

Unrecorded Two Species and One Subspecies of Trochidae (Gastropoda; Archeogastropoda) from Korean Waters.

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Two species and one subspecies of Trochidae collected from 13 localities in South Korea are described, all of which are newly known to Korea: *Tristichotrochus consors multilirata* (Sowerby, 1875), *Euchelus rubra* (A. Adams, 1853) and *Conotalopia (Awajitrochus) mustelina* (Gould, 1861). As a result, the Korean Trochidae comprises 26 species and 7 subspecies in 12 genera.

KEY WORDS: Gastropoda, Trochidae, Unrecorded species, South Korea.

The total 24 species and 6 subspecies in 12 genera of the Korean Trochidae have been reported by previous authors (Nomura and Hatai, 1928; Shiba, 1934; Kamita and Sato, 1941; Lee, 1956a, 1956b, 1958; Yoo, 1959, 1976; Kang, 1971; Chang *et al.*, 1987; Choe and Kim, 1988; Choe and Yoon, 1990). We identified Trochidae specimens collected from 13 localities in South Korean Waters between August 1982 and July 1990, and report hitherto unrecorded 2 species and 1 subspecies of Trochidae from Korean Waters: *Tristichotrochus consors multilirata* (Sowerby, 1875), (A. Adams, 1853) and *Conotalopia (Awajitrochus) mustelina* (Gould, 1861).

Results

Class Gastropoda 복족 강

Order Archeogastropoda 원시복족 목

Family Trochidae 받고둥 과

Genus *Tristichotrochus* Ikebe, 1942 방석고둥 속 (신칭)

1. *Tristichotrochus consors multilirata* (Sowerby, 1875)

얼룩방석고둥 (신칭)

(Fig. 1; Plate-figs. 1, 4)

Ziziphinus multiliratum Sowerby, 1875 (Pro. Zool. Soc. London, p. 127, pl. 24, fig. 10, cited from Ikebe, 1941).

Calliostoma consors multiliratum: Ikebe, 1941 (p. 58).

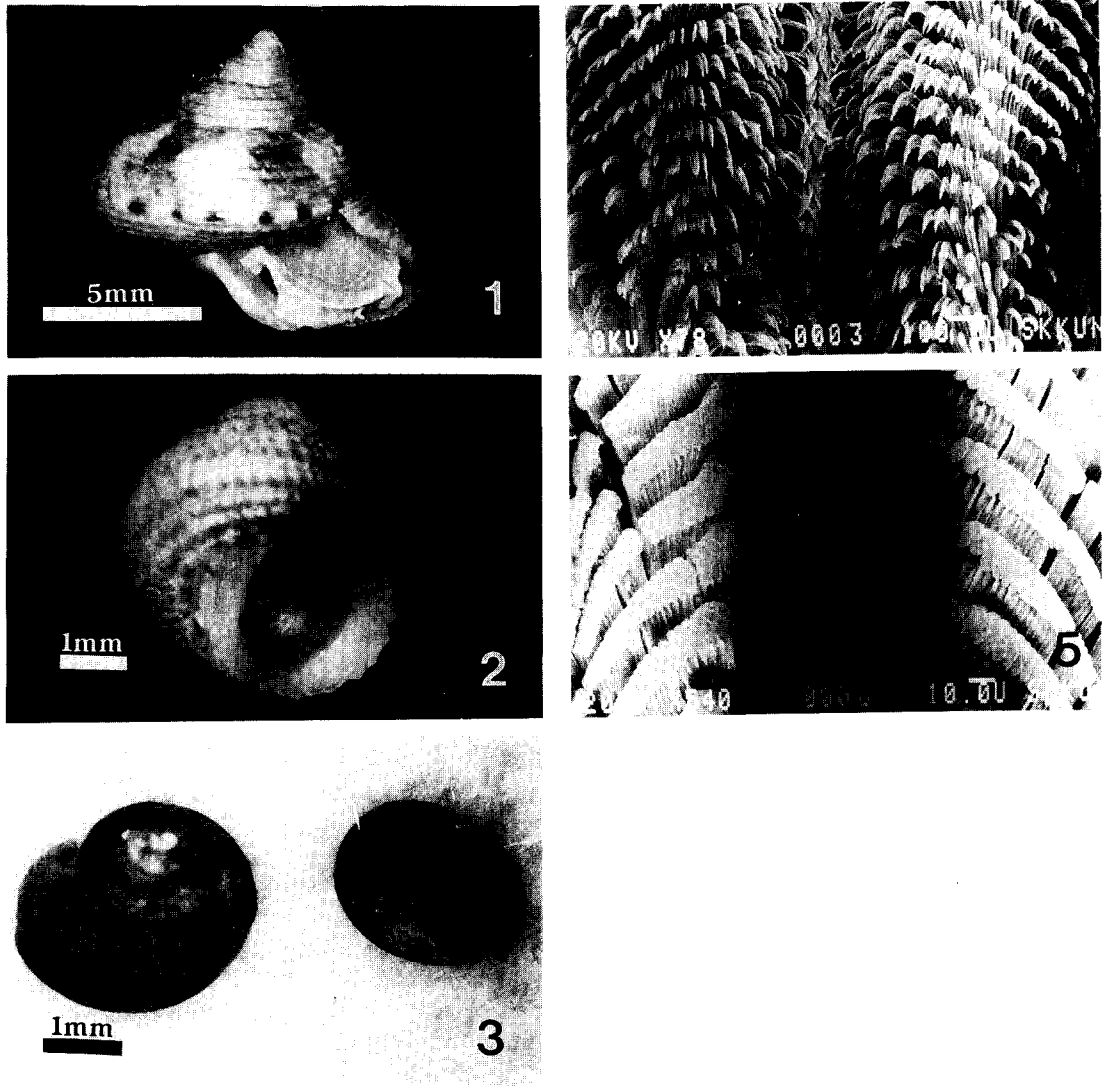
Tristichotrochus multiliratus: Habe and Kosuge, 1967 (p. 9, pl. 5, fig. 17); Habe, 1975 (p. 13, pl. 5, fig. 2); Habe and Ito, 1979 (p. 13, pl. 5, fig. 5); Okada, 1981 (p. 26); Inaba, 1982 (p. 76); Habe and Okutani, 1987 (p. 46, 243)

Tristichotrochus multilirata: Higo, 1973 (p. 21); Watanabe and Naruke, 1988 (p. 30).

Type locality: Unknown.

Material examined: 1 specimen, Cheju Söngsan Ilch'ulbong, Aug. 7, 1983 (B.L. Choe); 2 specimens, Tolsan'ip, May. 10, 1983 (S.K. Kim); 3 specimens, Tolsando Pangjukp'o, Jun. 10, 1983 (B.L. Choe); 1 specimen, Pangp'o, Apr. 5, 1984 (B.L. Choe); 1 specimen, Namhae Sangju, May. 19, 1985 (B.L. Choe); 3 specimens, Paengnöyngdo Tumujin, Jul. 25, 1987 (H.S. Kim); 2 specimens, Soch'öngdo, Oct. 4, 1987 (B.L. Choe); 1 specimen, Namhae, May. 15, 1988 (B.L. Choe); 1 specimen, Tolsando Imp'o, Jun. 12, 1989 (B.L. Choe); 5 specimens, Odo, Aug. 16, 1989 (SCUBA).

Description: Conical shell with 8 whols. Height of shell 17.00 mm (range, 3.80-20.90



Plate

Figs. 1, 4. *Tristichtrochus consors multilirata* (Sowerby, 1875): (1: Shell; 4: Radula)

Fig. 2. *Euchelus rubra* (A. Adams, 1853): Shell

Figs. 3, 5. *Conotalopia (Awajitrochus) mustelina* (Gould, 1861) (3: Shell; 5: Radula)

mm), breadth of shell 18.40 mm (range, 4.60-21.60 mm). Shell reddish brown and light gray blotches on brown background with deep sutures. Body whorl with 13 minute granulated spiral lines. Periphery and base angle rather sharp. Base of shell rather flat with 13 threads. Umbilicus open.

Operculum brown color and multispiral with 15 circlets. Radula formula $\infty:4:1:4:\infty$.

Distribution: Japan (Hokkaido, Sagami Bay, Seto Inland Sea, Choshi, Shikoku, Kyushu).

Habitat: On rocks and among gravels between tide marks down to 30 m deep.

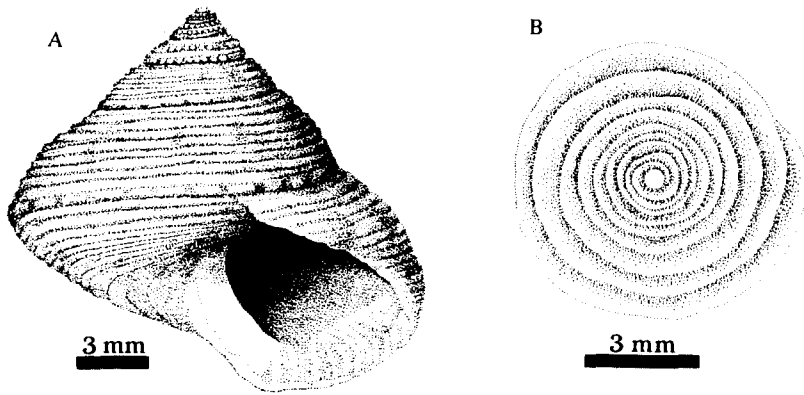


Fig. 1. *Tristichotrochus consors multilirata* (Sowerby, 1875)

A: Shell B: Operculum

Genus *Euchelus* Philippi, 1847 홍색밤고동 속 (신칭)

2. *Euchelus rubra* (A. Adams, 1853) 홍색 밤고동 (신칭)
(Fig. 2; Plate-fig. 2)

Monodonta rubra A. Adams, 1853 (p. 176).

Euchelus rubra: Pilsbry, 1889 (p. 440, pl. 67, fig. 79); Kawamoto and Tanabe, 1956 (p. 5); Kuroda *et al.*, 1971 [p. 50 (in Japanese), p. 33 (in English), pl. 106, fig. 12]; Inaba, 1982 (p. 76); Habe and Okutani, 1987 (p. 45, 187).

Euchelus ruber brunneus Pilsbry, 1901 (p.

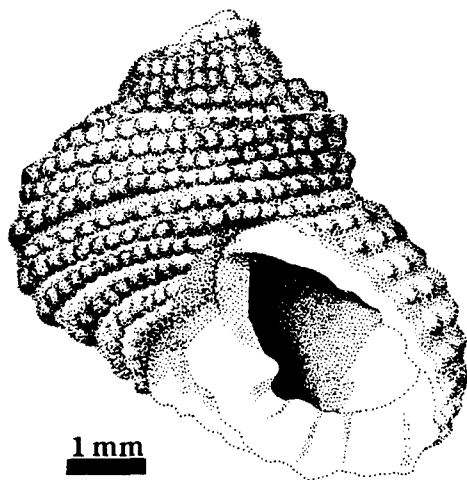


Fig. 2. *Euchelus rubra* (A. Adams, 1853)

201).

Euchelus hachijoensis Pilsbry, 1904 (p. 35, pl. 6, fig. 56).

Euchelus (Euchelus) rubra: Higo, 1973 (p. 26).

Euchelus (Euchelus) rubra: Watanabe and Naruke, 1988 (p. 32).

Type locality: China (*M. rubra*); Hirado, Nagasaki Pref., Kyushu (*E.r. brunneus*), Kumihama, Kyoto Pref., Honshu.

Material examined: 1 specimen, Ch'ujado, Jul. 23, 1990 (SCUBA).

Description: Small globular shell thick, solid with 5 whorls dark gray in color. Height of shell 4.95 mm, breadth of shell 4.35 mm. Each whorl bears 5 granulated spiral lines, body whorl and base ornamented with 15 spiral lines. Suture between whorls deep, body whorl occupied 5/6 of shell. Aperture colored in white. Outer margin and basal lip characterized by 15 callus fold. One remarkable tooth found in front of columella. Umbilicus very deep.

Distribution: Japan (Najima, Boso Peninsula, Shikoku, Kyushu, Seto Inland Sea, Choshi) China; Indonesia.

Habitat: On rocks and among gravels between tide marks down to 30 m deep.

Genus *Conotalopia* Iredale, 1929 깨고동 속 (신칭)

3. *Conotalopia (Awajitrochus) mus-*

telina (Gould, 1861) 깨알밤고동 (신칭)
(Fig. 3; Plate-figs. 3, 5)

Margarita mustelina Gould, 1861 (Proc. Boston Soc. Nat. Hist., 8, p. 15, Cited from Kuroda *et al.*, 1971); Dunker, 1882 (p. 145); Habe, 1960 (p. 13).

Gibbula awajiensis Sowerby, 1914 [Ann. Mag. Nat. Hist., (8)14, p. 34, pl. 2, fig. 4, Cited from Kuroda *et al.*, 1971]; Hirase, 1941 (p. 37, pl. 68, fig. 8).

Calliotrochus awajiensis: Hirase, 1941 (p. 37, pl. 68, fig. 8).

Conotalopia (Awajitrochus) mustelina: Habe and Ito, 1979 (p. 16, pl. 6, fig. 1).

Type locality: Hakodadi (= Hakodate), Hokkaido.

Material examined: 3 specimens, Kuryongp'o (swimming beach), Aug. 10, 1982 (B.L. Choe); 6 specimens, Kyöngbuk Kanggu, Aug. 13, 1982 (B. L. Choe).

Description: Shell small, thin and ovate. Height of shell 3.15 mm (range, 1.85-3.15 mm), breadth 3.0 mm (range, 2.10-3.00 mm). Inflated whorls 5 in number. Surface smooth but sculptured with very narrow, weak spiral lines. Shell varied in color, usually white dots on blackish brown background. Whorls distinctive by deep sutures, body whorl occupied 5/6 of shell. Base weakly convexed. Callus yellowish white, umbilicus deeply perforated. Operculum multispiral, brown color and horny. Rhipidoglossate radula.

Distribution: Japan (Southern Hokkaido, Shikoku, Kyushu, Koronbane, Jogashima,

Hakodate, Seto Inland Sea, Choshi).

Habitat: Among sea weeds on rocks between tide marks down to 10 m deep.

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References

- Adams, A., 1953. Contributions towards a monograph of the Trochidae, a family of gastropodous mollusca. *Proc. Zool. Soc. London*, 1851. pp. 150-192.
- Chang, J.W., B.Y. Kim, J.H. Kim, J.W. Kim and M.S. Park, 1987. Catalog of shell specimen. *National Fisheries Research and Development Agency* **3**: 1-101 (These authors and titles were translated from Korean by the present authors).
- Choe, B.L. and H.S., Kim, 1988. On the classification and distribution of Archeogastropods from Korean Waters. *Korean J. Syst. Zool. Special Issue* **2**: 135-198.
- Choe, B.L. and S.H., Yoon, 1990. Classification and description of Archeogastropods from Ullüng Island Waters. *Korean J. Malacol.*, **6(1)**: 56-79.
- Dunker, G., 1882. Index molluscorum maris Japonici. *Cassellis Cattorum, Sumptibus Theodori Fischer* pp. 1-301, pls. 1-16.
- Habe, T., 1960. Notes on the species of Japanese shells

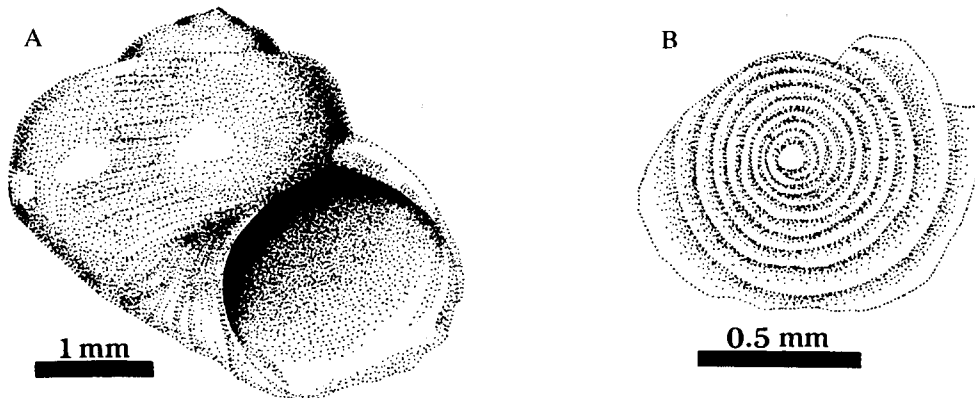


Fig. 3. *Conotalopia (Awajitrochus) mustelina* (Gould, 1861)
A: Shell B: Operculum

- described by A. A. Gould. *Venus*, **21(1)**: 10-31.
- Habe, T., 1975. Shells of the western Pacific in colour. *Hoikusha Pub. Co.*, pp. 1-233, pls. 1-66.
- Habe, T. and K. Ito, 1979. Shells of the world in color. I. The northern Pacific. *Hoikusha Pub. Co.*, pp. 1-176.
- Habe, T. and S. Kosuge, 1967. Standard coloured encyclopedia (III). *Hoikusha Pub. Co.* pp. 1-223 (This title was translated from Japanese by the present authors).
- Habe, T. and T. Okutani, 1987. The mollusks of Japan (Sea Snails). *Gakken Co., Ltd.*, pp. 1-301.
- Higo, S., 1973. A catalogue of molluscan fauna of the Japanese islands and the adjacent area. *Bio. Soc. Nagasaki Pref. Nagasaki*, pp. 1-397.
- Hirase, S., 1941. A collection of Japanese shells with illustrations in natural colours. *Matsumura Sanshodo Co.*, pp. 1-217, pls. 1-129.
- Ikebe, N., 1941. A catalogue of Japanese *Calliostoma*. *Venus* **11**: 54-63.
- Inaba, A., 1982. Molluscan fauna of the Seto Inland Sea, Japan. *Hiroshima Shell Club*, pp. 1-181, pls. 1-4.
- Kamita, T. and T.N. Sato, 1941. Marine fauna at Jinsen Bay, Korea. *Journal of Chosen Natural History Society*, **8**: 1-3.
- Kang, Y.S.(Editor in chief), 1971. Nomina animalium koreanorum. *Hyang Moon Co.* 3: 1-180.
- Kawamoto, T. and J. Tanabe, 1956. Catalogue of molluscan shells of Yamaguti Prefecture. *Yamaguti Prefectural Yamaguti Museum* pp. 1-171, pls. 1-25.
- Kuroda, T., T. Habe and K. Oyama, 1971. The sea shells of Sagami Bay. *Maruzen Co.* pp. 1-484 (In Japanese), pp. 1-304 (In English), pls. 1-64, 106-114.
- Lee, B.D., 1956a. Catalogue of Molluscan shells in Pusan Region. *Pusan Fisheries College*, **1**: 1-17.
- Lee, B.D., 1956b. The Catalogue of Molluscan shells of Korea. *Bull. Fish. Coll.* **1**: 53-100.
- Lee, B.D., 1958. Unrecorded species of Molluscan shells in Korea. *Bull. Fish. Coll.* **2**: 15-26.
- Nomura, S. and K. Hatai, 1928. An outlook of shell distribution in seashores of Korea. *J. Chosen Natural Hist. Soc.* **6**: 92-100 (This title was translated from Japanese by the present authors).
- Okada, K., 1981. New illustrated encyclopedia of the fauna of Japan (II). *Hokuryukan*, pp. 1-208
- Pilsbry, H.A., 1889. Manual of conchology, **11**: 1-519.
- Pilsbry, H.A., 1901. The Japanese marine, land and fresh-water Mollusca. *Proc. Acad. Nat. Sci. Phila.* **53**: 385-408, pls. 19-21.
- Pilsbry, H.A., 1904. New Japanese marine Mollusca: Gastropoda. *Proc. Acad. Nat. Sci. Phila.* **56**: 3-250, pls. 1-6.
- Shiba, N., 1934. Catalogue of the Molluscs of Chosen (Corea). *J. Chosen Natural Hist. Soc.* **18**: 6-31.
- Watanabe, T. and M. Naruke, 1988. A catalogue of Mollusca of Choshi. *Choshi.shizenwo tanoshimu-kai Kaiho*, **4**: 1-140.
- Yoo, J.S., 1959. Descriptions of 9 unrecorded species of Molluscan shells in Korea. *Korean J. Zool.* **II**: 29-33.
- Yoo, J.S., 1976. Korean shells in colour. *Iljisa Co.* pp. 1-196, pls. 1-36.

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밤고둥 과(복족 강; 원시복족 목)의 한국 미기록 2종 및 1아종
최병래 · 윤숙희 (성균관대학교 이과대학 생물학과)

1982년 8월부터 1990년 7월까지 남한의 13개 지점에서 저자들이 채집한 밤고둥 과의 표본들을 동정한 결과, *Tristichotrochus consors multilirata* (Sowerby, 1875), *Euchelus rubra* (A. Adams, 1853), 그리고 *Conotalopia (Awajitrochus) mustelina* (Gould, 1861)의 2종 1아종이 한국 미기록종으로 확인되었기에 기재 보고한다.