

Five Unrecorded Ostreacean Species (Mollusca, Bivalvia) from Korean Waters

Hongying Qi and Byung Lae Choe

(Department of Biological science, College of Natural Sciences,
Sungkyunkwan University, Suwon 440-746, Korea)

ABSTRACT

As a result of study on the oysters collected from 8 localities of Korean coastal area, the following five species were found to be new to the Korean fauna: *Parahyotissa chemnitzii* (Hanley, 1786) and *P. inaequivalvis* (Sowerby, 1871) belong to the Pycnodonteidae; *Dendostrea folium* (Linnaeus, 1758), *Ostrea futamiensis* Seki, 1929, and *Saccostrea mordax* (Gould, 1850) belong to the Ostreidae.

Key words: Taxonomy, Ostreacea, Bivalvia, Korea

INTRODUCTION

With regard to the taxonomic studies on Korean oysters, 2 families, 7 genera, 13 species of oysters have been fragmentarily reported by many previous investigators (Nomura and Hatai, 1928; Hirase, 1930, 1932, and 1941; Shiba, 1934; Lee, 1956a, 1956b; Kira, 1962; Kwon *et al.*, 1993; Kim *et al.*, 1994; Choe *et al.*, 1996) up to date.

As a series of taxonomic studies on Korean bivalves, the specimens belonging to superfamily Ostreacea were collected at 8 localities of Korean coastal area (Fig. 1) during the period of 1987-1997. Specimens were mostly fixed and preserved in 95% alcohol for subsequent analysis.

The specimens identified on the basis of morphological and anatomical characteristics under the stereoscopic-dissecting microscope. From this study, five species were turned out to be new to Korean fauna. Redescriptions and illustrations for these species were provided.

This study is supported by grants from the project KOSEF 95-0401-04-01-3

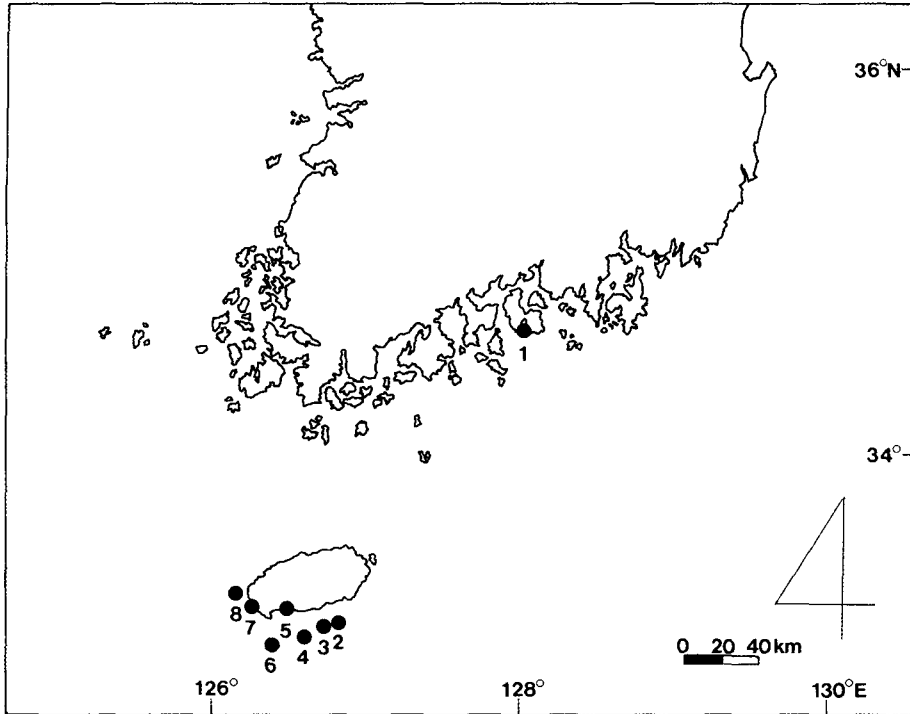


Fig. 1. The map of sampling localities. 1, Sangju, Namhae; 2, Supšom Is.; 3, Munšom Is.; 4, Pömsom Is.; 5, Taep'yongri; 6, Mara Is.; 7, Tongilli; 8, Ch'agwi Is.

DESCRIPTIONS OF SPECIES

Family Gryphaeidae Vyalov, 1936

Genus *Parahyotissa* Harry, 1985

1. *Parahyotissa chemnitzii* (Hanley, 1786) (Fig. 2A, B)

Ostrea chemnitzii: Kuroda, 1930, app. 52.

Ostrea (Lopha) chemnitzii: Hirase, 1932, p. 215, fig. 2.

Saxostrea chemnitzii: Kuroda *et al.*, 1971, p. 594, p. 380, pl. 85, figs. 3-5.

Saccostrea chemnitzii: Okutani and Habe, 1990, p. 261, fig. 102.

Pretostrea chemnitzii: Habe, 1977, p. 107; Higo and Goto, 1993, p. 586.

Hyotissa chemnitzii: Torigoe, 1981, pp. 302, 323, pl. 1, fig. 4, pl. 12.

Type locality. China.

Material examined. 1 ind., Supšom Is., Aug. 1987, J. R. Lee, SCUBA; 3 inds., Ch'agwi Is., Sep. 1995; 8 ind., Munšom Is., Sep. 1995, SCUBA; 6 inds., Supšom Is., Sep. 1995, SCUBA; 2 inds., Pömsom Is., Sep. 1995, SCUBA; 8 inds., Munšom Is., Sep. 1995, SCUBA 25m; 1 ind., Tongilli, Cheju Is., Sep. 1995, SCUBA; 72 inds., Munšom Is., Oct. 1995, SCUBA; 1 ind., Mara Is., Oct. 1995, B. L. Choe, SCUBA; 3 inds., Munšom Is., Jan. 1997; 9 inds., Munšom Is., Jan. 1997.

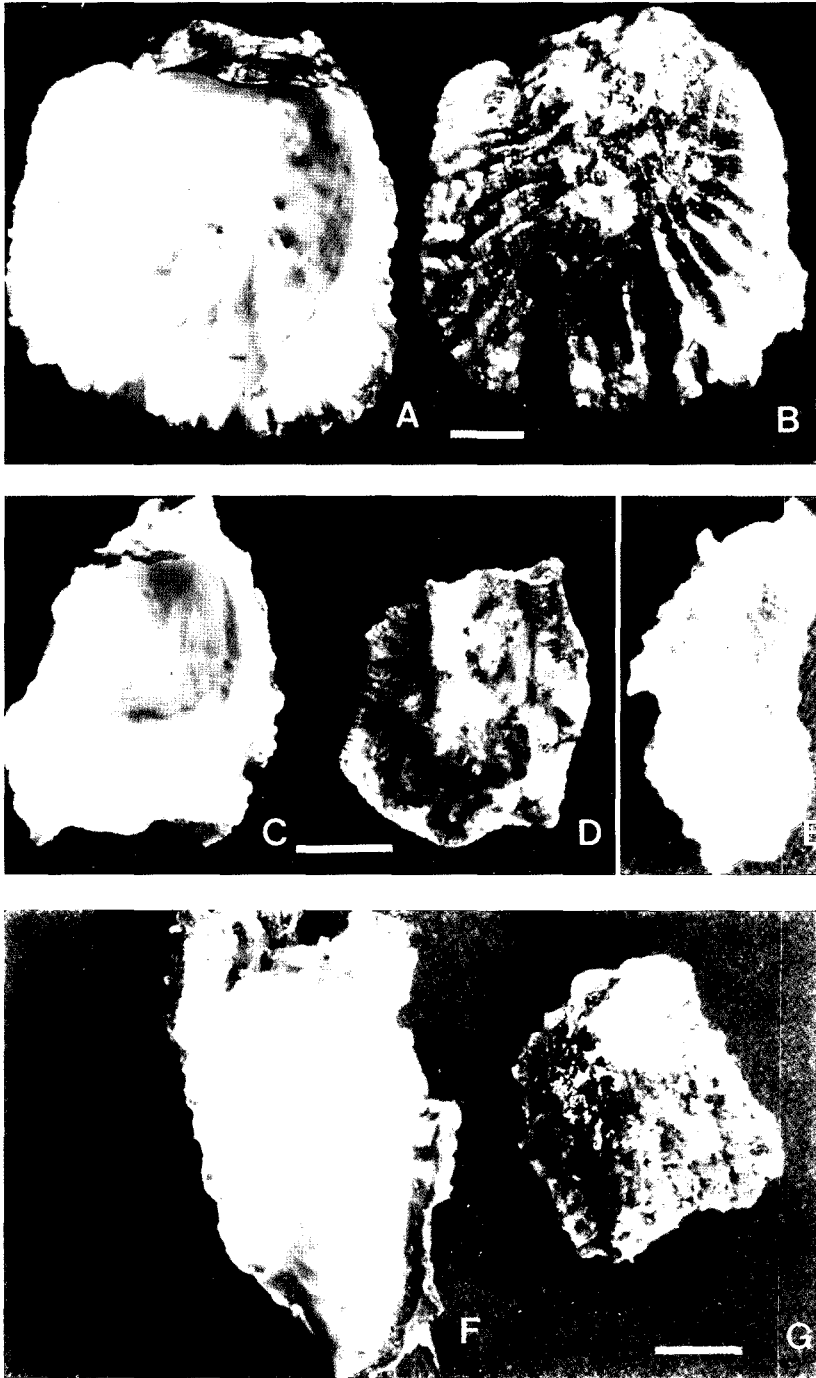


Fig. 2. A, B. *Parahyotissa chemnitzii*. A, internal view of left valve; B, external view of right valve; C-E, *Parahyotissa inequivalvis*: C, internal view of left valve; D, external view of right valve; E, right side view of both valves; F, G, *Dendostrea folium*: F, internal view of left valve; G, external view of right valve. Scale bar = 10 mm.

Measurement. 47.70 mm in height; 58.20 mm in length; 15.23 mm in width (Supsöm, Aug. 11, 1987, J. R. Lee).

Description. Small to medium sized. Both valves thin, concave, and reddish purple or deep rose outside; pale brownish white inside often with dark brown or dark red blotches. Outline circular. Umbonal cavity shallow. Attachment area varied from small to large. Both valves have dichotomous radial ribs from umbo; without hyote spines or imbrications; usually, shell surface becomes flat and smooth due to erosions. Commissural shelf narrow to medium, with many plication. Chomata vermiculate. Adductor muscle scar commonly circular, placed near to the hinge. Vesicular shell structure present.

Soft parts preserved in alcohol were dissected. Promyal passage presents only on the right side, extending from the adductor muscle nearly to the isthmian mantle. Outer labial plaps fused broadly, more than half at the dorsal part. Intestine forms a Z-shape and penetrates the ventricle, which is dull white in color. Auricles are deep brown, broadly joined. Rectum runs along the adductor muscle posteriorly and the anus opens at the tip of the long anal papilla by the ventral side of the muscle.

Distribution. Korea (Chejudo Is.), Japan (Sagami Bay), Southwest Pacific.

2. *Parahyotissa inaequalvis* (Sowerby, 1871) (Fig. 2C-E)

Ostrea (*Crassostrea*) *inaequalvis*: Hirase, 1930, p. 222.

Dendostrea inaequalvis: Habe, 1977, p. 110; Bernard *et al.*, 1993, p. 45; Higo and Goto, 1993, p. 589.

Hyotissa inaequalvis: Torigoe, 1981, pp. 303, 324, pl. 1, fig. 5, pl. 13.

Type locality. Mauritius, Madagascar.

Material examined. 1 ind., Pömsöm Is., Oct. 1995, SCUBA 5-25 m.

Measurement. 28.70 mm in height; 19.12 mm in length; 11.35 mm in width (Pömsöm, Chejudo Is., Oct. 1995).

Description. Small sized. Both valves thin, dull white with purple streaks exteriorly and dull white with pale grayish blotches inside. Outline oval, subequivalves. Left valve concave and right one rather flat. Umbonal cavity deep. Attachment area large on the whole left valve. Both valves have radial ribs, without hyote spine or commissural plication. Commissural shelf medium. Vermiculate chomata present. Vesicular shell structure exists. Adductor muscle scar translucent with some light brown color, and dorso-posteriorly situated.

Soft parts similar to those of *P. Chemnitzii*.

Distribution. Korea (Chejudo Is.), Japan (Amami-Oshima), Indo-Pacific.

Family Ostreidae Rafinesque, 1815

Subfamily Lophinae Vyalov, 1936

Genus *Dendostrea* Swainson, 1835

3. *Dendostrea folium* (Linnaeus, 1758) (Fig. 2F, G)

Dendostrea folium: Okutani and Habe, 1990, p. 282, fig. 102; Habe, 1977, p. 110; Torigoe, 1981, pp. 315, 337, pl. 5, fig. 2, pl. 26, pl. 33, fig. 3; Li and Qi, 1994, p. 165.

Ostrea (*Lopha*) *folium*: Hirase, 1930, p. 21, figs. 35-37; Kuroda, 1930, p. 50.

Lopha folium: Stenzel, 1971, p. 1157, fig. J47.

Type locality. unknown.

Material examined. 2 inds., Mara Is., Oct. 1995, B. L. Choe, SCUBA.

Measurement. 57.53 mm in height; 32.68 mm in length; 22.45 mm in width (Mara Is., Oct. 1995, B. L. Choe).

Description. Medium sized. Subcircular or elongate dorsoventrally. Both valves deeply colored from reddish to purplish brown; internal color dull white with olive blotches. Both shell thin, concave and have dichotomous radial ribs from umbo. The attachment area large. Umbonal cavity shallow. Short clasper spines present on left shell. Both valves have many fine and imbricated growth squamae. Commissural shelf narrow. Ostreine chomata limited on the subligamental area

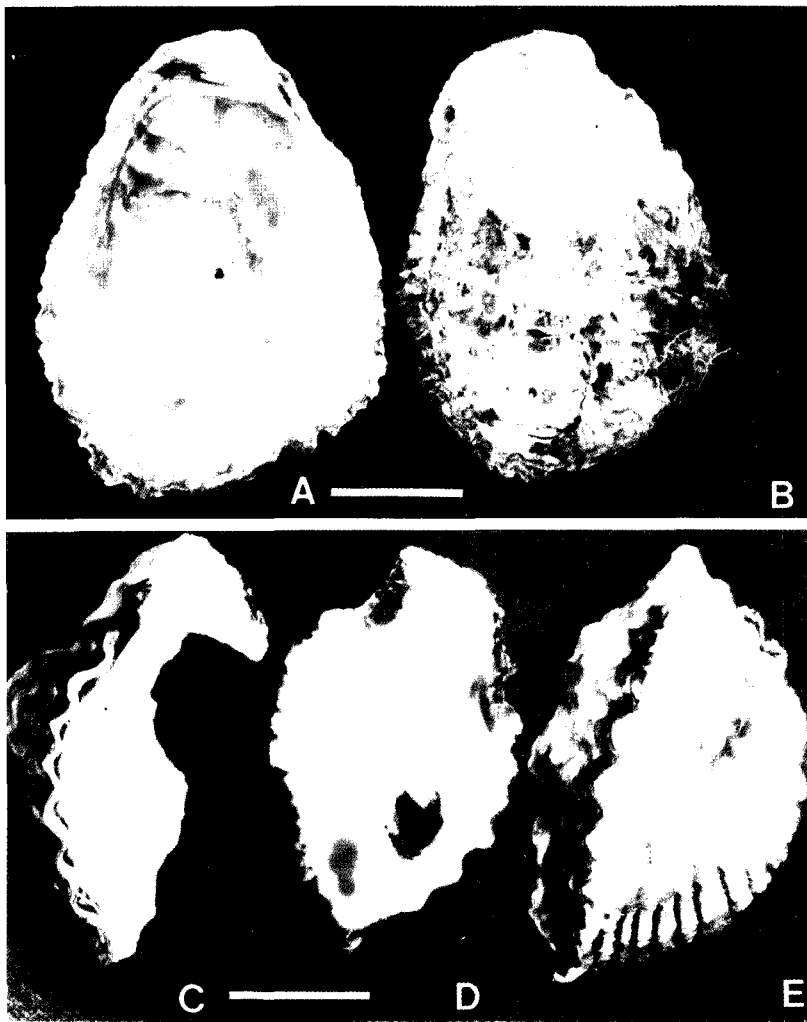


Fig. 3. A, B. *Ostrea futamiensis*. A, internal view of left valve; B, external view of right valve; C-E, *Saccostrea mordax*: C, internal view of left valve; D, external view of right valve; E, right side view of both valves. Scale bar = 10 mm.

of both valves. Adductor muscle scar lustrous, reniform, and close to dorso-posterior side of the shell. Mantle lobes thin. Promyal passage absent. The outer labial palps joined broadly, and more than half at the dorsal border. Intestine Z-shape. Anal papilla present. Ventricle dull white and auricles dark brown, broadly joined. Rectum passes ventrally under the adductor muscle and ends at a little anterior part of the muscle. Anus has a large papilla extending from the outer part of its rim.

Distribution. Korea (Chejudo Is.), Japan (Kii Peninsula), Indo-Pacific.

Subfamily Ostreinae Rafinesque, 1815

Genus *Ostrea* Linn, 1758

4. *Ostrea futamiensis* Seki, 1929 (Figs. 3A, B)

Ostrea futamiensis: Kuroda, 1930, p. 50; Habe, 1951, p. 94; Torigoe, 1981, pp. 312, 333, pl. 4, fig. 2, pl. 23.

Ostrea denselamellosa futamiensis: Okutani and Habe, 1990, p. 207, fig. 102; Habe, 1977, p. 110.

Type locality. Futami, Akashi, Hyogo Pref. Japan.

Material examined. 2 inds., Sangju, Namhae, May. 1988.

Measurement. 74.10 mm in height; 53.55 mm in length; 27.40 mm in width (Sangju, Namhae, May. 1988).

Description. Medium sized. Shell thick, bears many closed piled growth squamae. Outline circular. Shell external color plaque white or dull white with many dark brown streaks radiating from umbo. Internal color olive. Subequivalves. Attachment area large to the whole left valve. Both valves concave. Umbonal cavity shallow. Commissural shelf narrow. Ostreine chomata present. Left valve margin raised vertically; radial ribs and small crenulated commissural plication well recognized in left valve. Right valve covered by many fragile flattish growth squamae, concentric growth lines found when squamae eroded. Adductor muscle scar large, reniform, semitranslucent with pale brown growth lines and centrally located. Soft parts not available.

Distribution. Korea (Namhaedo Is.), Japan (Inland Sea of Seto), Ariake Bay.

Subfamily Crassostreinae Rafinesque, 1815

Genus *Saccostrea* Dollfus et Dautzenberg, 1920

5. *Saccostrea mordax* (Gould, 1850) (Figs. 3C-E)

Ostrea cucullata: Lamarck, 1819, p. 200

Ostrea mordax: Sowerby, 1871, pl. 15, fig. 31, a, b.

Ostrea (Lopha) cucullata: Hirase, 1930, p. 25, fig. 39.

Ostrea (Lopha) mordax: Kuroda, 1930, p. 51, fig. 59.

Saxostrea mordax: Habe, 1951, p. 94, fig. 191; Kira, 1962, p. 144, pl. 52, fig. 4.

Ostrea (Saxostrea) mordax: Kuroda, 1960, p. 59, sp. 1724.

Saccostrea mordax: Okutani and Habe, 1990, p. 194, fig. 102; Habe, 1977, p. 109; Torigoe, 1981, pp. 307, 328, pl. 3, fig. 1, pl. 17; Higo and Goto, 1993, p. 587.

Saccostrea cucullata: Li and Qi, 1994, p. 170.

Type locality. Fiji Islands.

Material examined. 2 inds., Taep'yongri, Cheju Is., Mar. 1996.

Measurement. 48.35 mm in height; 33.05 mm in length; 12.15 mm in width (Taep'yongri, Cheju Is., Mar. 1996, B. L. Choe).

Description. Small sized. Outline triangular form. Attachment area large; umbonal cavity deep. Strong ostreine chomata present on both valves. Auricles broadly joined together. Shell commonly elongate dorso-ventrally. Both valves are dull white with light to dark brown blotches. Marginal area light brown. Internal color white with dark brown or violet blotches. Right valve slightly concave, with many square shaped growth squamae. Left valve deeply concave. Radial ribs present on both valves. Adductor muscle scar elliptical, translucent white in left valve but lucid dark violet in right valve, and located at the ventro-posterior shell margin. Soft parts of specimen preserved in alcohol somewhat twisted. Outer gill lamellae move to the posterior side of the visceral mass, and the heart moves to the left part. Mantle lobes thick. Gills pall grayish. Promyal passage presents on the right side, extending from the dorsal border of the muscle to 2/3 or 3/4 that of the visceral mass. Outer labial palps not fused. Intestine forms a wide loop. Rectum short, the anal papilla absent. Auricles brown in color and ventricles ivory.

Distribution. Korea (Chejudo Is.), Japan (Kii Peninsula), China (East sea and South sea).

REFERENCES

- Bernard, F. R., Y. Y. Cai and B. Morton, 1993. Catalogue of the Living marine Bivalve Mollusca of China. Hong Kong University Press, 146 pp. + 15.
- Choe, B.L., J.K., Park and J.R. Lee, 1996. Marine mollusks from Pogil Island. Rep. Surv. Nat. Environ. Korea, **11**: 337-362 (in Korean).
- Habe, T., 1951. Genera of Japanese shells, Pelecypoda, (1): 1-99. (in Japanese).
- Habe, T., 1977. Systematics of Mollusca in Japan (Bivalvia and Scaphopoda). Hokuryukan, Tokyo, xii+372 pp., 72 pls. (in Japanese).
- Higo, S. and Y. Goto, 1993. A systematic list of mollusca shells from the Japanese Is. and adjacent area. Yuko Pub. Co. Ltd., Osaka, 693 pp. (in Japanese).
- Hirase, S., 1930. On the classification of Japanese oysters. Jap. Jour. Zool., **3**: 1-65.
- Hirase, S., 1932. Some more species of Japanese oysters. Jap. Jour. Zool., **4**: 213-222.
- Hirase, S., 1941. A collection of Japanese in natural colours (7th ed.). Matsumura sanshodo, Tokyo, Japan, 217 pp. (in Japanese).
- Kim, I.H., J. K. Park, J. R. Lee, T. H. Lee and C. R. Choi, 1994. Marine invertebrate fauna of Sohuskondo Island. '93 Rep. Surv. Nat. Ecosys. Ministry of Environment, pp. 163-178 (in Korean).
- Kira, T., 1962. Shells of the Western Pacific in Color. I, Hoikusha, Pub. Co. Osaka, 240 pp., 72 pls.
- Kuroda, T., 1930. The illustrated catalogue of the Japanese shells. Venus, **1**(3)-**5**(4). pp. 1-154 (in Japanese).
- Kuroda, T., 1960, A Catalogue of Molluscan Fauna of the Okinawa Islands. p. 59, sp. 1724 (cited from Torigoe, 1981).
- Kuroda, T., T. Habe and K. Oyama, 1971. The seashells of Sagami bay. Maruzen Pub. Co., Tokyo, pp. 1-741 (in Japanese), pp. 1-489 (in English).
- Kwon, O. K., K. M. Park and J. S. Lee, 1993. Coloured Shells of Korea. Academy Publishing Company, Seoul, 445 pp. (in Korean).

- Lamarck, J. B., 1819. Hist. Nat. Anim. S. Vert., 6, p. 200 (non Born, 1780) (cited from Torigoe, 1981).
- Lee, B. D., 1956a. The catalogue of molluscan shells of Korea. Bull. Fish. Coll., **1**(1): 53-100 (in Korean).
- Lee, B. D., 1956b. Catalogue of molluscan shells in Pusan region. Euhwa, **1**: 1-17 (in Korean).
- Li, X. and Z. Qi, 1994. Studies on the comparative anatomy, systematic classification and evolution of Chinese oysters. Studia Marina Sinica, **35**: 143-178. (in Chinese).
- Nomura, S. and K. M. Hatai, 1928. On the Distribution of Mollusca from Korean coast. J. Chosen Natural Hist. Soc., **6**: 92-100 (in Japanese).
- Okutani, T. and T. Habe, 1990. Gakken Illustrated Nature Encyclopedia, the Mollusks in Japan, Gakken Co. Ltd., Tokyo, 2. 294 pp. (in Japanese).
- Shiba, N., 1934. Catalogue of the Mollusca of Chosen (Corea). J. Chosen Natural Hist. Soc., **18**: 6-31 (in Japanese).
- Sowerby, G. B., 1871. Monograph of the genus *Ostrea* in Reeve: Conchologia Iconica, London, 18, No. 291.
- Stenzel, H. B., 1971. Oysters. In: Treatise on Invertebrate Paleontology. R. C. Moore, ed. Part N, Vol. 3, Mollusca 6, Bivalvia. Geological Society of America and University of Kansas Press, i-iv+N953-N1224; 153 figs.
- Torigoe, K., 1981. Oysters in Japan. Jour. Sci. Hiroshima Univ., Ser. B, Div. 1, (Zoology), **29**(2): 291-419.

RECEIVED: 24 May 2000

ACCEPTED: 30 August 2000

한국산 굴상과(연체동물문, 이매패강)의 5미기록종

제 흥 영 · 최 병 래

(성균관대학교 자연과학대학 생명과학과)

요 약

한국 연안의 8개 지점에서 채집된 굴상과의 표본을 동정 분류한 결과, Pycnodonteidae과의 2종, *Parahyotissa chemnitzii* (Hanley, 1786), *P. inaequalvis* (Sowerby, 1871)와, Ostreidae 과의 3종, *Dendostrea folium* (Linnaeus, 1758), *Ostrea futamiensis* (Seki, 1929), *Saccostrea mordax* (Gould, 1850)는 한국 미기록종으로 확인되었다.