

New Records of Eight Species of the Suborder Cottoidei (Pisces: Scorpaeniformes) from Korea

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Eight species of the suborder Cottoidei collected from coastal waters of Korea were described with photographs, all of which are newly known to Korea. They are as follows: *Malacocottus zonurus* Bean and *Eurymen gyrinus* Gilbert et Burke of the family Psychrolutidae; *Podothecus veterinus* Jordan et Starks, *Sarritor leptorhynchus* (Gilbert), and *Agonomalus proboscidalis* (Valenciennes) of the family Agonidae; *Liparis agassizii* Putman, *Liparis megacephalus* Burke, and *Liparis choanus* Wu et Wang of the Family Cyclopteridae.

KEY WORDS: Suborder Cottoidei, New records

Although the suborder Cottoidei of the order Scorpaeniformes is known to constitute a diverse fish group on the North temperate waters (Nelson, 1984), little is known in Korean waters. The previous records of cottoid fishes of Korea were those of Mori (1952) and Chyung (1977) who listed 65 species from Korea. Recently Kim and Youn (1992) reviewed the fish species of the family Cottidae including 5 species as new records to Korea and their taxonomic position.

In the course of studying the Korean fish fauna we collected many specimens of the cottoid fishes from 1990 to 1992. Among them eight species were recognized as new records from Korea. In this paper the authors redescribe them and provide their distributional data in Korea.

Materials and Methods

Fishes were collected at several sites of the East and West coast of Korea by gill net from 1990 to

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1992 (Fig. 1). The specimens were fixed in 10% formalin solution and measured with a digital caliper (Mitutoyo, Japan) to the nearest 10th of a millimeter. The methods of counts and measurement followed mostly Hubbs and Lagler (1964). And those of families Agonidae and Cyclopteridae followed Maeda and Amaoka (1988), and Able and McAllister (1980) respectively. Radiographs by soft x-ray (Hitex 80-A, Japan) were used in counting the number of vertebrae and fin rays. The concept of the suborder Cottoidei and their families were those of Nelson (1984).

All the specimens were registered and deposited in Department of Biology, Chonbuk National University (CUB).

Results

1. Family Psychrolutidae 물수배기과
Genus *Malacocottus* Bean, 1890 물수배기속
(1) *Malacocottus zonurus* Bean, 1890 얼룩수배기(신칭) (Pl. 1A)
Malacocottus zonurus Bean, 1890. p. 43; Masuda *et al.*, 1984. p. 330; Lindberg and

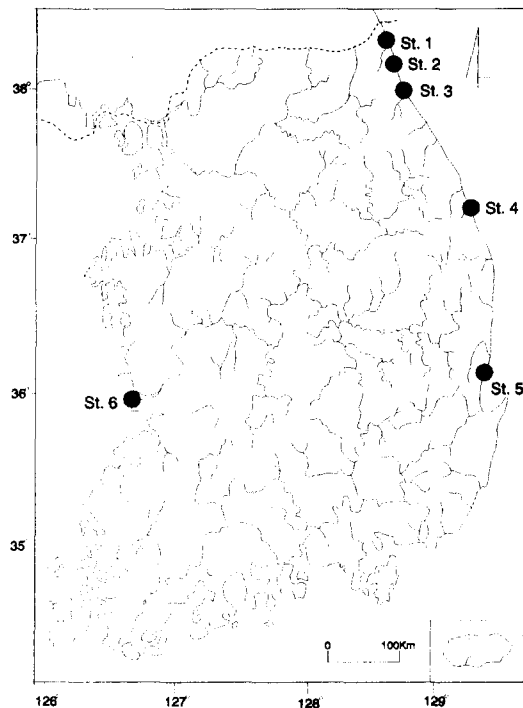


Fig. 1. Map showing the collection sites. St. 1; Kojin-up, Kosong-gun, Kangwon-do, St. 2p Sokcho-si, Kangwon-do, St. 3; Namae-ri, Hyonbuk-myon, Yagyang-gun, Kangwon-do, St. 4; Mukho-dong, Tonghae-si, Kangwon-do; St. 5; Kanggu-ri, Kanggu-myon, Yongdok-gun, Kyongsangbuk-do; St. 6; Haemang-dong, Kunsan-si, Chollabuk-do

Krasyukova, 1987. p. 271.

Malacocottus kincaidi Watanabe, 1978. p. 398.

Materials examined: CUB 17112-17114 (3) 102.1-164.4 mm SL, Kojin-up, Kosong-gun, Kangwon-do, Nov. 10, 1991; CUB 16639-16640 (2) 158.6-179.5 mm SL, Kanggu-ri, Kanggu-myon, Yongdog-gun, Kyongsangbuk-do, Apr. 27, 1990; CUB 16623-16625 (3) 161.8-178.3 mm SL, Kojin-up, Kosong-gun, Kangwon-do, July 1, 1991.

Description: D. VIII-X, 12-14; A. 11-12; LL. 13-16; Vert. 31-34. Body fusiformed. Head long and not depressed, 1.5-1.6 in standard length; body depth 3.5-3.9. Eye diameter 5.7-5.9 in head length; length of jaw 2.5-2.8. Two dorsal fins, its bases nearly continuous. Preopercle with 2 or 3 spines, the base of second one with small process.

No teeth on vomer and palatine. Gill membranes joined to isthmus.

Color of the body dark brown, posterior part of caudal with dark band, all fins margined with white.

Distribution: East coast of Korea, northern part of Japan, Okhotsk Sea, and Bering Sea.

Genus *Eurymen* Gilbert and Burke, 1912

털수배기속 (신칭)

(2) *Eurymen gyrinus* Gilbert and Burke, 1912 털수배기 (신칭) (Pl. 1B)

Eurymen gyrinus Gilbert et Burke, 1912. p. 64; Matsubara, 1955. p. 1161; Lindberg and Krasyukova, 1987. p. 265.

Materials examined: CUB 16895 (1) 135.6 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Oct. 10, 1991; CUB 17115 (1) 268.4 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Nov. 10, 1991; CUB 17116 (1) 280.2 mm SL, Koljangdong-ri, Puk-myon, Uljin-gun, Kyongsangbuk-do, Nov. 10, 1991.

Description: D. VIII-IX, 20-22; A. 16-17; LL. 17; Vert. 38. Body more or less compressed. Head depressed, 2.6-2.9 in standard length; body depth 4.7-5.2. Snout length 4.4-5.5 in head length; eye diameter 4.7-6.5; length of caudal peduncle 5.7-9.3; caudal peduncle depth 5.3-5.6.

Pointed dermal process present on the surface of postorbital, cheek, and lateral line; four pairs of leaf-like dermal processes on jaw. Gill membranes not joined to isthmus, forming folds. Two dorsal fins continuous. Teeth on vomer; palatine without teeth.

Color of the body brownish; ventral redish.

Distribution: East coast of Korea and northern part of Japan.

2. Family Agonidae 날개줄고기과

Genus *Podothecus* Gill, 1861 줄고기속

(3) *Podothecus veternus* Jordan et Starks, 1895 왕눈줄고기 (신칭) (Pl. 1C)

Podothecus veternus Jordan et Starks, 1895, p. 819. Robben Island.

Materials examined: CUB 17311 (1) 174.8 mm SL, Sokcho-si, Kangwon-do, Jan. 25, 1992; CUB 17218-17221 (4) 185.3-216.9 mm SL, Namae-ri, Hyonbuk-myon, Yangyang-gun,

Kangwon-do, Jan. 25, 1992; CUB 17214 (1) 192.8 mm SL, Kojin-up, Kosong-gun, Kangwon-do, Jan. 24, 1992; CUB 17316 (1) 193.5 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Jan. 24, 1992; CUB 17199 (1) 185.9 mm SL, Mugho-dong, Tonghae-si, Kangwon-do, Jan. 25, 1992.

Description: D. VIII-IX, 6-7; A. 7-9; P. 15-16; LL. 37-40; Vert. 38-41. Body elongated. Head somewhat large, 3.4-3.9 in standard length; distance from tip of snout to anus 3.3-3.8. Snout length 3.6-4.6 in head length; head width 1.5-1.8; eye diameter 4.4-5.6; interorbital space 4.9-5.7; length of caudal peduncle 0.8-0.9; caudal peduncle depth slender, 11.3-13.1.

Two dorsal fins. Gill membranes joined to isthmus, not forming fold. Nasal spine present, one pair of spines present on end of snout, each side of snout with a spine. Head with three pairs of spines and one pair of processes. Upper jaw longer than lower; fewer and smaller barbels present. No teeth on jaws, vomer, and palatine.

Color of the body yellowish, dorsal and ventral part pale; each side of the body mottled with small black spots.

Distribution: East coast of Korea, Okhotsk Sea, and Bering Sea.

Genus *Sarritor* Cramer, 1896 (in Jordana et Evermann, 1896) 긴코줄고기속 (신칭)

(4) *Sarritor leptorhynchus* (Gilbert), 1893
긴코줄고기 (신칭) (Pl. 1D)

Odontopyxis leptorhynchus Gilbert, 1893(1895), p. 437.

Sarritor leptorhynchus Jordan et Starks, 1904, pp. 597-598.

Materials examined: CUB 17247 (1) 156.3 mm SL, Mugho-dong, Tonghae-si, Kangwon-do, Nov. 25, 1989; CUB 17252 (1) 162.0 mm SL, Kojin-ri, Hyonnae-myon, Kangwon-do, July 1, 1991; CUB 17314 (1) 157.6 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Jan. 24, 1992; CUB 17196-17198 (3) 135.8-178.4 mm SL, Mugho-dong, Tonghae-si, Kangwon-do, Jan. 25, 1991.

Description: D. VII-VIII, 5-6; A. 5-6; P. 12-14; Mid-LL. 40-42; Vert. 43-44. Body elongated. Head length 3.8-4.4 in standard length; body

depth 9.8-16.7; distance from tip of snout to anus 3.5-4.3. Snout length 3.3-3.6 in head length; eye diameter 4.9-5.3; interorbital space 7.3-8.3; length of caudal peduncle 0.6.

Two dorsal fins. Gill membranes joined to isthmus, not forming folds. One pair of nasal spines present; small and pointed spines and lateral process present on each side of head. One pair of small spines present on the tip of snout, curved dorsally; many barbels present on the ventral part of snout. Jaws and vomer with teeth.

Color of the body brown, ventral part paler and yellowish.

Distribution: East coast of Korea, northern part of Japan, Okhotsk Sea, and Bering Sea.

Genus *Agonomalus* Guichenot, 1866 고양이고기속

(5) *Agonomalus proboscidalis* (Valenciennes), 1858 (in Jordan and Starks, 1904) 곱추줄고기 (신칭) (Pl. 1E)

Aspidophorus proboscidalis Valenciennes, 1858, p. 1040.

Agonomalus proboscidalis Jordan and Starks, 1904, p. 578-580.

Materials examined: CUB 16896-16897 (2) 103.0-129.9 mm SL, Susan-ri, Sonyang-myon, Yangyang-gun, Kangwon-do, Nov. 19, 1990; CUB 17243-17245 (2) 108.2-122.4 mm SL, Kojin-up, Kosong-gun, Kangwon-do, Oct. 10, 1991; CUB 16889-16894, 17248-17250 (9) 84.5-137.6 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, July 1, 1991; CUB 17269-17271 (3) 113.2-117.8 mm SL, Kojin-up, Kosong-gun, Kangwon-do, Nov. 10, 1991; CUB 17304 (1) 120.1 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Nov. 25, 1991.

Description: D:IX-X, 5-6; A:10-12; P:2; V:11; Vert: 34-35. Body compressed. Head small, 4.0-4.7 in standard length; body depth 4.5-5.2, distance from tip of snout to anus 2.8-3.1. Snout length 6.7-12.9 in head length; eye diameter 3.4-4.0; interorbital width 2.5-3.4; caudal peduncle length 1.1-1.4; caudal peduncle depth 2.8-3.9.

Two dorsal fins; the length of first spine somewhat longer than that of second. Gill membranes joined to isthmus, forming folds. Upper jaw equal to lower. A long barbel at tip of snout. One pair of

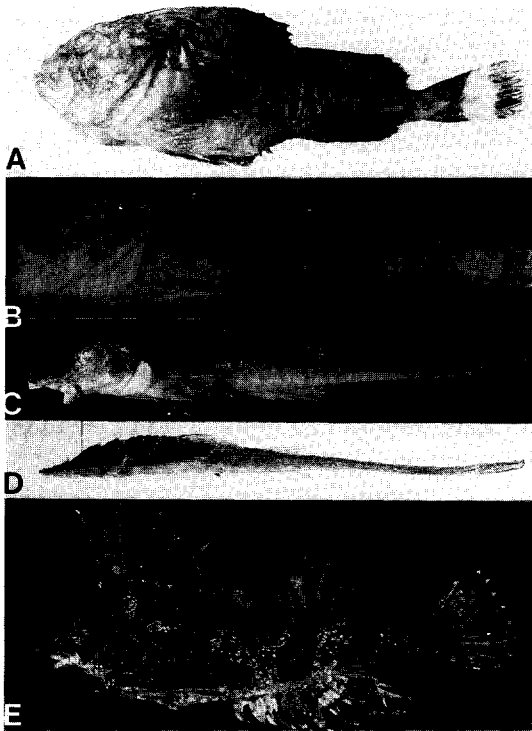


Plate 1. A; *Malacocottus zonurus* Bean, 179.5 mm SL. B; *Eurymen gyrinus* Gilbert and Burke, 135.6 mm SL. C; *Podothecus veternus* Jordan et Starks, 174.8 mm SL. D; *Sarritor leptorhynchus* (Gilbert), 156.3 mm SL. E; *Agonomalus proboscidalis* (Valenciennes), 120.1 mm SL.

nasal spines present. Lateral process on cheek. Two row of bony plates on the side of upper and lower body, each plate bearing hooked spines.

Color of the body pinkish except lower border and jaw, with white and black spots. Membranes between tip of spines of caudal with black spots, tip of spines white. Anal with white band on anterior and mid part.

Distribution: East coast of Korea, northern part of Japan, Okhotsk Sea, and Bering Sea.

3. Family Cyclopteridae 도치과

Genus *Liparis* Scopoli, 1777 꼼치속

(6) *Liparis agassizii* Putnam, 1874 아가씨 물메기 (신칭) (Pl. 2B)

Liparis agassizii Putnam, 1874. p. 339; Burke, 1930. p. 76; Matsubara, 1955. p. 1191; Lindberg and Krasnyukova, 1987. p. 396.

Materials examined: CUB 17318-17322 (5).

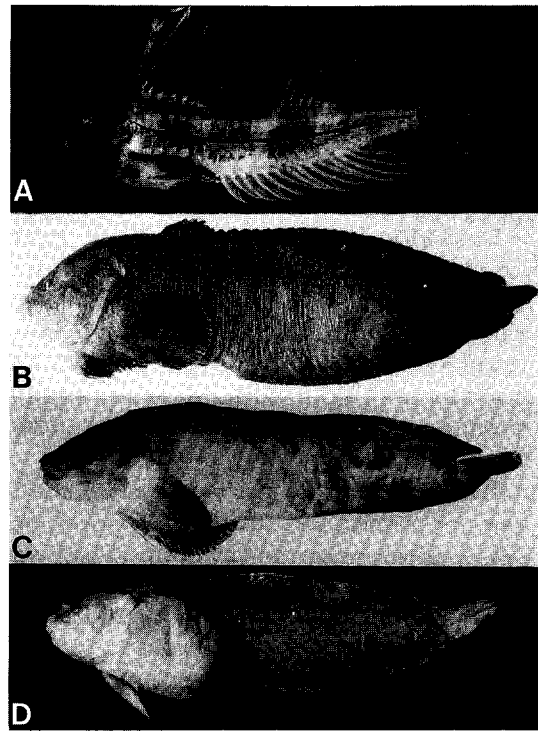


Plate 2. A; *Agonomalus jordani* Schmidt, 135.8 mm SL. B; *Liparis agassizii* Putnam, 221.8 mm SL. C; *Liparis megacephalus* (Burke), 267.5 mm SL. D; *Liparis choanus* Wu et Wang, 90.0 mm SL.

221.8-250.3 mm SL, Taejin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Oct. 10, 1991.

Description: D. 43-46; A. 34-37; P. 36-37; Pyloric coeca 64-75; Vert. 46-49. Body deeply compressed, tapering gradually to the caudal fin. Head somewhat depressed, 3.5-4.5 in standard length; distance from tip of snout to the base of dorsal 2.9-3.0. Snout length 2.1-2.7 in head length; eye diameter 7.8-9.5; interorbital width 1.8-2.3; length of gill slit 2.2-2.8; length of disk 1.7-2.5.

Dorsal fin unnotched, connected to the basal two-fifth of the caudal. Caudal rounded, its base connected to dorsal and anal. Pectoral fin bilobed with shallow notch at lower part. Upper jaw slightly projecting. No teeth on palatine and vomer. One pair of nostrils present.

Body dark brown with pale blotch or brownish with strips extending from snout to base of caudal.

Peritoneum silvery.

Distribution: East coast of Korea and northern part of Japan (Hakodate).

(7) *Liparis megacephalus* (Burke), 1912 보라물메기 (신칭) (Pl. 2C)

Cyclogaster megacephalus Burke, 1912. P. 569.

Liparis megacephalus Burke, 1930, p. 73.

Materials examined: CUB 17290 (1) 267.5 mm SL, Kojin-ri, Hyonnae-myon, Kosong-gun, Kangwon-do, Nov. 25, 1991.

Description: D. 45; A. 37; P. 42; Pyloric coeca 36; Vert. 52. Body deeply compressed, tapering rapidly from the origin of dorsal to the base of caudal. Head heavy, about as wide as deep, 3.8 in standard length; distance from tip of snout to the base of dorsal 3.3. Snout length 2.4 in head length; eye diameter 6.9; interorbital space 2.1; length of gill slit 1.9; disk length 2.7.

Upper jaw slightly projecting than lower. One pair of nostrils present. Caudal rounded, connected for two-fifths its length to the dorsal. Pectoral with a shallow notch.

Color of the body redish with broad, short brown band. Dorsal, anal, and caudal barred with broad brown band. Head with violet band radiating from eye. Peritoneum silvery.

Distribution: East coast of Korea and Bering Sea

(8) *Liparis choanus* Wu et Wang, 1933 노랑물메기 (신칭) (Pl. 2D)

Liparis choanus Wu et Wang, 1933. p. 83;

Lindberg and Krasnyukova, 1987. p. 395

Materials examined: CUB 17831-17834 (4) 87.2-91.0 mm SL, Haemang-dong, Kunsan-si, Chollabuk-do, Dec. 22, 1991.

Description: D. 35; A. 30; P. 38; Pyloric coeca 13-15; Vert. 40-42. Body deeply compressed. Head 3.6-3.7 in standard length; distance from tip of snout to the base of dorsal 2.8-3.3. Snout length 9.9-10.5 in standard length; eye small, 24.1-29.3; interorbital width 8.4-12.9; length of gill slit 10.2-11.8; disk length 7.9-8.7.

Upper jaw slightly projecting than lower. One pair of nostrils present. Dorsal and anal fin nearly separated to the caudal base.

Body yellowish with no coloration. Peritoneum

silvery.

Distribution: West coast of Korea and coast of China.

Discussion

Taxonomy of cottoid fishes has been studied by many investigators (Regan, 1913; Matsubara, 1955; Yabe, 1985). Matsubara (1955) classified Japanese cottoid fishes into two superfamilies Cottoidea with two families Cottidae and Psychrolutidae, and Agonoidea with two families Agonidae and Aspidophoridae. The taxonomic study on the suborder Cottoidei were very few in Korea except that of Mori (1952) and Chyung (1977) based on the system of Matsubara (1955). The recent work on this taxon is only Kim and Youn (1992). But because they treated only the family Cottidae, further study needed for the rest. In this paper we report eight new records of the suborder Cottoidei except the family Cottidae.

Among them *Agonomalus jordani* (Pl. 2A) of the family Agonidae was recorded by Mori (1952) and Chyung (1977). But Chyung's (1977) description and photographs of *A. jordani*, however, did not agreed with description of Jordan and Starks (1904) but is similar with that of *A. proboscidalis*. The authors collected two specimens of *A. jordani* and many of *A. proboscidalis* in this study. Therefore the authors redescribe the specimens of *A. proboscidalis* collected in this time and report as new record from Korea. *A. proboscidalis* is common than *A. jordani* at East coast of Korea.

Liparis choanus of the family Cyclopteridae was collected only the coast of Yellow Sea, while the remainder were from East and South Sea. The authors considered that this species probably restricted in Yellow Sea.

Many cottoid fishes were occurred in the northern sea waters of Hokkaido, the Okhotsk Sea and the Bering Sea (Masuda *et al.*, 1984). The cottoid distribution seems to be related to the cold currents from the Okhotsk Sea of Pacific-Western boreal region (Briggs, 1974).

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한국산 독중개아목(Cottoidei) 어류 8미기록종
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1990년에서 1992년 사이에 우리나라의 동해안과 서해안 수역에서 채집된 독중개아목 어류 표본을 조사한 결과 다음과 같은 8미기록종을 확인하였기에 이를 보고한다. 미기록종은 물수배기과 Psychrolutidae의 얼룩수배기(국명신칭) *Malacocottus zonurus* Bean와 털수배기(국명신칭) *Eurymen gyrinus* Gilbert et Burke, 날개줄고기과 Agonidae의 왕눈줄고기(국명신칭) *Podothecus veterenus* Jordan et Starks, 긴코줄고기(국명신칭) *Sarritor leptorhynchus*(Gilbert), 그리고 곱추줄고기(국명신칭) *Agonomalus proboscidalis* (Valenciennes), 도치과 Cyclopteridae의 아가씨물메기(국명신칭) *Liparis agassizii* Putman, 보라물메기(국명신칭) *Liparis megacephalus* Burke, 그리고 노랑물메기(국명신칭) *Liparis choanus* Wu et Wang이다. 이 가운데 *Liparis choanus*는 서해 연안에서만 채집되었고 나머지 7종은 모두 동해 연안에서 채집되었다.