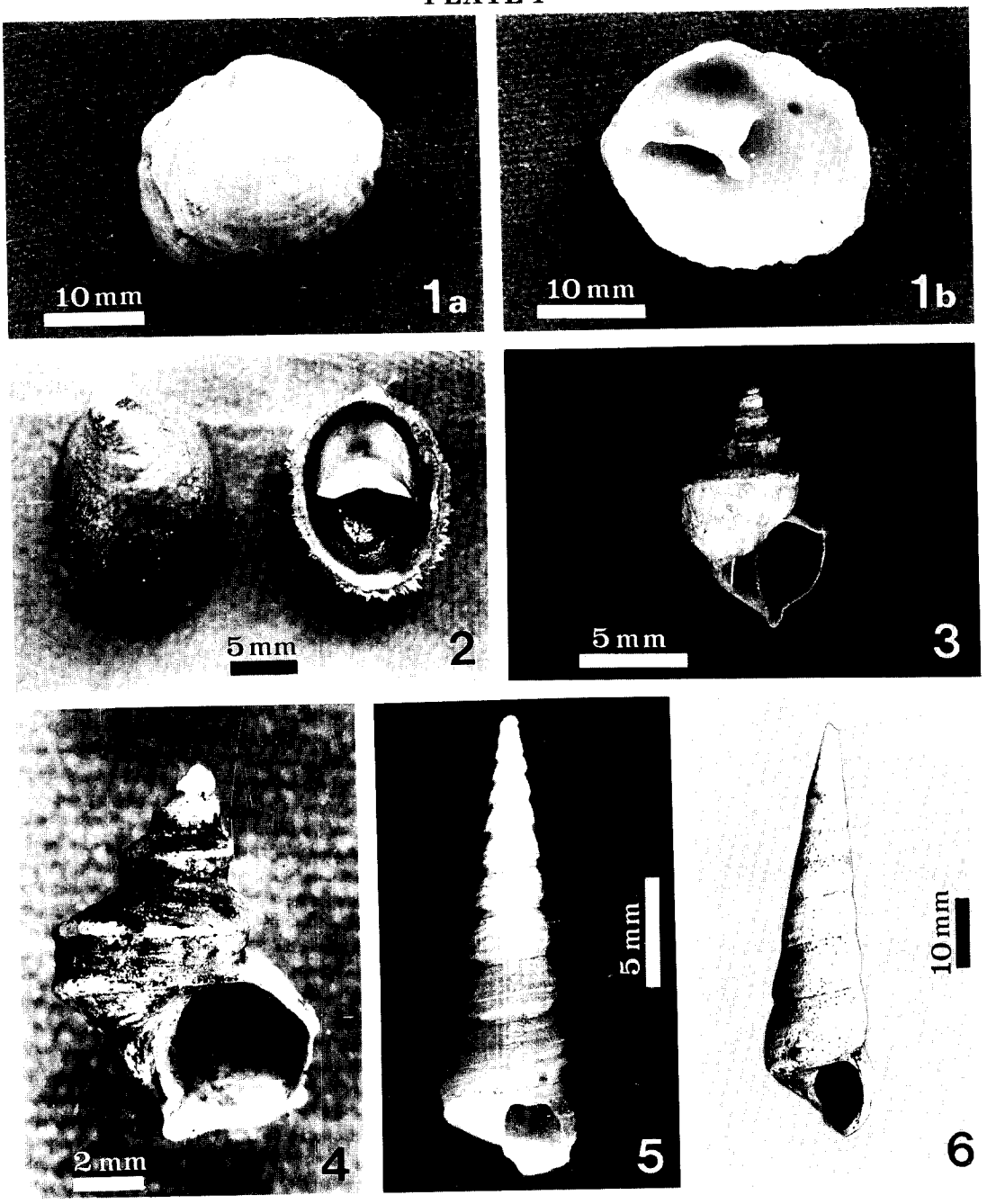

Fig. 1. *Calyptraea morbida* (Reeve, 1859).
Fig. 2. *Crepidula onyx* (Sowerby, 1824).
Fig. 3. *Iphinoe unicarinatus* (Broderip & Sowerby, 1829).
Fig. 4. *Turritropis turrita* Habe, 1962.
Fig. 5. *Kurosioia fascialis* (Menke, 1828).
Fig. 6. *Neohaustator andenensis* (Otuka, 1934).

PLATE 2

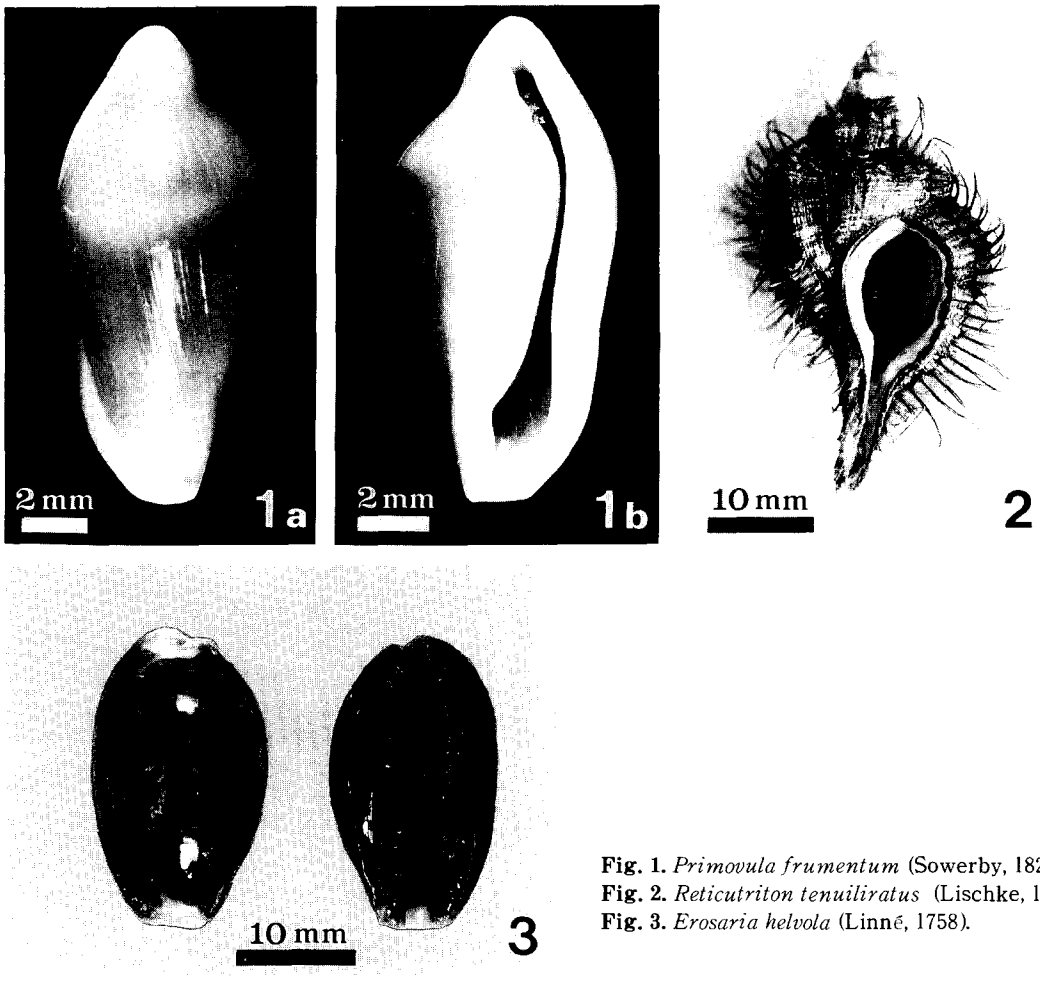

Fig. 1. *Primovula frumentum* (Sowerby, 1828).
Fig. 2. *Reticutriton tenuiliratus* (Lischke, 1873).
Fig. 3. *Erosaria helvola* (Linné, 1758).