

Taxonomic Revision of the Scorpionfishes (Pisces: Scorpaenidae) with four New Records from Korea

Ik-Soo Kim and Wan-Ok Lee

Department of Biology, College of Natural Sciences, Chonbuk National University, Chonju 560-756, Korea

The taxonomic revision of the family Scorpaenidae was conducted based on the specimens collected from the coasts of the Korean Peninsula from 1989 to 1992. The scorpionfishes of Korea are composed of 30 species in 8 genera, and the keys to species and genera are provided with synonyms and their distributions. Four species newly reported from Korea are redescribed and figured: *Sebastiscus tertius* (Barsukov et Chen), *Sebastes steindachneri* Hilgendorf, *S. minor* Barsukov and *S. zonatus* Chen et Barsukov. It is noted that the genus *Sebastes* comprise 18 species in Korean waters without endemics. Most species of the Korean scorpionfishes are shared with Japanese and Taiwanese faunas including temperate and tropical scorpionfishes. Most *Sebastes* species are recognized as temperate elements but other genera of this family are regarded as tropical elements.

KEY WORDS: Pisces, Scorpaenidae, Scorpionfish, Korea

The scorpionfishes composed of 350 species are the largest family in the order Scorpaeniformes. Most member of the family are mostly found in the shallow waters in the Indian and Pacific Oceans (Eschmeyer, 1969). These fishes are characterized by usually having large head, large mouth and eyes, and stout, laterally compressed bodies with large pectoral fins. Most of them have venom gland in fin spines and are commercially important.

The systematic studies of the scorpionfishes have been conducted by many ichthyologists (Jordan and Starks, 1904; Matsubara, 1943, 1955; Eschmeyer, 1969, 1971, 1975; Chen, 1981, 1986), but this taxa in Korea are not well known until now. In Korea the latest treatments on this family were those of Mori (1952) and

Chyung (1977) who listed 27 species living around Korea. In the last few years, collecting in the coastal waters of Korea has resulted in obtaining additional valuable materials including the four new records from Korea.

The purpose of the present study is to recomplie taxonomical and distributional data of the scorpionfish fauna of Korea and to add or modify to Mori (1952) and Chyung's list (1977).

Materials and Methods

The material specimens examined were collected at several sites of all coasts of Korea by trawlers and hooks from 1989 to 1992 (Fig. 1). The specimens examined here were deposited in Department of Biology, Chonbuk National University (CUB). Methods of measuring and counting, and terminology of head spines (Fig. 2) are based on those of follow Eschmeyer (1969). Vertebral counts and some of the fin ray counts

The present study was supported by the Basic Science Research Institute Program grant, Ministry of Education of Republic of Korea, (Project no. BSRI-92-414, 1992)

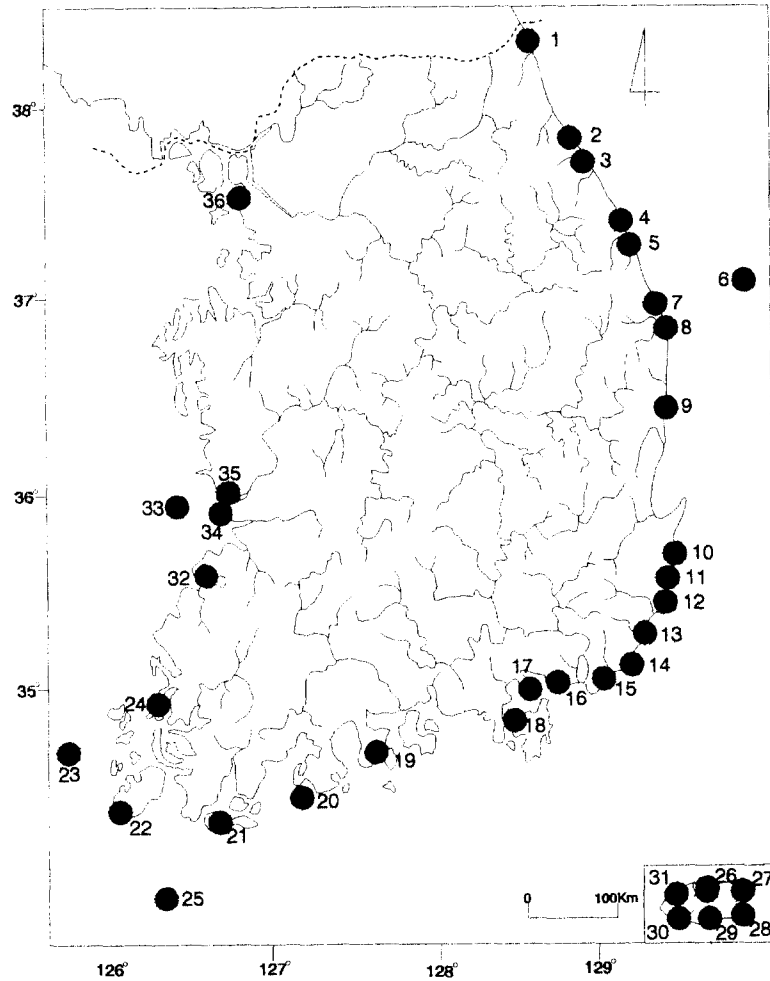


Fig. 1. Localities from which specimens of the present study were collected. 1. Taejin(대진); 2. Namae(남애); 3. Chumunjin(주문진); 4. Mukho(목호); 5. Samchok(삼척); 6. Todong(도동); 7. Chukpyon(죽변); 8. Ch'uksan(축산); 9. Kanggu(강구); 10. Kamp'o(감포); 11. Jwachen(좌천); 12. Kori(고리); 13. Chinha(진하); 14. Songjung(송정); 15. Pusan(부산); 16. Yongwon(용원); 17. Tongyong(통영); 18. Chungmu(충무); 19. Yeosu(여수); 20. Nokdong(녹동); 21. Wando(완도); 22. Jindo(진도); 23. Sohuksando(소흑산도); 24. Mokp'o(목포); 25. Ch'ujado(추자도); 26. Chejusi(제주시); 27. Kujwa(구좌); 28. Songsan(성산); 29. Sogwip'o(서귀포); 30. Chungmun(중문); 31. Hallim(한림); 32. Komso(곰소); 33. Muyaedo(무녀도); 34. Hajae(하재); 35. Kunsan(군산); 36. Soraep'o(소래포).

were made from radiographs by soft x-ray (Hitex 80-A, Hitachi). Classification system is after that of Nelson (1984).

Key to genera and species of family Scorpaenidae of Korea

Body compressed; head usually with ridges and spines; dorsal fin usually single with usually 11-17 spines and 8-18 soft rays; anal fin with 1-3 spines

and 3-9 soft rays; pectoral fin well developed usually with 15-25 rays.

- 1a. Chin with three barbals; lowermost pectoral ray free; lachrymal with a long, backward directing projection.....*Apistus carinatus* 별감펍
- 1b. No chin barbels; lowermost pectoral ray connected to neighboring ray by membrane.....2

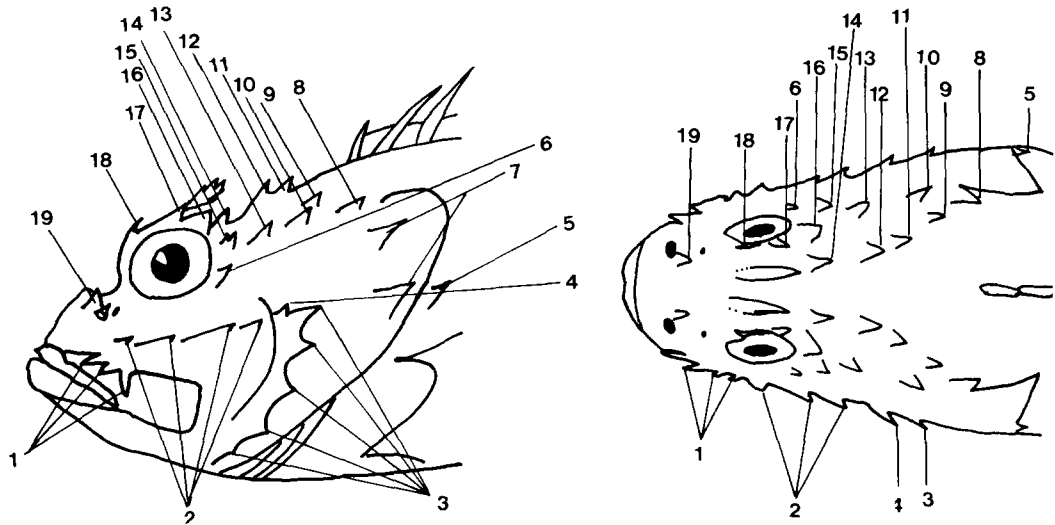


Fig. 2. Diagram of head spines in the suborder Scorpaenoidei (from Eschmeyer, 1969). 1. Preorbital; 2. Suborbital; 3. Preopercular; 4. Supplemental preopercular; 5. Cleithral; 6. Fourth suborbital; 7. Opercular; 8. Supracleithral; 9. Upper posttemporal; 10. Lower posttemporal; 11. Nuchal; 12. Parietal; 13. Pterotic; 14. Tympanic; 15. Sphenotic; 16. Postocular; 17. Supraocular; 18. Preocular; 19. Nasal.

- | | |
|---|--|
| 2a. Posterior tip of pectoral fin extending beyond caudal fin base and all rays not branched, membrane incision deep; dorsal spines often as long as or longer than body depth..... | 6b. Ocular edge of second suborbital without a spine; P_1 usually 18 or 19..... |
| <i>Pterois lunulata</i> 쏘배감펍 | 7 |
| 2b. Posterior tip of pectoral fin reaching to or at most slightly beyond anal fin; upper pectoral fin ray branched; length of dorsal spines normally much less than body depth..... | 7a. P_1 usually 18; rakers on outer row of first gill arch usually 24 or less..... |
| 3 | <i>S. marmoratus</i> 솜뱅이 |
| 3a. Dorsal spines normally 12; vertebrae 24-25..... | 7b. P_1 usually 19; rakers on outer row of first gill arch usually 24 or more..... |
| 4 | <i>S. tertius</i> 붉은솜뱅이 (국명신칭) |
| 3b. Dorsal spines more than 12; vertebrae more than 25..... | 8a. Palatine tooth present..... |
| 12 | 9 |
| 4a. Dorsal soft-rays 11-13; suborbital ridges poorly developed and usually without spines..... | 8b. Palatine tooth absent..... |
| 5 | 11 |
| 4b. Dorsal soft-rays 10 or less; suborbital ridges well developed and bearing spines..... | 9a. P_1 usually 19-20; upper axilla of pectoral fin with a dermal flap; posterior lachrymal projection directing straight downward..... |
| 8 | <i>Scorpaena neglecta</i> 살살치 |
| 5a. Coronal spines absent; gill cavity lining black; gas-bladder absent..... | 9b. P_1 usually 16-17; upper axilla of pectoral fin without dermal flap; posterior lachrymal projection directing obliquely downward..... |
| <i>Helicolenus hilgendorfi</i> 홍감펍 | 10 |
| 5b. Coronal spines present; gill cavity lining white; gas-bladder present..... | 10a. Posterior tip of upper jaw just below posterior margin of eye; black blotch on membranes between 6th and 9th dorsal spines in male; without in the female..... |
| 6 | <i>Scorpaena onaria</i> 점감펍 |
| 6a. Ocular edge of second suborbital with a spine; P_1 usually 17..... | 10b. Posterior tip of upper jaw not reaching below eye center; small black blotch on membranes between 7th and 9th dorsal spines in male; without in the female..... |
| <i>Sebastiscus albofasciatus</i> 붉감펍 | |

- *Scorpaena miostoma* 주굴감펍
- 11a. Interorbital width less than orbit length; posterior part of pectoral fin not reaching anal fin base, without hump behind head.....
- *Scorpaenopsis cirrhosa* 숙감펍
- 11b. Interorbital width greater than orbit length; posterior part of pectoral fin exceeding anal fin base, with hump behind head.....
- *Scorpaenopsis diabolus* 놀락감펍
- 12a. Dorsal spines 15 or 16; vertebrae about 29.....
- *Sebastolobus macrochir* 홍살치
- 12b. Dorsal spines 13 (rarely 14); vertebrae 26-28..... 13
- 13a. Base of skull strongly curved; interorbital space broad, flat or convex; cranial spines relatively low; gill rakers relatively long and sharp..... 14
- 13b. Base of skull nearly straight; interorbital space narrow, deep concave or flat; cranial spines relatively sharp and high; gill rakers relatively short and thick..... 26
- 14a. Cranial spines absent, except nasal spine; body yellowish-orange with irregularly shaped blotches, distinct narrow light band on lateral line..... *Sebastes steindachneri* 노랑불낙 (국명신칭)
- 14b. Some cranial spine present; body without yellowish-orange and distinct narrow light band on lateral line..... 15
- 15a. Cranial ridges except parietal, all obsolete, or very slightly developed; caudal fin emarginate or truncate; lower jaw projecting..... 16
- 15b. Cranial ridges somewhat developed, most of them present and ending in a slender spine; caudal fin rounded, upper jaw projecting or upper and lower jaw equal..... 23
- 16a. Dorsal spine 14; vertebrae 30; caudal fin deeply emarginate.....
- *Sebastes owstoni* 황불낙
- 16b. Dorsal spine 13; vertebrae 26-29; caudal fin emarginate or truncate..... 17
- 17a. Interorbital space broad, flat, convex; postocular, tympanic, nuchal, coronal spines and frontal ridge absent..... 18
- 17b. Interorbital space concave; postocular, tympanie, parietal, nuchal, coronal spines and frontal ridge present and all strong.....
- *S. baramenuke* 돌삼팽이
- 18a. Caudal fin emarginate; pores in lateral line 27-31..... 19
- 18b. Caudal fin truncate; pores in lateral line 39-56..... 20
- 19a. Dorsal fin ray 11-13 (12); pectoral fin usually 15-16 rays, and lower 7 rays or less unbranched.....
- *S. minor* 좀불낙 (국명신칭)
- 19b. Dorsal fin ray 13-14 (14); pectoral fin usually 17-18 rays, and lower 8 rays unbranched.....
- *S. wakiyai* 말락불낙
- 20a. No scales on lower jaw; lachrymal margin without spine; body color brown, posterior margin of caudal fin white.....
- *S. taczanowskii* 탁자불낙
- 20b. Lower jaw with small scales; lachrymal margin with 2 sharp spines; body color variables, but caudal fin without a white margin..... 21
- 21a. Pores in lateral line 39-48 (42-45); pectoral fin ray 16-18 (17)..... *S. inermis* 불낙
- 21b. Pores in lateral line 47-56; pectoral fin ray 15-17 (16)..... 22
- 22a. Six transverse conspicuous brown bands on body, 5th band below posterior end of dorsal fin base and 6th on caudal peduncle.....
- *S. joyneri* 도화불낙
- 22b. Five indistinct blackish bands on body, 4th band below dorsal fin base of soft rays and 5th on caudal peduncle.....
- *S. thompsoni* 불불낙
- 23a. Pores in lateral line 39-52; free lachrymal margin with 3 sharp spines.....
- *S. schlegeli* 조피불낙
- 23b. Pores in lateral line 31-36; lack of spine on free lachrymal bone..... 24
- 24a. Rakers on first gill arch usually 28-30.....
- *S. vulpes* 누루시불낙
- 24b. Rakers on first gill arch usually 25-28..... 25
- 25a. Body uniformly blackish or grayish, with trace of light mottlings, vertical band, if present, poorly defined; pectoral membrane black; rakers on first gill arch usually 25-27.....
- *S. ijimae* 놀치불낙
- 25b. Body white to pink, mottled with dark frecklings or spots, three distinct vertical dark bands, one extends from dorsal fin between 4th or 5th and 11th or 12th dorsal spines

- downward to distal edge of pectoral fin, one extends from soft dorsal downward to near anal fin, another across caudal peduncle; pectoral membrane clear or slightly dusky; rakers on first gill arch usually 27-28.....
 *S. zonatus* 띠볼낙(국명신칭)
- 26a. Interorbital space broad, flat; cranial spines small, and their posterior curved; preocular spine absent..... *S. oblongus* 황점볼낙
- 26b. Interorbital space narrow deeply concave; cranial spines large, strong and greatly produced upward; preocular spine present 27
- 27a. Frontal ridge distinct, their interspace forming a deep groove..... 28
- 27b. Frontal ridge indistinct, their interspace not forming a deep groove.....
 *S. pachycephalus* 개볼낙
- 28a. Pores in lateral line 31-40; gill raker 24-28.....
 *S. trivittatus* 세줄볼낙
- 28b. Pores in lateral line 26-30; gill raker 16-21..... 29
- 29a. Dorsal fin usually having 14 spines and 12 soft rays; caudal fin brown spots.....
 *S. hubbsi* 우럭볼낙
- 29b. Dorsal fin usually having 13 spines and 13 soft rays; anterior 1/2 of caudal fin distinctly white..... *S. longispinis* 흰꼬리볼낙

Systematic Accounts

Order Scorpaeniformes 횃대목

Suborder Scorpaenoidei 양볼낙아목

Family Scorpaenidae 양볼낙과

Genus 1. *Sebastes* Cuvier, 1829 볼낙속

1. *Sebastes steindachneri* Hilgendorf, 1880 (Pl. 1A, Table 1)

(New Korean name; Norang-bolnak 노랑볼낙)

Sebastes steindachneri Hilgendorf, 1880. p. 172 (type locality: Yezo).

Material examined: CUB 17820 (1), 269.0mm SL, St. 2, Sep. 9, 1990; CUB 18250 (1), 156.8mm SL, St. 3, April 25, 1992.

Description: D.XIII, 14; A.III, 7; P. 18; vertebrae 28; lateral line pores 31; no spines on head

except nasal. Gill rakers long and slender, and total 31. Doral spines rather low, a little lower than soft rays. Pectoral rather broad and rounded, 18 rays, lower 9 unbranched. Ventrals not reaching to vent. Second anal spine stouter and as long or a little longer than third. Scales everywhere strongly ctenoid; mandible naked; maxillary and preorbital with fine scales. Caudal fin emarginate. Color of fresh specimen, light olive green, verging on golden below and orange-tinged on breast. Dull orange stripes radiating from eye. Dorsal clouded olive, pinkish at tip with blackish edging. Pectoral pink, yellow olive at base. Ventral yellow olive with pink on first rays and blackish at tip. Anal spines pink, rays bright yellow olive. Caudal bright olive, pinkish above and below. Color of specimens preserved in formalin almost entirely disappeared; back clouded with dusky; opercular spots conspicuous, but with blended edges. Measurement for one specimen (102.9 mm SL) in percent of standard length: head length 34.7%; snout length 9.5%; orbit length 8.3%; interorbital width 10.1%; predorsal length 33.4%; body depth 36.6%; pectoral fin length 30.2%; caudal peduncle length 19.6%; caudal peduncle depth 10.8%.

Distribution: East Sea (Coast of Taejin and Namae, Kangwon-do province) of Korea, northern parts of Japan and Okhotsk Sea.

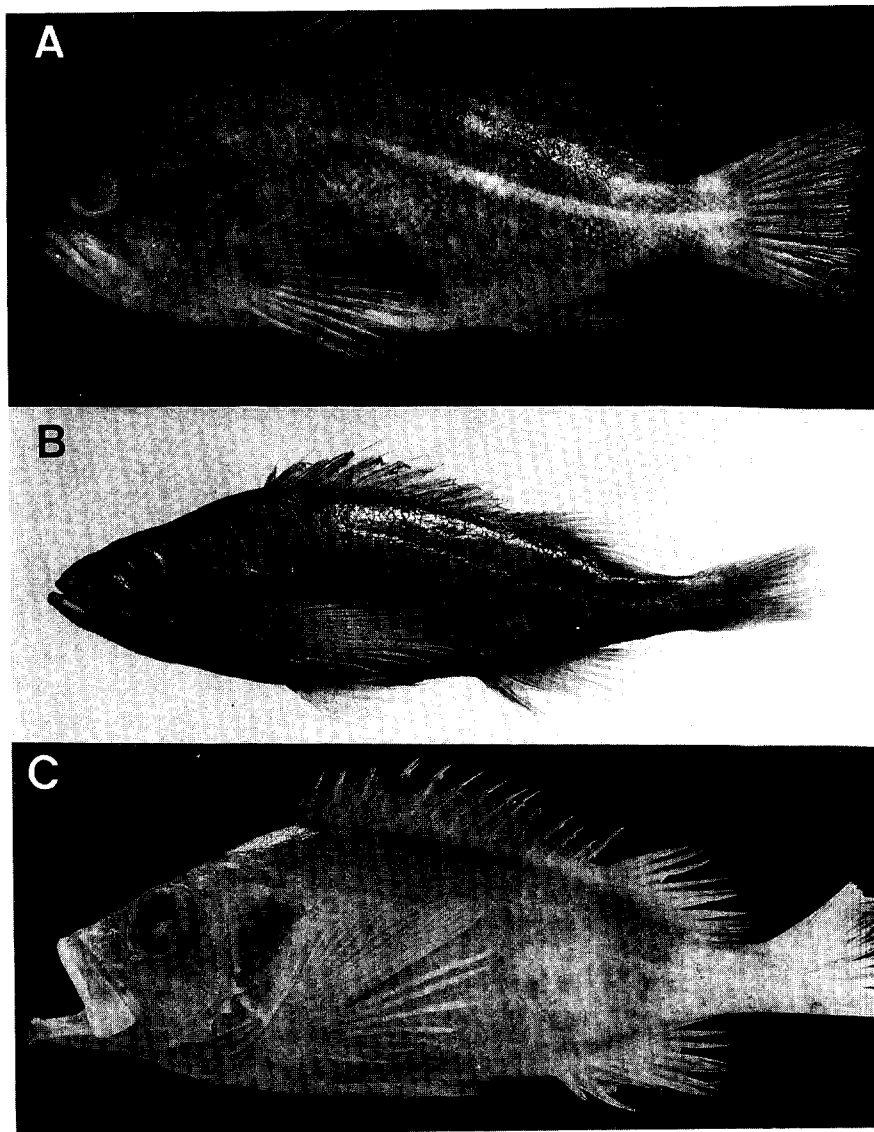
Remarks: This species is similar to *S. taczanowskii*, but differ in having the emarginate caudal fin and a distinct narrow light band on the lateral line. *S. steindachneri* have been reported only from Japan and Okhotsk Sea, but in the present study this species was collected from the coasts of Taejin and Namae, Kangwon-do province, Korea for the first time.

2. *Sebastes owstoni* (Jordan et Tompson, 1914) 황볼낙 (Pl. 1B)

Sebastes owstoni Jordan et Tompson, 1914. p. 270 (type locality: Aomori); Mori et Uchida, 1934, p. 27 (Wonsan, Chongjin).

Sebastes owstoni: Mori, 1952, p. 150 (Wonsan, Chongjin).

Material examined: CUB 18083-18086 (4), 112.3-134.6mm SL, St. 4, Nov. 26, 1989; CUB 18136 (1), 96.8mm SL, St. 4, Jun. 25, 1992;



Pl. 1 **A.** *Sebastes steindachneri* Hilgendorf, 172.0 mm in SL; **B.** *Sebastes owstoni* (Jordan et Tompson), 145.0 mm in SL; **C.** *Sebastes baramenuke* (Wakiya), 210.0 mm in SL.

CUB 18254-18259 (6), 170.0-195.0mm SL, St. 3, April 25, 1992; CUB 18296-18301 (6), 138.5-155.0mm SL, St. 7, Oct. 9, 1991; CUB 18305 (1), 180.0mm SL, St. 4, April 28, 1990.

Distribution: East Sea of Korea, Japan, Okhotsk Sea.

Remarks: This species was known to distribute from the northeast coast in Korea but we collected it from the coast of Kangwon-do province, Korea

for the first time.

**3. *Sebastes baramenuke* (Wakiya, 1917)
돌삼뱅이 (Pl. 1C)**

Sebastodes baramenuke Wakiya, 1917, p. 14 (type locality: Miyako).

Sebastes baramenuke: Mori, 1952, p. 151 (Chongjin); Chyung, 1977, p. 504.

Material examined: CUB 18286-18290 (5),

Table 1. Comparison of some morphometrics and meristic counts in a specimen (CUB 17820) of *Sebastes steindachneri*

	Present study (n=1)	Jordan and Starks (1904)	Matsuda <i>et al.</i> (1984)	Chen (1986)
Standard length (mm)	269	200-240	-	-
No. of				
Dorsal fin ray	XIII,14	XIII,14	XIII,13-15	XIII,13-15
Anal fin ray	III,7	III,7	III,6-7	III,6-8
Pectoral fin ray	18	18	17-19	17-19
Gill raker	34	-	33-37	33-37
Lateral line pore	31	30	31-32	-
Vertebrae	28	-	28	28
In % of SL				
Head length	34.7	35.3	34.4-37.2	-
Body depth	36.6	37.5	33.3-40.7	-

189.7-208.3mm SL, St. 3, Nov. 16, 1991; CUB 18291-18292 (2), 194.8-219.0mm SL, St. 10, Aug. 6, 1991.

Distribution: Korea, southern parts of Japan.

Remarks: This species was known also from Chongjin of North Korea but we collected it from the coast of Kangwon-do province, Korea in this time.

4. *Sebastes minor* Barsukov, 1972 (Pl. 2A, Table 2)

(New Korean name; Jom-bolnak 쯤볼낙)

Sebastes minor Barsukov, 1972, p. 630 (type locality: Vladivostock).

Material examined: CUB 17822-17830 (9), 106.8-127.0mm SL, St. 1, July 1, 1991; CUB 17837-17839 (3), 105.6-135.2mm SL, St. 1, Oct. 10, 1991; CUB 17835 (1), 146.7mm SL, St.7, Oct. 9, 1991; CUB 18252-18253 (2), 122.2-152.9mm SL, St. 3, April 25, 1992; CUB 18261 (1), 140.0mm SL, St. 5, April 28, 1992; CUB 18303 (1), 73.2mm SL, St. 1, Oct. 10, 1991; CUB 18304 (1), 146.1mm SL, St. 4, April 28, 1990; CUB 18314-18317 (4), 96.1-108.0mm SL, St. 2, Oct. 11, 1991.

Description: D.XIII, 12; A.III, 6-7; P. 15-16; vertebrae 27; lateral line pores 28-30; no spines on head except nasal. A rudimentary preopercle spine on cranium. Gill rakers long and slender, and total 32-35. Pectoral rather broad and rounded, 15-16 rays, lower 7 unbranched.

Ventrals not reaching to vent. Second anal spine stouter and as long or a little longer than third. Scales everywhere strongly ctenoid. Color in life yellowish brown, light clouds on body. Dorsal and caudal clouded brown, yellowish brown at tip with light blackish edging. Pectoral, ventral and anal fin pale. In the specimens preserved in formalin almost color entirely disappeared except black. Measurement for 13 specimens (106.8-146.7mm SL) in percent of standard length: head length 31.8-35.1%; snout length 7.7-8.7%; orbit length 7.7-9.7%; interorbital width 8.5-9.2%; upper jaw length 13.8-14.3%; predorsal length 32.5-34.6%; body depth 29.7-33.7%; caudal peduncle length 18.7-21.2%; caudal peduncle depth 8.9-9.7%.

Distribution: East Sea of Korea, Japan, Sakhalin.

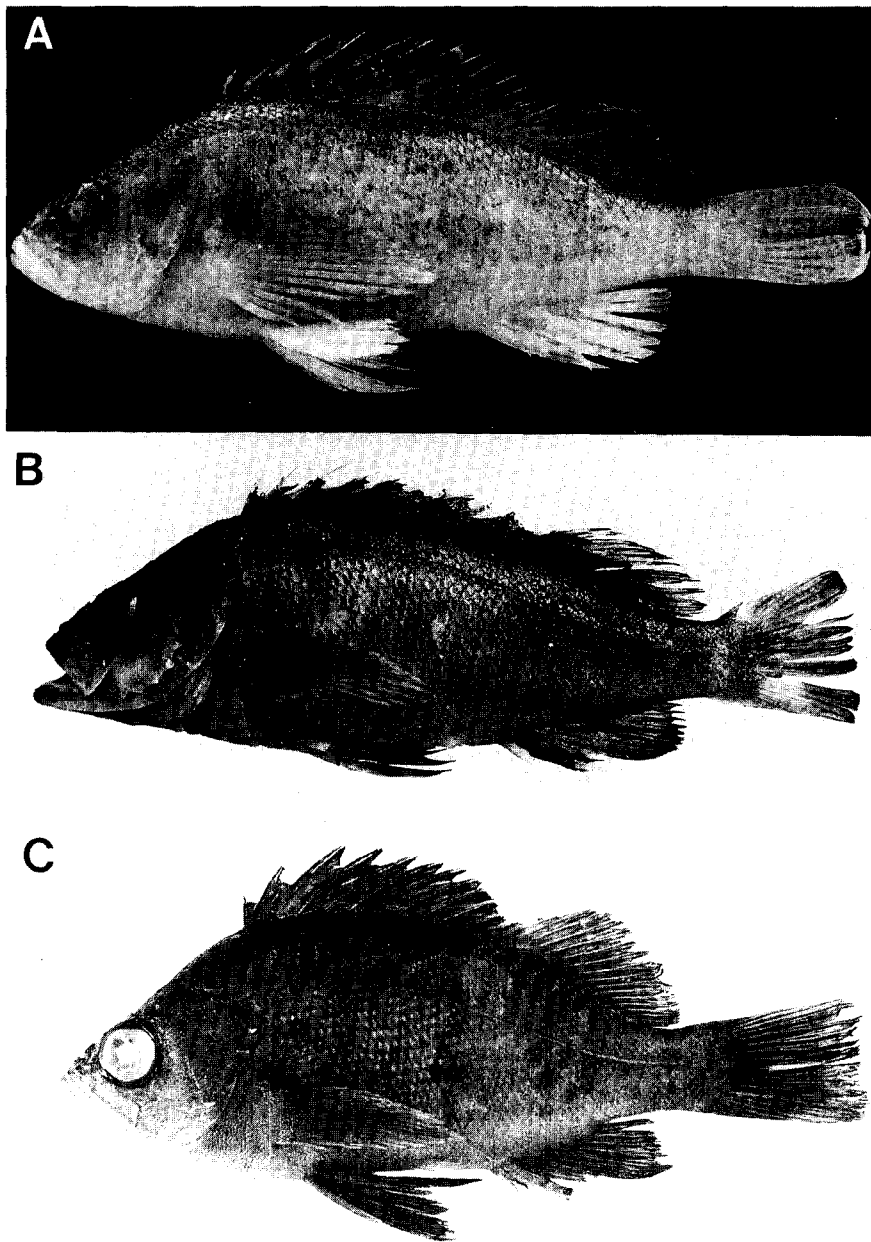
Remarks: This species resembles *S. inermis* and *S. owstoni*, but differs in having the lesser number of lateral scale (28-30) and the small size in body. This species is reported for the first time from Korea.

5. *Sebastes wakiyai* (Matsubara, 1934) 말락볼낙

Sebastodes wakiyai Matsubara, 1934, p. 205 (type locality: Miyako).

Sebastes wakiyai: Mori, 1952, p. 150 (Pusan, Chongjin); Chyung, 1977, p. 504-505.

Sebastes paradoxus Matsubara, 1943, p. 198-201 (type locality: Japan); Mori, 1952, p. 150



Pl. 2 A. *Sebastes minor* Barsukov, 115.0 mm in SL; **B.** *Sebastes taczanowskii* Steindachner, 167.4 mm in SL; **C.** *Sebastes inermis* Cuvier, 140.5 mm in SL.

(Pusan); Chyung, 1977, p. 505.

No specimen examined

Distribution: East Sea of Korea and Japan.

Remarks: Formerly *S. wakiyai* and *S. paradoxus* are recorded from Korea, Chen (1985) and other ichthyologists considered that *S.*

paradoxus Matsubara is a junior synonym of *S. wakiyai* (Chen, 1985).

6. *Sebastes taczanowskii* Steindachner, 1880 탁자볼낙 (**Pl. 2B**)

Sebastes taczanowskii Steindachner, 1880, p.

Table 2. Comparison of some meristic counts in *Sebastes minor*

	Present study			Barsukov (1972)	Masuda <i>et al.</i> (1984)	Chen (1986)
	Daejin (n=9)	Kojin (n=4)	Chukpyon (n=1)			
Standard length (mm)	107-127	106-135	147	32-142	-	-
No. of						
Dorsal fin ray	XIII,12	XIII,12	XIII,12	XIII,11-13	XII-XIII,11-13	XIII,11-13
Anal fin ray	III,6-7	III,7	III,7	III,7	III,6-8	III,6-8
Pectoral fin ray	15-16	15	15	15	15-16	15-16
Gill raker	33-35	32-33	33	33-35	31-37	-
Lateral line pore	28-30	29-30	30	27	27-31	-
Vertebrae	27-29	27	27	27	27-28	27-28

256 (type locality: Bays of the Gulf of Strielok); Mori, 1952, p. 151 (Wonsan); Chyung, 1977, p. 501.

Sebastes taczanowskii: Jordan et Metz, 1913, p. 51 (Wonsan); Mori et Uchida, 1934, p. 27 (Wonsan).

Material examined: CUB 18302 (1), 167.4mm SL, St. 1, Oct. 10, 1991.

Distribution: East Sea of Korea, Japan.

7. *Sebastes inermis* Cuvier, 1829 불낙 (PI. 2C)

Sebastes inermis Cuvier in Cuvier et Valenciennes, 1829, p.346 (type locality: Japan); Mori, 1952, p. 150 (Wonsan, Pusan, Inchon, Cheju Isl.); Chyung, 1977, p. 499-500.

Sebastes inermis: Jordan et Metz, 1913, p. 51 (Fusan); Mori et Uchida, 1934, p. 27 (Chinnampo, Inchon, Pusan).

Sebastes guntheri Jordan et Stark, 1904, p. 102 (Korea); Jordan et Metz, 1913, p. 49 (Chinnampo)

Sebastes tokyonis: Mori et Uchida, 1934, p. 27 (Pusan)

Material examined: CUB 18095-18097 (3), 121.6-137.7mm SL, St. 14, Nov. 19, 1989; CUB 18103-18110 (8), 115.2-168.4mm SL, St. 31, Aug. 17, 1991; CUB 18116-18117 (2), 71.5-75.6mm SL, St. 18, Dec. 31, 1989; CUB 18098-18099 (2), 118.0-136.3mm SL, St. 12, Dec. 24, 1989; CUB 18125 (1), 143.2mm SL, St. 14, April 10, 1991; CUB 18126 (1), 118.0mm SL, St. 27, Jan. 4, 1990; CUB 18160-18163 (4), 105.7-126.6mm SL, St. 20, May 10,

1990; CUB 18228-18230 (3), 76.6-128.6mm SL, St. 19, April 17, 1992; CUB 18251 (1), 107.9mm SL, St. 3, April 25, 1992; CUB 18260 (1), 142.0mm SL, St. 5, April 28, 1992; CUB 18275-18278 (4), 125.5-155.5mm SL, St. 20, Nov. 18, 1991; CUB 18325 (1), 132.5mm SL, St. 20, Nov. 13, 1991.

Distribution: Southern parts of Korea and Japan.

Remarks: This species resembles *S. taczanowskii*, but differs in having the lower jaw with small scales and the free lachrymal margin with 2 sharp spines (Masuda *et al.*, 1984).

8. *Sebastes joyneri* Günther, 1878 도화불낙 (PI. 3A)

Sebastes joyneri Günther, 1878, p. 485 (type locality: Japan); Mori, 1952, p. 150-151 (Pusan); Chyung, 1977, p. 500-501.

Sebastes joyneri: Mori et Uchida, 1934, p. 27 (Pusan).

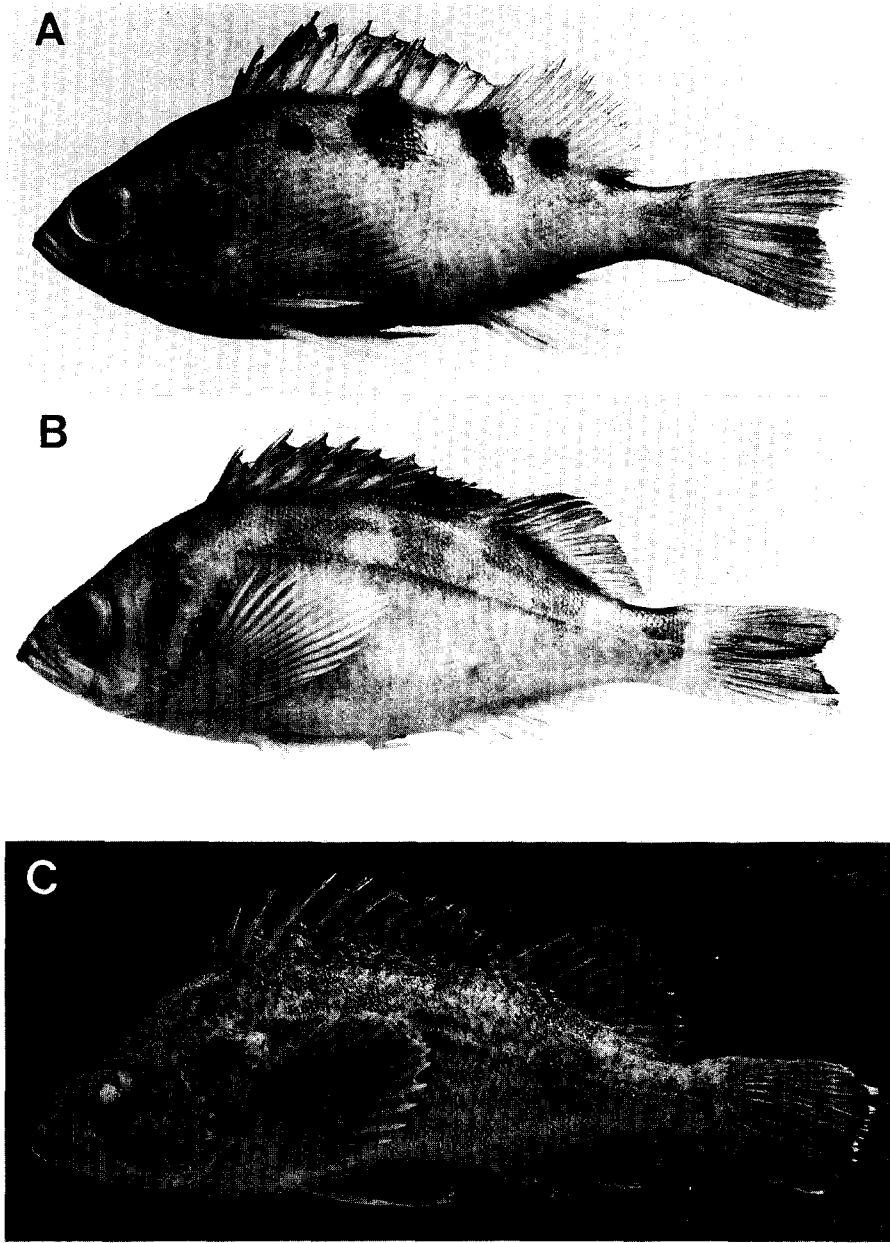
Material examined: CUB 18310-18311 (2), 124.4-151.5mm SL, St. 31, Aug. 17, 1991.

Distribution: Southern parts of Korea, Japan, Taiwan, East China Sea.

9. *Sebastes thompsoni* (Jordan et Hubbs, 1925) 불불낙 (PI. 3B)

Sebastes thompsoni Jordan et Hubbs, 1925, p. 265 (type locality: Miyako; Osaka); Mori et Uchida, 1934, p. 27 (Pusan); Mori, 1952, p. 150 (Pusan); Chyung, 1977, p. 504.

Material examined: CUB 18079 (1), 151.5mm SL, St. 31, Jan. 12, 1990; CUB 18151 (1), 171.



Pl. 3 A. *Sebastes joyneri* Günther, 151.5 mm in SL; **B.** *Sebastes thompsoni* (Jordan et Hubbs), 197.1 mm in SL; **C.** *Sebastes schlegeli* Hilgendorf, 155.0 mm in SL.

3mm SL, St. 25, May 22, 1992; CUB 18177 (1), 197.1mm SL, St. 24, July 13, 1991; CUB 18324 (1), 183.9mm SL, St. 20, Nov. 13, 1991.

Distribution: East Sea and southern coast of Korea, Japan.

10. *Sebastes schlegeli* Hilgendorf, 1880 조피볼락 (**Pl. 3C**)

Sebastes schlegeli Hilgendorf, 1880, p. 171 (type locality: Tokyo, Hakodate); Mori, 1952, p.

151-152 (Coasts of all Korea); Chyung, 1977, p. 502.

Sebastodes schlegeli: Jordan et Metz, 1913, p. 49 (Chinnampo, Pusan, Kunsan); Mori et Uchida, 1934, p. 27 (Coasts of all Korea).

Sebastodes fuscescens Jordan et Stark, 1904, p. 206 (Wonsan).

Material examined: CUB 17766 (1), 104.5mm SL, St. 32, March 30, 1990; CUB 17767 (1), 108.9mm SL, St. 34, March 14, 1990; CUB 18039 (1), 147.8mm SL, St. 33, May 29, 1992; CUB 18069 (1), 97.5mm SL, St. 17, Dec. 31, 1989; CUB 18072 (1), 80.3mm SL, St. 14, Jan. 26, 1989; CUB 18080-18082 (3), 80.9-122.3mm SL, St. 13, Dec. 24, 1989; CUB 18127-18132 (6), 89.4-110.2mm SL, St. 20, April 18, 1990; CUB 18141 (1), 187.7mm SL, St. 20, Nov. 18, 1990; CUB 18158-18159 (2), 116.7-132.5mm SL, St. 20, May 10, 1990; CUB 18227 (1), 125.1mm SL, St. 19, April 17, 1992; CUB 18272-18274 (3), 80.5-186.1mm SL, St. 20, Nov. 18, 1991.

Distribution: Korea (Yellow Sea and South Sea), Japan, China.

Remarks: This species is distributed widely and commonly in the coasts of Korea. And this species is raised in hatcheries in Korea.

11. *Sebastes vulpes* Steindachner et Döderlein, 1884 누루시볼낙 (Pl. 4A)

Sebastes vulpes Steindachner et Döderlein, 1884, p.203 (type locality: Tokyo); Mori, 1952, p. 151 (Pusan); Chyung, 1977, p. 502-503.

Sebastichthys vulpes: Jordan et Metz, 1913, p. 51 (Pusan); Mori et Uchida, 1934, p. 27 (Pusan).

Material examined: CUB 18164 (1), 153.0mm SL, St. 4, May 17, 1991.

Distribution: East Sea of Korea, Japan.

12. *Sebastes ijimae* (Jordan et Metz, 1913) 놀치볼낙 (Pl. 4B)

Sebastodes ijimae Jordan et Metz, 1913: 49-50 (type locality: Pusan, Korea); Mori et Uchida, 1934, p. 27 (Pusan).

Sebastes ijimae: Mori, 1952, p. 152 (Pusan); Chyung, 1977, p. 503.

Material examined: CUB 18060 (1), 138.2mm SL, St. 17, June 22, 1992; CUB 18178 (1), 207.

5mm SL, St. 24, July 13, 1991; CUB 18267-18269 (3), 156.0-180.8mm SL, St. 5, April 28, 1992; CUB 18321 (1), 90.8mm SL, St. 9, Oct. 10, 1991.

Distribution: East Sea of Korea and Japan.

Remarks: Jordan and Metz (1913) described this species as *Sebastodes ijimae* from Pusan in Korea. This species is distributed on the southern coast of Korea and all Japanese coasts of the Sea of Japan.

13. *Sebastes zonatus* Chen et Barsukov, 1976 (Pl. 4C, Table 3)

(New Korean name; Tti-bolnak 띠볼낙)

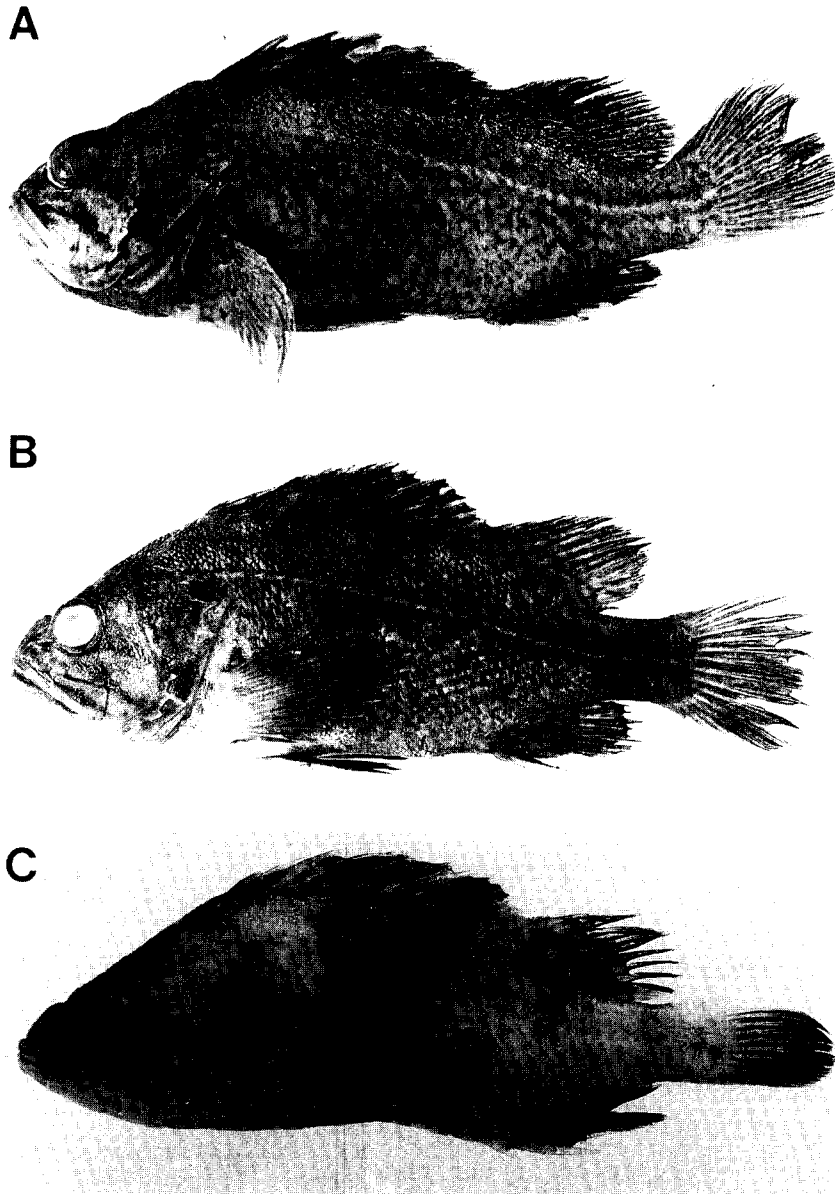
Sebastes zonatus Chen et Barsukov, 1976, p. 6-7 (type locality: Hakodate, Japan).

Material examined: CUB 17819 (1), 102.9mm SL, St. 28, Sep. 9, 1990; CUB 18068 (1), 72.4mm SL, St. 14, Jun. 13, 1990; CUB 17836 (1), 109.0mm SL, St. 1, Oct. 10, 1991.

Description: D. XIII, 13; A. III, 6; P. 17; vertebrae 26; lateral line pores 34; pectoral fin reaching to about beginning of anal fin; gill rakers total 14 on outside of first arch (3 on upper arch, 11 on lower arch); first 4 or 5 dorsal spines with blackish area at distal part of membrane. Dorsal half of body brownish or grayish, with blotchy pale spotted areas, and irregular pale stripes. Ventral portion of body pale, lacking markings. Anal fin black anteriorly, pale posteriorly. Pectoral fin base whitish, outside of fin mostly black. Pelvic fin base pale, fin blackish distally. Caudal fin pale. Measurement for one specimen (102.9 mm SL) in percent of standard length: head length 36.2%; snout length 13.6%; orbit length 8.2%; interorbital width 9.0%; body depth 31.8%; pectoral fin length 30.7%; pelvic fin length 24.5%; length of 1st dorsal fin 9.4%; length of 3rd dorsal fin 9.8%; length of 1st anal spine 5.2%; length of 2nd anal spine 6.0%; caudal peduncle length 7.1%; caudal peduncle depth 9.9%.

Distribution: Southern parts of Korea (Cheju isl.), southern Japan and Taiwan.

Remarks: This species resembles *S. ijimae*, but differ in having a pinkish or whitish body with sparsely scattered dark freckles or spots, and usually 27-28 gill raker on first gill arch. This species is reported for the first time from Korea.



Pl. 4 **A.** *Sebastes vulpes* Steindachner et Döderlein, 153.0mm in SL; **B.** *Sebastes ijimae* (Jordan et Metz), 164.0 mm in SL; **C.** *Sebastes zonatus* Chen et Barsukov, 72.4 mm in SL

14. *Sebastes oblongus* Günther, 1880 황점
볼낙 (**Pl. 5A**)

Sebastes oblongus Günther, 1880, P. 64 (type locality: Inland Sea, Japan; Yokohama); Mori, 1952, p. 151 (Pusan); Chyung, 1977, p. 501.

Sebastichthys oblongus: Mori et Uchida, 1934,

p. 27 (Pusan)

Sebastichthys mitsukurii: Jordan et Metz, 1913, p. 52 (Pusan)

Material examined: CUB 18073 (1), 131.3mm SL, St. 14, Dec. 28, 1989; CUB 18157 (1), 132.4mm SL, St.20, May 10, 1990; CUB 18224-18226 (3), 92.0-149.3mm SL, St. 19, April 17,

Table 3. Comparison of some morphometrics and meristic counts in specimen (CUB 17836) of *Sebastes zonatus*

	Present study (n=1)	Chen and Barsukov (1976)	Masuda <i>et al.</i> (1984)	Chen (1986)
Standard length (mm)	109	112-376	-	-
No. of				
Dorsal fin ray	XIII,13	XIII,12-13	XIII,12-13	XIII,12-13
Anal fin ray	III,6	III,6-7	III,6-7	III,6-7
Pectoral fin ray	17	15-18	15-18	15-18
Gill raker	27	26-29	26-29	26-29
Lateral line pore	34	31-37	31-37	31-38
Vertebrae	26	26	26	26
In % of SL				
Head length	36.1	37-41	-	-
Snout length	9.2	9-11	-	-
Orbit length	9.2	9-11	-	-
Interorbital width	7.0	6-8	-	-
Upper jaw length	17.8	19-21	-	-
Predorsal length	34.7	33-38	-	-
Body depth	33.9	34-41	-	-
Length of 1st anal spine	7.1	5-9	-	-
L. of 2nd anal spine	14.1	12-17	-	-
L. of 3rd anal spine	15.1	13-17	-	-
L. of 2nd dorsal soft ray	17.3	15-21	-	-
CPL	20.2	17-20	-	-
CPD	11.0	10-12	-	-

1992.

Distribution: Southern coast of Korea and Japan.

15. *Sebastes pachycephalus* Temminck et Schlegel, 1843 개볼낙 (Pl. 5B,C)

Sebastes pachycephalus Temminck et Schlegel, 1843, p. 17 (type locality: Nagasaki, Japan); Mori, 1952, p. 151 (Pusan, Incheon).

Sebastes pachycephalus pachycephalus: Chyung, 1977, p. 501.

Sebastichthys pachycephalus: Jordan et Metz, 1913, p. 52 (Pusan); Mori et Uchida, 1934, p. 27 (Incheon, Pusan).

Material examined: CUB 18088-18089 (2), 129.7-143.6mm SL, St. 14, Jun. 26, 1990; CUB 18113-18115 (3), 119.5-134.4mm SL, St. 27, Jun. 14, 1990; CUB 18124 (1), 91.2mm SL, St. 28, April 14, 1991; CUB 18137-18139 (3), 122.4-104.0mm SL, St. 8, July 9, 1991; CUB 18153-18156 (4), 104.2-134.6mm SL, St. 28, Aug. 18, 1991; CUB 18165 (1), 152.1mm SL,

St. 4, May 17, 1991; CUB 18262-18266 (5), 135.0-148.0mm SL, St. 5, April 28, 1992; CUB 18318-18320 (3), 78.1-80.4mm SL, St. 9, Oct. 10, 1991.

Distribution: Southern parts of Korea, Japan.

Remarks: This species has been sometimes reported as subspecies, but they are regarded as color variations of *S. pachycephalus* (Masuda *et al.*, 1984).

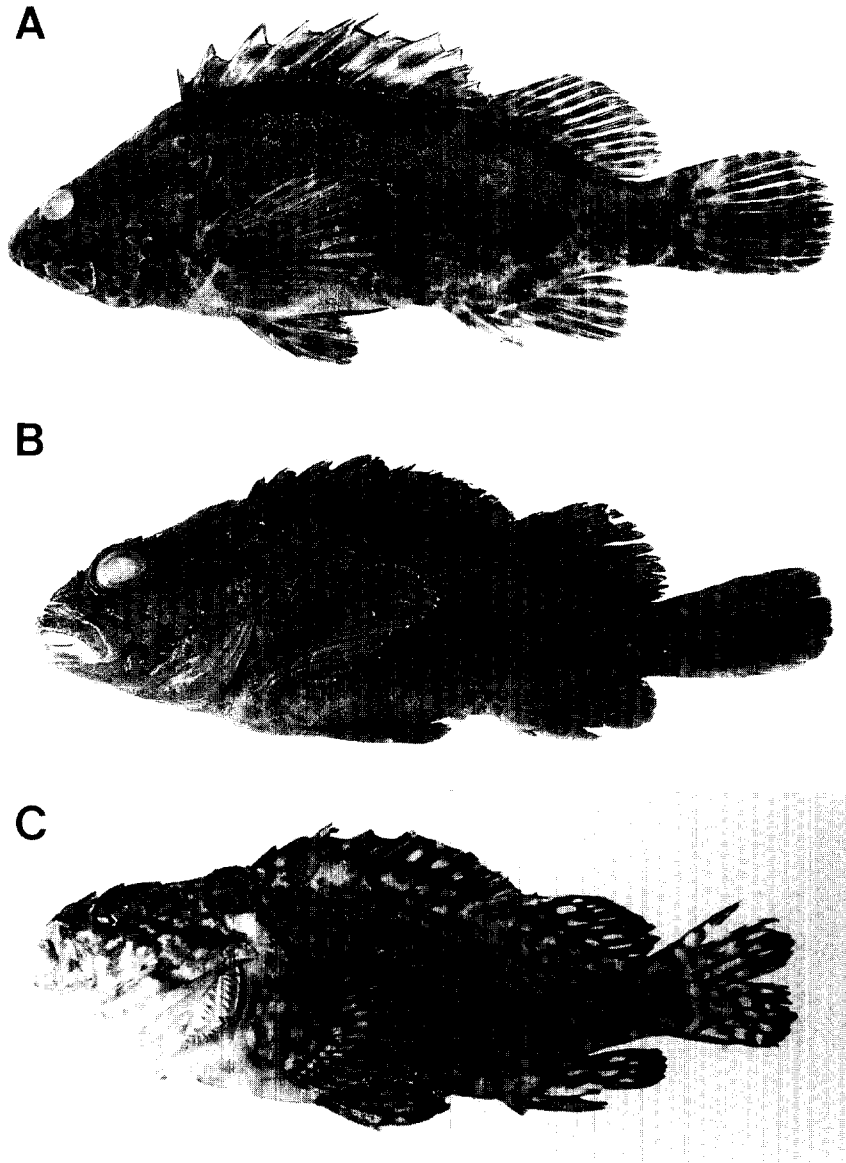
16. *Sebastes trivittatus* Hilgendorf, 1880 세줄볼낙

Sebastes trivittatus Hilgendorf, 1880, p. 171 (type locality: Japan); Mori, 1952, p. 152 (Incheon, Chinnampo); Chyung, 1977, p. 502.

Sebastodes trivittatus: Jordan et Metz, 1913, p. 51 (Incheon, Chemulpo); Mori et Uchida, 1934, p. 27 (Incheon, Chongjin).

No specimen examined.

Distribution: Coast of Korea and Japan.



Pl. 5 A. *Sebastes oblongus* Günther, 169.0 mm in SL; **B, C.** *Sebastes pachycephalus* Temminck et Schlegel, 139.0 (B), 135.0 (C) mm in SL.

17. *Sebastes hubbsi* (Matsubara, 1937) 우럭볼낙 (Pl. 6A)

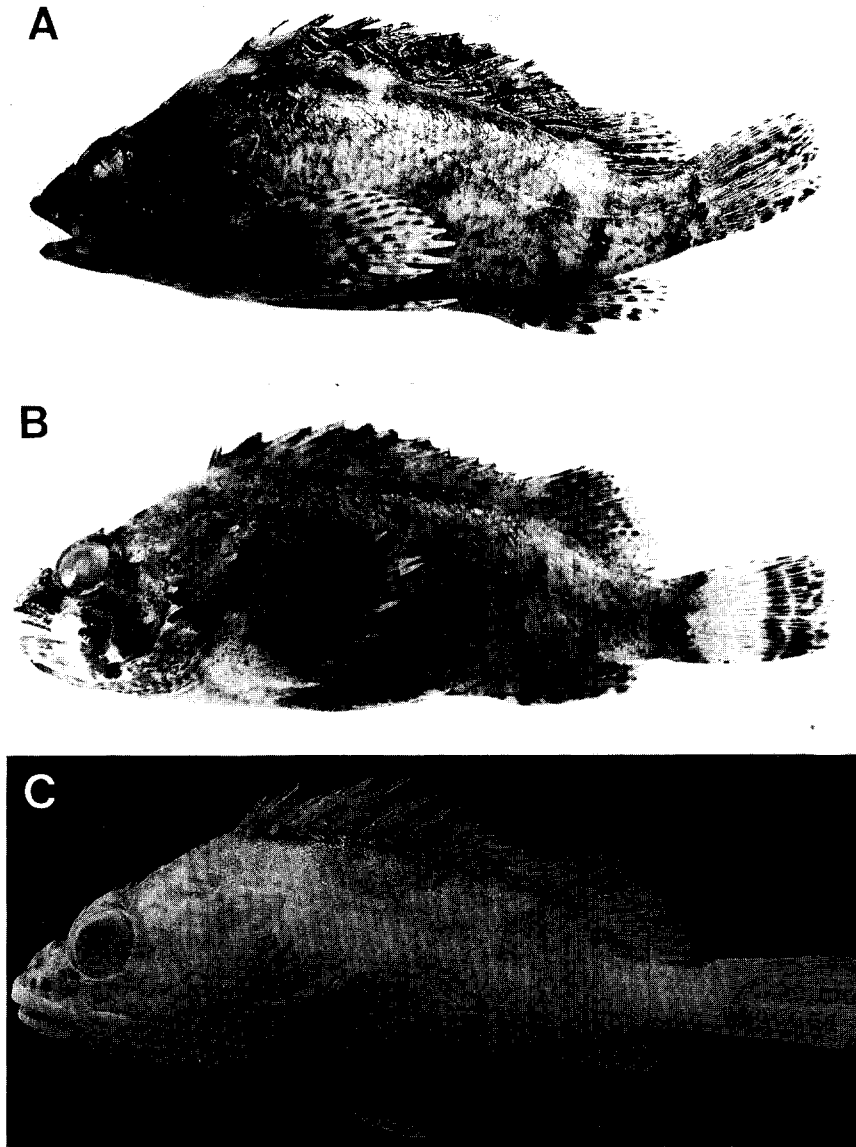
Sebastichthys hubbsi Matsubara, 1937, p. 57.

Sebastichthys elegans: Jordan et Metz, 1913, p. 51 (Pusan); Mori et Uchida, 1934, p. 27 (Pusan).

Sebastichthys brevispinis Masubara, 1936, p. 84 (Pusan).

Sebastes hubbsi: Mori, 1952, p. 152 (Pusan); Chyung, 1977, p. 503.

Material examined: CUB 18040 (1), 142.5mm SL, St. 33, May 29, 1992; CUB 18061-18062 (2), 146.7-150.0mm SL, St. 22, June 22, 1992;



Pl. 6 **A.** *Sebastes hubbsi* (Matsubara), 140.0 mm in SL; **B.** *Sebastes longispinis* (Matsubara), 113.0 mm in SL; **C.** *Sebastiscus albofasciatus* (Lacepede), 196.5 mm in SL

CUB 18074 (1), 132.9mm SL, St. 27, Jun. 14, 1990; CUB 18119 (1), 114.7mm SL, St. 8, July 3, 1991; CUB 18120-18123 (4), 94.0-130.0mm SL, St. 28, Aug. 18, 1991; CUB 18169-18173 (18), 97.4-112.8mm SL, St. 36, Jun 5, 1991.

Distribution: Southern coast of Korea and Japan.

18. *Sebastes longispinis* (Matsubara, 1935) 흰꼬리볼낙 (Pl. 6B)

Sebastichthys longispinis Matsubara, 1935, p. 209 (type locality: Pusan); Mori, 1952, p. 152 (Pusan); Chyung, 1977, p. 505.

Material examined: CUB 18070-18071 (2), 73.8-99.6mm SL, St. 14, Feb. 10, 1990; CUB

18075-18078 (4), 105.4-113.4mm SL, St. 14, Nov. 19, 1989; CUB 18090-18091 (2), 110.4-116.0mm SL, St. 12, Nov. 2, 1990; CUB 18118 (1), 99.7mm SL, St. 19, Sep. 26, 1990; CUB 18134 (1), 97.2mm SL, St. 14, Nov. 19, 1989; CUB 18135 (1), 85.1mm SL, St. 7, July 10, 1991; CUB 18147 (1), 106.5mm SL, St. 18, May 17, 1992; CUB 18223 (1), 112.9mm SL, St. 19, April 17, 1992.

Distribution: Southern coast of Korea and Japan.

Genus 2. *Sebastiscus* Jordan et Starks, 1904 **썸뱅이속**

19. *Sebastiscus albofasciatus* (Lacepede, 1802) 붉감쟁 (Pl. 6C)

Holocentrus albofasciatus Lacepede, 1802, p. 372 (type locality: Japan)

Sebastiscus albofasciatus: Mori et Uchida, 1934, p. 27 (Pusan); Mori, 1952, p. 153 (Pusan, Cheju Isl.); Chyung, 1977, p. 505-506.

Material examined: CUB 18064 (1), 196.5mm SL, St. 26, Oct. 15, 1992; CUB 18313 (1), 190.0mm SL, St. 26, Aug. 19, 1991.

Distribution: Southern coast of Korea, Japan, Taiwan and East China Sea.

20. *Sebastiscus marmoratus* (Cuvier, 1829) 썸뱅이 (Pl. 7A)

Sebastes marmoratus Cuvier in Cuvier et Valenciennes, 1829, p. 345 (type locality: Japan).

Sebastiscus marmoratus: Jordan et Metz, 1913, p. 51 (Pusan); Mori et Uchida, 1934, p. 27 (Mokpo, Pusan); Mori, 1952, p. 153 (Pusan, Mokpo, Cheju Isl.); Chyung, 1977, p. 506.

Material examined: CUB 18039 (1), 81.1mm SL, St. 26, Oct. 15, 1992; CUB 18092-18093 (2), 139.0-142.4mm SL, St. 35, May 6, 1990; CUB 18100-18102 (3), 131.3-142.2mm SL, St. 27, Jun. 14, 1990; CUB 18111 (1), 184.6mm SL, St. 14, Nov. 19, 1989; CUB 18112 (1), 89.7mm SL, St. 14, Jun. 13, 1990; CUB 18150 (1), 160.0mm SL, St. 25, June 22, 1992; CUB 18279-18281 (3), 137.1-152.7mm SL, St. 20, Nov. 18, 1991; CUB 18322 (1), 182.8mm SL, St. 20, Nov. 13, 1991.

Distribution: Southern coast of Korea, Japan,

Taiwan and East China Sea.

21. *Sebastiscus tertius* (Barsukov et Chen, 1978) (Pl. 7B, Table 4)

(New Korean name: Bulgun-ssombangi 붉은 썸뱅이)

Sebastes tertius Barsukov et Chen, 1978, p. 202-205.

Sebastiscus tertius: Masuda et al., 1984, p. 313.

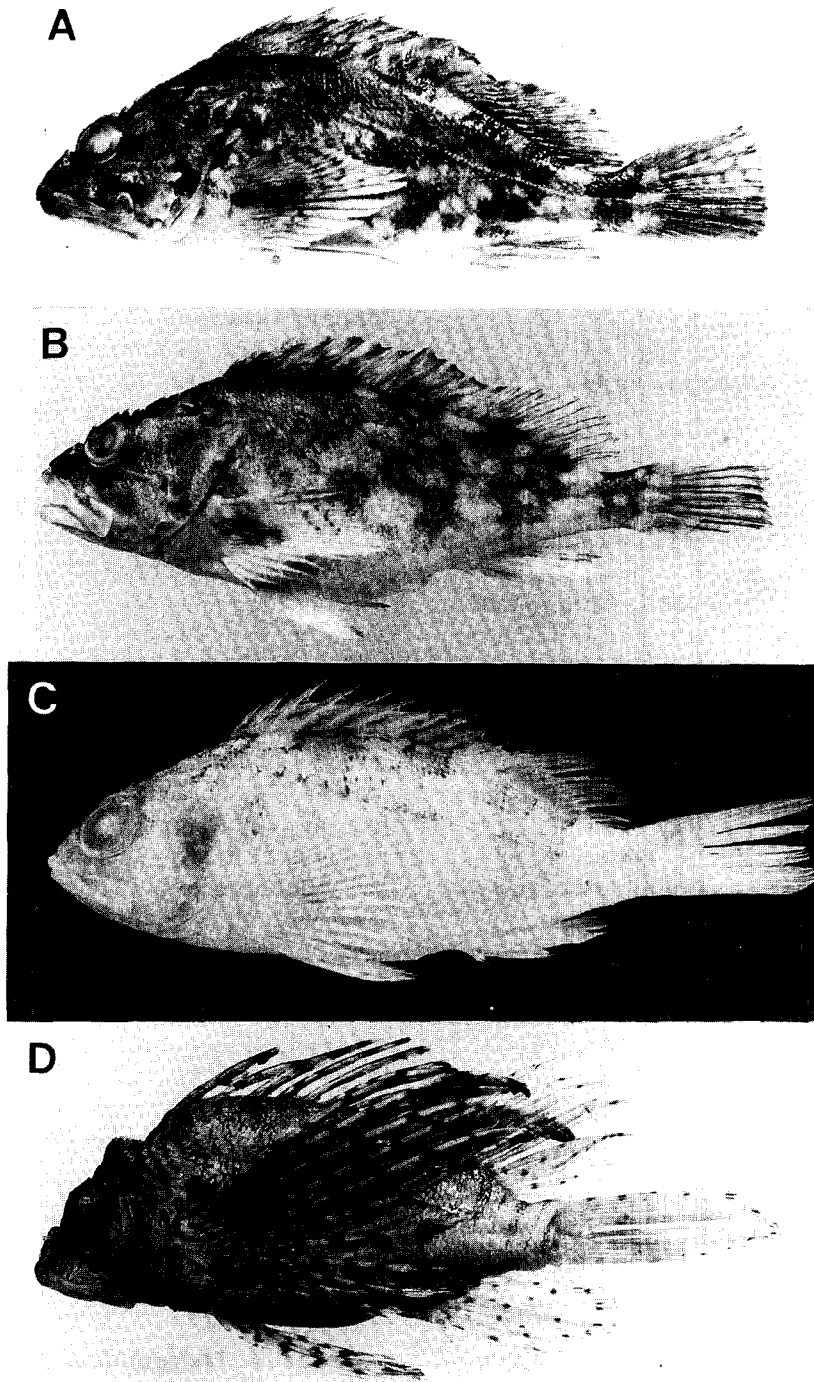
Material examined: CUB 17821 (1), 264.3mm SL, St. 20, Nov. 18, 1991; CUB 17842 (1), 181.6mm SL, St. 35, Jan. 30, 1992; CUB 18198 (1), 122.3mm SL, St. 14, Sep. 7, 1992; CUB 18038 (1), 141.8mm SL, St. 26, Oct. 15, 1992; CUB (1), 195.0mm SL, St. 20, Nov. 18, 1990; CUB 18283-18284 (2), 127.3-139.2mm SL, St. 20, Nov. 18, 1991.

Description: D.XII, 12; A.III, 5; P. 19; vertebrae 25; lateral line pores 50-53; jaws equal or lower slightly included. A small dermal filament usually present behind each of the parietal, nuchal, and superocular spines. Interorbital deeply concave. Gill rakers short in length about one-fourth eye, and total 23-25. Caudal truncate, or very slightly rounded. Color in life reddish and brown on back, belly red; 5 light large red spots along back at base of dorsal; in preserved specimen spots on body and all fin light olive green. Measurement for three specimen (122.3-264.3mm SL) in percent of standard length: head length 39.8-42.8%; snout length 11.6-12.8%; orbit length 8.5-11.4%; interorbital width 5.7-6.8%; body depth 32.5-34.4%; pectoral fin length 26.1-30.4%; pelvic fin length 19.9-22.8%; caudal peduncle length 18.5-19.4%; caudal peduncle depth 8.9-9.6%.

Distribution: Southern coast of Korea, Japan, Taiwan and East China Sea.

Remarks: Resembles *Sebastiscus marmoratus*, but differ in having more reddish body color and usually 19 pectoral fin ray. This species is reported for the first time from Korea.

Genus 3. *Helicolenus* Good et Bean 1896, 홍감쟁속



Pl. 7 **A.** *Sebastes marmoratus* (Cuvier), 155.0 mm in SL; **B.** *Sebastes tertius* (Barsukov et Chen), 141.8 mm in SL; **C.** *Helicolenus hilgendorfi* (Steindachner et Döderlein), 140.0 mm in SL. **D.** *Pterois lunulata* Temminck et Schlegel, 172.0 mm in SL.

Table 4. Comparison of some meristic counts in *Sebastes tertius*

	Present study			Barsukov and Chen (1978)	Masuda <i>et al.</i> (1984)	Chen (1986)
	Kunsan (n=1)	Kohwung (n=1)	Pusan (n=1)			
Standard length (mm)	181.6	264.3	122.3	-	-	-
No. of						
Dorsal fin ray	XII,12	XII,12	XII,12	XII,12	XII,11-12	XII,12
Anal fin ray	III,5	III,5	III,5	III,5	III,5-6	III,5
Pectoral fin ray	19	19	19	18-20(19)	18-20	18-20
Gill raker	23	25	25	23-27(25)	23-27	23-27
Lateral line pore	53	51	52	49-54(51)	49-54	49-54
Vertebrae	25	25	25	25	25	25

22. *Helicolenus hilgendorfi* (Steindachner et Döderlein, 1884) 흥감팽 (Pl. 7C)

Sebastes hilgendorfi Steindachner et Döderlein 1884, p.202 (type locality: Tokyo).

Helicolenus dactylopterus: Mori, 1952, p. 153 (Pusan).

Helicolenus hilgendorfi: Chyung, 1977, p. 506-507.

Material examined: CUB 18199 (1), 134.5mm SL, St. 15, Sep. 7, 1992; CUB 18133 (1), 91.1mm SL, St. 28, Sep. 17, 1992; CUB 18293-18294 (2), 87.9-97.1mm SL, St. 10, Aug. 6, 1991.

Distribution: Southern coast of Korea, Japan, Taiwan and East China Sea.

Genus 4. *Scorpaena* Linnaeus 1758, 점감팽속

23. *Scorpaena onaria* Jordan et Snyder, 1902 점감팽 (Pl. 8A)

Scorpaena onaria Jordan et Snyder, 1902, p. 365, (type locality: Tokyo); Masuda *et al.*, p. 314.

Scorpaena neglecta Temminck et Schlegel, 1943, p.43 (type locality: Nagasaki); Mori et Uchida, 1934, p. 27 (Pusan)

Scorpaena neglecta f. *neglecta*: Mori, 1952, p. 154 (Pusan); Chyung, 1977, p. 509.

Material examined: CUB 18087 (1), 162.3mm SL, St. 26, Sep. 8, 1990; CUB 18145-18146 (2), 164.2-167.2mm SL, St. 18, May 17, 1992; CUB 18167 (1), 166.7mm SL, St. 26, Jan. 12, 1990; CUB 18176 (1), 151.4mm SL, St. 19,

April 17, 1992; CUB 18285 (1), 154.5mm SL, St. 20, Nov. 18, 1991; CUB 18323 (1), 145.5mm SL, St. 20, Nov. 13, 1991.

Distribution: Southern coast of Korea, Japan, Taiwan and East China Sea.

Remarks: *Scorpaena neglecta neglecta* was reported as a synonym of *Scorpaena onaria* according to Masuda *et al.* (1984).

24. *Scorpaena miostoma* Günther, 1880 쭈굴감팽 (Pl. 8B)

Scorpaena miostoma Günther, 1880, p. 65 (type locality: Yokohama); Masuda *et al.*, p. 314.

Scorpaena neglecta f. *miostoma*: Mori, 1952, p. 154 (Pusan); Chyung, 1977, p.509-510.

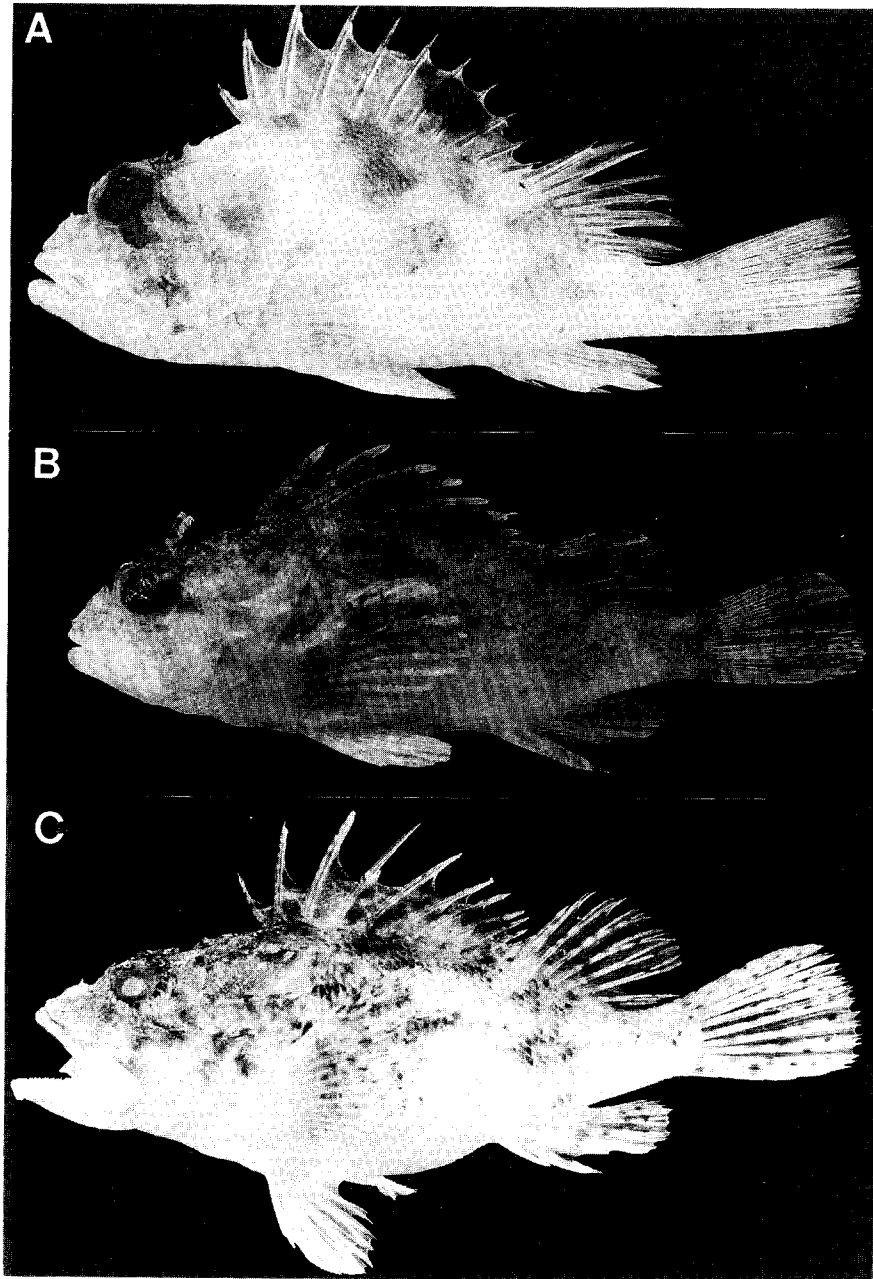
Material examined: CUB 18094 (1), 103.0mm SL, St. 12, Nov. 19, 1989; CUB 18143 (1), 102.9mm SL, St. 20, Nov. 18, 1990; CUB 18166 (1), 94.1mm SL, St. 35, Jan. 30, 1992; CUB 18174 (1), 103.7mm SL, St. 19, April 17, 1992; CUB 18175 (1), 85.3mm SL, St. 21, June 20, 1992; CUB 18295 (1), 97.1mm SL, St. 10, Aug. 6, 1991; CUB 18306 (1), 111.2mm SL, St. 31, Aug. 18, 1991.

Distribution: Southern coast of Korea, Japan, Taiwan and East China Sea.

Remarks: This species had been identified as *S. neglecta miostoma*. Here it is treated as a distinct species according to Masuda *et al.* (1984).

25. *Scorpaena neglecta* Temminck et Schlegel, 1843 살살치 (Pl. 8C)

Scorpaena neglecta Temminck et Schlegel, 1943, p.43 (type locality: Nagasaki); Masuda *et*



Pl. 8 **A.** *Scorpaena onaria* Jordan et Snyder, 162.3 mm in SL; **B.** *Scorpaena miostoma* Günther, 120 mm in SL; **C.** *Scorpaena neglecta* Temminck et Schlegel, 150.0 mm in SL.

al., 1984, p. 314.

Scorpaena izensis Jordan et Starks, 1904, p. 134 (type locality: Suruga Bay, Totomi Bay, Sagami Bay); Mori, 1952, p. 154 (Pusan);

Chyung, 1977, p. 510.

Material examined: CUB 18142 (1), 95.7mm SL, St. 20, Nov. 18, 1990; CUB 18148 (1), 74.7mm SL, St. 11, Feb. 24, 1989; CUB 18168 (1),

125.9mm SL, St. 25, July 22, 1992; CUB 18307-18309 (3), 90.4-124.5mm SL, St. 31, Aug. 17, 1991.

Distribution: Southern coast of Korea, Japan, Taiwan and East China Sea.

Remarks: *Scorpaena izensis* was treated as a synonym of *Scorpaena neglecta* (Masuda *et al.*, 1984).

Genus 5. *Scorpaenopsis* Heckel, 1840 썩감팽속

26. *Scorpaenopsis cirrhosa* (Thunberg, 1793) 썩감팽

Perca cirrhosa Thunberg, 1793 p. 199 (type locality: Nagasaki).

Scorpaenopsis cirrhosa: Mori et Uchida, 1934, p. 27 (Pusan); Mori, 1952, p. 153 (Pusan); Chyung, 1977, p. 508.

No specimen examined.

Distribution: Southern coast of Korea, Japan, Taiwan, East China Sea and Indo-Pacific.

27. *Scorpaenopsis diabolus* Cuvier, 1829 놀락감팽

Scorpaenopsis diabolus Cuvier in Cuvier et Valenciennes, 1829, p. 312 (type locality: le grand Ocean oriental).

Scorpaenopsis gibbosa: Mori, 1952, p. 153 (Cheju Isl.); Chyung, 1977, p. 508-509.

No specimen examined.

Distribution: Southern coast of Korea, Japan, Taiwan, East China Sea, Hawaii and Indo-Pacific.

Remarks: *Scorpaenopsis gibbosa* is apparently restricted to the Indian Ocean and *S. diabolus* is widely distributed in the Indo-Pacific region including in Korea and Japan. *S. diabolus* and *S. gibbosa* may be separated easily on the basis of pectoral fin coloration; *S. diabolus* also has a longer snout and wider interorbit than *S. gibbosa*, and usually 18 rather than 17 pectoral rays (Eschmeyer and Randall, 1975; Masuda *et al.*, 1984).

Genus 6. *Sebastolobus* Gill, 1881 홍살치속

28. *Sebastolobus macrochir* (Günther, 1880) 홍살치

Sebastes macrochir Günther, 1880.p. 65 (type locality: Enoshima, Sagami Bay).

Sebastolobus macrochir: Mori, 1952, p. 152 (Wonsan); Chyung, 1977, p. 507.

No specimen examined.

Distribution: East Sea of Korea, Japan and Sakhalin.

Genus 7. *Pterois* Cuvier, 1817 썩배감팽속

29. *Pterois lunulata* Temminck et Schlegel, 1843 썩배감팽 (Pl. 7D)

Pterois lunulata Temminck et Schlegel, 1843, p. 46 (type locality: Nagasaki); Mori et Uchida, 1934, p. 27 (Mokpo, Cheju Isl., Pusan); Mori, 1952, p. 154 (Pusan, Mokpo, Cheju Isl.); Chyung, 1977, p. 510-511.

Material examined: CUB 18144 (1), 141.8mm SL, St. 19, March 30, 1991; CUB 18312 (1), 170.3mm SL, St. 30, Aug. 18, 1991.

Distribution: Indo-Pacific region including the coasts of Korea, Japan, Taiwan and China.

Genus 8. *Apistus* Cuvier, 1829 벌감팽속

30. *Apistus carinatus* (Bloch et Schneider, 1801) 벌감팽

Scorpaena carinatus Bloch et Schneider, 1801, p. 193.

Apistus evolans: Mori, 1952, p. 154-155 (Pusan).

Apistus carinatus: Chyung, 1977, p. 511.

No specimen examined.

Distribution: Southern coast of Korea, Japan, Taiwan, China and Indo-Pacific.

Systematics and Zoogeography of Korean Scorpionfishes

The Scorpionfishes with about 60 genera and 310 species in the world are the largest family in the Scorpaeniformes. Most species are recorded in the Indian and Pacific Oceans and only 58

Table 5. Distribution of family Scorpaenidae in Korea and adjacent waters

Species	Localities	NK*	SE*	SS*	CH*	YS*	OS**	HS**	JS**	SJ**	EC#
1. <i>Sebastes steindachneri</i>			+				+	+	+		
2. <i>S. owstoni</i>		+	+				+	+	+		
3. <i>S. baramenuke</i>		+	+					+	+		
4. <i>S. minor</i>			+				+	+	+		
5. <i>S. wakiyai</i>		+	+					+	+		
6. <i>S. taczanowskii</i>		+	+				+	+	+		
7. <i>S. inermis</i>		+	+	+	+			+	+		
8. <i>S. joyneri</i>				+	+				+	+	
9. <i>S. thompsoni</i>			+	+	+	+		+	+		
10. <i>S. schlegeli</i>		+	+	+	+	+		+	+		
11. <i>S. vulpes</i>		+	+	+				+	+		
12. <i>S. ijimai</i>			+	+		+		+	+		
13. <i>S. zonatus</i>			+	+				+	+		
14. <i>S. oblongus</i>				+	+			+	+	+	
15. <i>S. pachycephalus</i>		+	+	+	+	+		+	+		
16. <i>S. trivittatus</i>		+	+					+	+		
17. <i>S. hubbsi</i>				+	+	+			+	+	
18. <i>S. longispinis</i>				+	+			+	+		
19. <i>Sebastiscus albofasciatus</i>				+	+				+	+	+
20. <i>S. marmoratus</i>			+	+	+	+		+	+	+	+
21. <i>S. tertius</i>				+	+				+	+	+
22. <i>Helicolenus hilgendorfi</i>				+	+					+	+
23. <i>Scorpaena onaria</i>				+	+					+	+
24. <i>S. miostoma</i>				+	+					+	+
25. <i>S. neglecta</i>				+	+					+	+
26. <i>Scorpaenopsis cirrhosa</i>				+						+	+
27. <i>S. diabolus</i>				+						+	+
28. <i>Sebastolobus macrochir</i>		+					+	+	+		
29. <i>Pterois lunulata</i>				+	+			+	+	+	+
30. <i>Apistus carinatus</i>				+						+	+

*referred from Mori (1952). **referred from Masuda *et al.* (1984), #referred from Chen (1981).

NK: North Korea*, SE: South Korea (East Sea)*, SS: South Korea (South Sea)*, CH: Cheju Isl.*, YS: Yellow Sea*, OS: Okhotsk Sea**, HS: Hokkaido coast**, JS: Japan central coast**, SJ: South Japan coast**, EC: East China Sea (Taiwan)*

species in 11 genera are recognized from the Atlantic Ocean (Eschmeyer, 1969). Lindberg and Karsyukova (1987) redescribed 8 genera and 36 species of the Scorpaenidae from the Sea of Japan and the Yellow Sea.

Although 27 species in 8 genera in this family were reported from Korea (Mori, 1952; Chyung, 1977), 24 species are collected from 36 localities of Korean coasts in the present study, of which

four species are recognized for the first time to Korea; *Sebastiscus tertius* (Barsukov *et al.* Chen), *Sebastes steindachneri* Hilgendorf, *S. minor* Barsukov and *S. zonatus* Chen *et al.* Barsukov. And four species of *S. paradoxus*, *Scorpaena izensis*, *Scorpaena neglecta f. neglecta* and *Scorpaenopsis gibbosa* formerly listed from Korea are treated as junior synonyms of *Sebastes wakiyai*, *Scorpaena neglecta*, *Scorpaena onaria*

and *Scorpaenopsis diabolus* respectively.

Accordingly the Korean scorpionfishes comprise 30 species in 8 genera including 5 subfamilies of Apistinae (genus *Apistus*), Pteroinae (genus *Pterois*), Scorpaeninae (genera *Scorpaena* and *Scorpaenopsis*), Sebastolobinae (genus *Sebastolobus*) and Sebastinae (Genera *Sebastes*, *Sebastiscus* and *Halicolenus*). In comparison with the species number of Scorpionfishes in the adjacent countries, the number of Korean scorpionfishes seems to be smaller than 83 species of Japan (Masuda *et al.*, 1984) and 64 species of Taiwan (Chen, 1981). However the fish fauna of Korea will be increased in number by the further extensive collections.

The species of the genus *Sebastes* are common in the North Pacific with approximately 100 species (Chen, 1986) and the North Pacific appears to be the origin and center of speciation of *Sebastes* (Eschmeyer, 1969). Among 30 scorpionfishes, 18 species are referable to the genus *Sebastes* and the following 3 species are also occurred commonly along the Korean coasts; *Sebastes inermis*, *S. schlegeli* and *S. pachycephalus*. Without the endemic scorpionfishes in Korean waters, most species of them are shared with Japan and Taiwan, in relation to two groups (Table 1): northern group (almost species of genus *Sebastes*) and southern group (genera *Sebastiscus*, *Halicolenus*, *Scorpaena*, *Scorpaenopsis*, *Pterois* and *Apistus*).

And many of them morphologically similar to each other and found together apparently in mixed aggregations. This complex of species presents some interesting problems in their evolution and ecology (Moyle and Cech, 1982).

Acknowledgements

We wish to thank Dr. E.J. Kaňg and Mr. C.H. Youn of Chonbuk National University for their assistant in collecting the specimens.

References

- Barsukov, B.B., 1970. Species composition of genus *Sebastes* in the North Pacific and description of a new species. *Dok. Bio. Sci. Proc. Acad. Sci. USSR*. **195**: 760-763. 1 figs. (cited from Lindberg and Karsyukov, 1987)
- Barsukov, B.B., 1972. A systematic analysis of the group *Sebastes wakiyai*-*Sebastes paradoxus*-*Sebastes steindachneri*. Communication 1 (containing the description of a new species). *J. Ichthyol.* **12**: 576-585. (cited from Lindberg and Karsyukov, 1987)
- Barsukov, B.B. and L. Chen, 1978. Review of the subgenus *Sebastiscus* (*Sebastes*, Scorpaenidae) with a description of a new species. *J. Ichthyol.* **18**: 179-193. (cited from Lindberg and Karsyukov, 1987)
- Bloch, M.E. and J.G. Schneider, 1801. *Systema ichthyologiae iconibus cx illustratum*. Sanderiano Commissum, Berlin, ix+584pp. (cited from Eschmeyer and Rama-Rao, 1973)
- Chen, L.C., 1981. Scorpaenid fishes of Taiwan. *Q.J. Taiwan Mus.* **34**: 1-60.
- Chen, L.C., 1985. A study of the *Sebastes inermis* species complex, with delimitation of the subgenus *Mebarus* (Pisces, Scorpaenidae). *J. Taiwan Mus.* **38** (2): 23-37.
- Chen, L.C., 1986. Meristic variation in *Sebastes* (Scorpaenidae), with an analysis of character association and bilateral pattern and their significance in species separation. *NOAA Tech. Rep. NMFS* **45**: 1-17.
- Chen, L.C. and V.V. Barsukov, 1976. A study of the Western North Pacific *Sebastes vulpes* species complex (Scorpaenidae), with description of a new species. *Jap. J. Ichthyol.* **23**(1): 1-8.
- Chyung, M.K., 1977. The Fishes of Korea. Iljisa, Seoul, 727 pp. (In Korean).
- Cuvier, G., 1817. *Règne Animal*, Ed. I, Le Règne Animal Distribué d'Après son Organisation. Tome II (Reptiles, Fishes etc.), p. 286. (cited from Jordan, 1963)
- Cuvier, G., 1829. *Le Règne Animal*, Distribué d'Après son Organisation. Edition II, Vol. II (Fishes etc.), p. 72. (cited from Jordan, 1963)
- Cuvier, G. and A. Valenciennes, 1829. *Histoire Naturelle des Poissons*. F.G. Levrault, Paris, Vol. 4, XXXVI+518pp. (cited from Jordan, 1963)
- Eschmeyer, W.N., 1969. A systematic review of the scorpionfishes of the Atlantic Ocean (Pisces: Scorpaenidae). *Occa. Pap. Cali. Aca. Sci.* **79**: 130, 13 figs.
- Eschmeyer, W.N., 1971. Two new Atlantic scorpionfishes. *Proc. Cali. Acad. Sci., fourth series*, **37**(17): 501-508, 2 figs.
- Barsukov, B.B., 1970. Species composition of genus

- Eschmeyer, W.N. and J.E. Randall, 1975. The scorpaenid fishes of the Hawaiian Islands, including new species and new records (Pisces: Scorpaenidae). *Proc. Cali. Acad. Sci., fourth series*, **XL(11)**: 265-334, 25 figs.
- Gill, T., 1881. Record of recent scientific progress: A deep-sea rockfish. *Ann. Rep. Smithso. Inst.* **1880**: 375. (cited from Jordan, 1963)
- Günther, A., 1878. Preliminary notices of deep-sea fishes collected during the Voyage of H.M.S. Challenger. *Ann. Mag. Nat. Hist. ser. 5*, **2**: 485. (cited from Mori, 1952)
- Günther, A., 1880. Report on the shore fishes (in Zoology of the voyage of H.M.S. Challenger during the years 1873-1876). 1(6), 82pp. (cited from Mori, 1952)
- Heckel, J.J., 1840. Ichthyologische Beiträge zu den Familien der Cottoiden, Scorpaenoiden, Gobioiden und Cyprinoiden. *Ann. Wien Mus.* **2**: 143-164. (cited from Eschmeyer and Randall, 1975)
- Hilgendorf, F., 1880. Übersicht über Japonischen *Sebastes*-Arten. *Ges. naturforschender Freunde.* **10**: 165-172. (cited from Lindberg and Karsyukov, 1987)
- Jordan, D.S. and C.L. Hubbs, 1925. Record of fishes obtained by David Starr Jordan in Japan, 1922. *Mem. Carneg. Mus.* **10(2)**: 93-346.
- Jordan, D.S. and C.W. Metz, 1913. A catalogue of the fishes known from the waters of Korea. *Mem. Carn. Mus.* **9(1)**: 1-65, pl. 10.
- Jordan, D.S. and E.D. Starks, 1904. A review of the scorpaenoid fishes of Japan. *Proc. U.S. Nat. Mus.*, XXVII. **1351**: 95-175, pl. 2.
- Jordan, D.S. and J.O. Snyder, 1902. Discobolous fishes of Japan. *Proc. U.S. Nat. Mus.* **24**: 343-351. (cited from Lindberg and Karsyukov, 1987)
- Jordan, D.S. and W.F. Thompson, 1914. Record of the fishes obtained in Japan in 1911. *Mem. Carn. Mus.* **6(4)**: 205-313.
- Lacepede, B.G., 1802. Histoire naturelle des Poissons. *Chez Plasson, Paris*, vol. 7, 414pp. (cited from Lindberg and Karsyukov, 1987)
- Lindberg, G.U. and Z.V. Karsyukova, 1987. Fishes of the Sea of Japan and the Adjacent Waters of the Sea of Okhotsk and of the Yellow Seas. XXX. Scorpaeniformes. *Acad. Sci. USSR.* 525pp. 284 figs. (In Russian).
- Linnaeus, C., 1758. *Systema naturae per regna tria naturae*, edition 10. 824pp. (cited from Eschmeyer and Randall, 1975)
- Masuda, H., K. Amaoka, C. Araga, T. Uyeno and T. Yoshino, 1984. *The Fishes of the Japanese Archipelago*. Tokai Univ. Press. Tokyo. Text 456 pp, Plate 378 pp.
- Matsubara K., 1934. Studies on the scorpaenoid fishes of Japan. I. Descriptions of one new genus and five new species. *J. Imp. Fish. Inst. Tokyo.* **30(3)**: 194-210. (cited from Matsubara, 1955)
- Matsubara K., 1935. On two new species of fishes found in Japan., *Annot. Zool. Jap.* **15(3)**: 355-360. (cited from Matsubara, 1955)
- Matsubara K., 1936. Studies on the scorpaenoid fishes of Japan. III. On the external and internal characters of *Sebastichthys longispinis* Mihi and *Sebastichthys brevispinis*, nom. nov., *J. Imp. Fish. Inst. Tokyo.* **31(1)**: 97-114. (cited from Matsubara, 1955)
- Matsubara K., 1937. A new name, *Sebastichthys hubbsi* Matsubara, substituted for *Sebastichthys brivispinis* Matsubara, from Japan. *Copeia* **1937(1)**: 1-57. (cited from Matsubara, 1955)
- Matsubara K., 1943. Studies on the scorpaenoid fishes of Japan. Anatomy, Phylogeny and Taxonomy. *Trans. Sigen-kagaku Kenkyosyo. Tokyo.* (1 and 2), 486pp, 156figs, 4pls. (cited from Matsubara, 1955)
- Matsubara, K., 1955. Fish Morphology and Hierarchy. Ishizaki Shoten. Tokyo, xi+1605pp., 135 pls. (In Japanese)
- Mori, T., 1952. Check list of the fishes of Korea. *Mem. Hyogo Univ. Agr.* **1(3)**: 1-228.
- Mori, T. and K. Uchida, 1934. A revised catalogue of the fishes of Korea. *J. Chosen Nat. Hist. Soc.* **1**: 12-33.
- Moyle, P.B. and J.J. Cech JR., 1982. *Fishes: An introduction to ichthyology*. Prentice-Hall, Inc., New York. 593pp.
- Nelson, J.S., 1984. *Fishes of the world* (2nd ed.). John Wiley & Sons, New York. 523pp.
- Steindachner, F., 1880. Über einige fischarten aus dem nordlichen Japan, desammelt vom professor Dybowski. (III). *S. Ber. Acad. Wiss. Wien Bd 82. Art. 1. S.* **1**: 1-29. (cited from Lindberg and Karsyukov, 1987)
- Steindachner, F. and L. Döderlein, 1884. Beiträge zur kenntniss der fische Japan's. (III.). *Denk. Math. Cl. Kaiser. Aka. Wissen. Wien* **49**: 171-212, pls.1-7. (cited from Lindberg and Karsyukov, 1987)
- Temminck, C. and H. Schlegel, 1843-1850. Pisces. In Siebold's *Fauna Japonica*, pl. 1-16, Leiden, 323pp.
- Thmberg, C.P., 1793. Atskillige forut okande fisker af abborslagt [Perca]. *Vet. Akad. Nya Handl.* **14**: 192. (cited from Chen, 1981)
- Wakiya, Y., 1917. *Nippon Suisan gakukaiho.* **2(1)**: 1-21 (in Japanese). (cited from Mori, 1952)

(Accepted July 12, 1993)

한국산 양볼낙과 어류의 분류 및 4 미기록종
김익수·이완옥(전북대학교 자연과학대학 생물학과)

1989년부터 1992년까지 우리나라 전 연안에서 양볼낙과 어류를 채집하여 분류학적으로 검토하였다. 본 조사에서 채집된 24종을 포함하여 모두 8속 30종의 속 및 종을 정리하고, 이들의 속과 종의 검색표, 동종이명, 미세분포를 제시하였다. 이 가운데 붉은솜뱀이 *Sebastiscus tertius*(Barsukov et Chen), 노랑볼낙 *Sebastes steindachneri* Hilgendorf, 쯤볼낙 *Sebastes minor* Barsukov 그리고 띠볼낙 *Sebastes zonatus* Chen et Barsukov의 4종은 한국 미기록종으로 그 형태적 특징을 재기재하였다. 양볼낙과 어류 가운데 *Sebastes*속 어류는 고유종없이 18종이나 분포하고 있어 주목되었다. 한국에 분포하는 양볼낙과 어류의 대부분의 종들은 난대 및 온대성 어류로 일본과 대만에도 출현하는 종들이었다. 이중에 *Sebastes*속 어류는 온대성이었고, 나머지속들은 난대성 어류들이었다.