

## Synopsis of the Family Cottidae (Pisces : Scorpaeniformes) from Korea

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Thirty six species belonging to 21 genera in the family Cottidae from Korea are reviewed and provisional keys to species and genera are provided. Synonyms based on Korean references are included for all cottid fishes of Korea, and their taxonomic positions and distribution are discussed. Specimens of twenty one species of this family were collected by trawlers from 38 localities during 1989 to 1992. Five cottid species are recorded for the first time in Korea: They are *Triglops jordani* (Schmidt), *Myoxocephalus stelleri* Tilesius, *Taurocottus bergi* Solatov et Pavlenko, *Icelus ochotensis* Schmidt and *Pseudoblennius zonostigma* Jordan et Starks. It is noticeable that most cottid fishes of Korea except 3 species are distributed along the north-eastern coast at the southern extremity of cold current from the Okhotsk Sea.

### Introduction

The fishes of the family Cottidae inhabit mostly marine habitats in the temperate and cold waters of the Northern Hemisphere. This group including 70 genera and 300 species in the world (Nelson, 1984) are characterized by usually stout body with a large depressed head, enlarged and well modified preopercular spines, lack of a swimmbladder, and large pectoral fins.

The systematic studies of the cottid fishes have been conducted by many ichthyologists (Matsubara, 1936; Berg, 1940; Nelson, 1984; Yabe, 1984), but the cottids of Korea are not well known till now. In Korea latest treatments on this group were those of Mori(1952) and Chyung(1977) who listed 36 species around Korea. In the last few years, collecting in the coastal waters of Korea has resulted in additional valuable materials. Five species are found to be new records from Korea, and some comments on possible synonyms or close relatives are presented for them.

The purpose of the present study are to recompile taxonomical and distributional data of the cottid fish fauna of Korea and to add or modify to Mori(1952) and Chyung's list(1977).

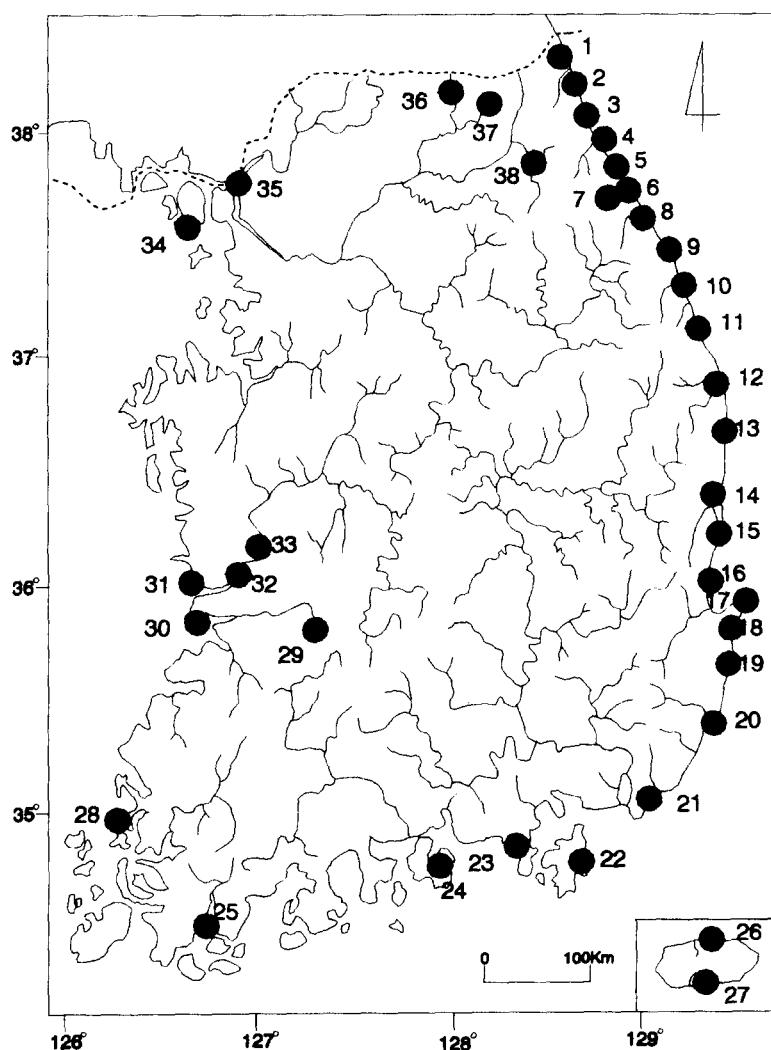
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## Methods

The materials identified were collected from trawlers at the littoral zone of 38 localities around the coast of Korea from 1989 to 1992(Fig. 1). The specimens examined here were deposited in the Laboratory of the Department of Biology, Chonbuk National University(CUB). Measurements were made in accordance with those of Hubbs and Lagler(1958) except that depth of body was measured between origin of the first dorsal fin and origin of pelvic fin. All fin rays were counted except for the caudal fin in which only branched rays were counted. The vertebrae were counted from radiographs.

The concept of family Cottidae used here is a broad one, following that of Nelson(1984).



## Key to the Cottid Fishes of Korea

In identifying a specimen, refer to Fig. 2 for external morphology and segmental characters of the Cottidae.

- 1a. Gill membranes fused with the isthmus, not forming a fold ..... 2
- 1b. Gill membranes separated with the isthmus, forming a fold. ..... 6
- 2a. Suborbital stay flat, without ridge; head rounded above ..... genus *Cottus* ..... 3
- 2b. Suborbital stay with a prominent ridge; head with distinct ridges above ..... 5
- 3a. Palatines with teeth; lateral line complete ..... *C. czerskii*
- 3b. Palatines without teeth; lateral line incomplete ..... 4
- 4a. Dorsal soft rays 17-19; anal rays 13-14 ..... *C. poecilopus*
- 4b. Dorsal soft rays 19-22; anal rays 16-17 ..... *C. hangiongensis*
- 5a. Preopercle spine short, simple, and tips have not spinules ..... genus *Trachidermus*  
..... *T. fasiatus*
- 5b. Preopercle spine very long, tips have seven spinules ..... genus *Enophrys*  
..... *E. diceraus*
- 6a. Palatines without teeth ..... 7
- 6b. Palatines with teeth ..... 16
- 7a. Bony plate exists in postocular region and interorbital space ..... genus *Gymnocanthus* ..... 8
- 7b. No bony plate in postocular region and interorbital space ..... 10

Fig. 1. A map showing the collection sites of the family Cottidae.

- 1; Daejin-ri, Hyonnae-myon, Kosung-gun, Kangwon-do, 2; Kojin-up, Kosug-gun, Kangwon-do, 3; Daepo-dong, Sokcho-si, Kangwon-do, 4; Susan-ri, Sonyang-myon, Yangyang-gun, Kangwon-do, 5; Namae-ri, Hyonbuk-myon, myongju-gun, Kangwon-do, 6; Chumunjin-up, Myongju-gun, Kangwon-do, 7; Yongok-ri, Yongok-myon, Myongju-gun, Kangwon-do, 8; Jughon-dong, Kangrung-si, Kangwon-do, 9; Mugho-dong, Tonghae-si, Kangwon-do, 10; Songjong-dong, Samchok-si, Kangwon-do, 11; Kungchon-ri, Kundok-myon, Samchok-gun, Kangwon-do, 12; Imwon-ri, Kundok-myon, Samchok-gun, Kangwon-do, 13; Chukbyon-ri, Buk-myon, U1jin-gun, Kangwon-do, 14; Yonghae-up, Yongdok-gun, Kyongsangbuk-do, 15; Kanggu-ri, Kanggu-myon, Yongdok-gun, Kyongsangbuk-do, 16; Namchang-myon, Yongdok-gun, Kyongsangbuk-do, 17; Kuryongpo-up, Yongil-gun, Kyongsangbuk-do, 18; Yangpo-ri, Chihaeng-myon, Kyongju-gun, Kyongsanbuk-do, 19; Kampo-up, Yangbuk-myon, Kyongju-gun, Kyongsangbuk-do, 20; Ulsan-si, Kyongsangnam-do, 21; Songjong-dong, Pusan-si, 22; Sagok-ri, Sadong-myon, Koje-gun, Kyongsangnam-do, 23; Chungmu-si, Kyongsangnam-do, 24; Namhae-si, Kyongsangnam-do, 25; Kangjin-up, Kangjin-gun, Chollanam-do, 26; Hamdok-ri, Chochon-up, Pukjeju-gun, Jeju-do, 27; Chungmun-dong, Sokuipo-si, Jeju-do, 28; Changsan-myon, Sinan-gun, Chollanam-do, 29; Saekjang-ri, Chonju-si, Chollabuk-do, 30; Misong-up, Okgu-gun, Chollabuk-do, 31; Kusan-si, Chollabuk-do, 32; Ungpo-ri, Ungpo-myon, Iksan-gun, Chollabuk-do, 33; Puyo-up, Puyo-gun, Chungchongnam-do, 34; Kilsang-myon, Kanghwa-gun, Kyonggi-do, 35; Imjin-ri, Musan-up, Paju-gun, Kyonggi-do, 36; Dutayon-ri, Bangsan-myon, Yanggu-gun, Kangwon-do, 37; Haean-ri, Haean-myon, Yanggu-gun, Kangwon-do, 38; Kuidun-myon, Inje-gun, Kangwon-do

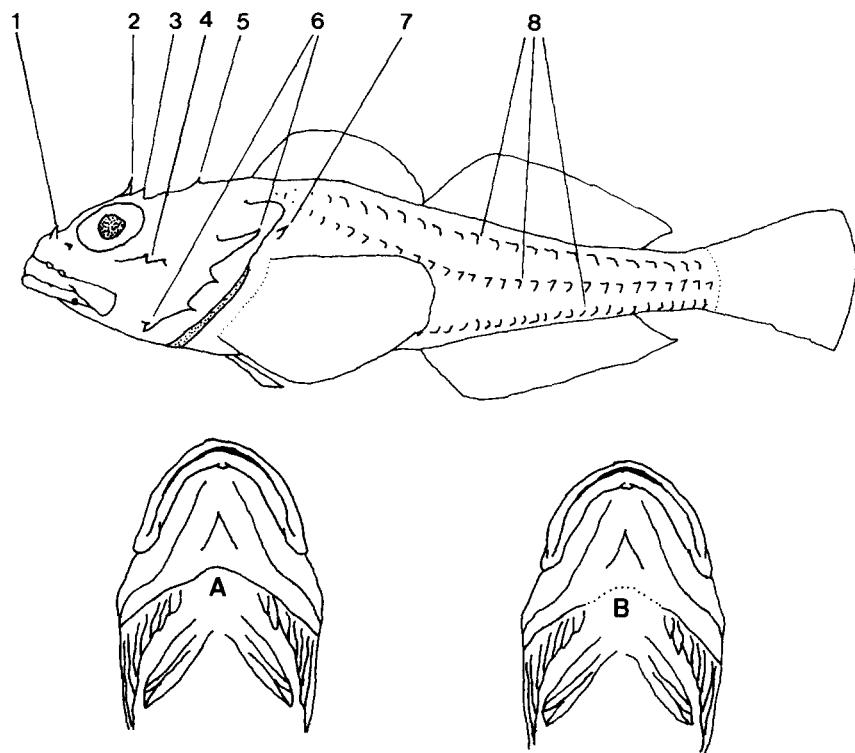


Fig. 2. Terms of segmental characters (top) and ventral side of head (bottom) of the Cottidae.

1; nasal spine, 2; supraocular cirrus, 3; supraocular spine, 4; infraorbital spine, 5; nuchal spine,  
6; preopercular spine 7; cleithral spine, 8; bony plate rows, A; gill membranes fused with the  
isthmus, B; gill membranes sperated with the isthmus.

- 8a. Caudal fin rather deeply concave, when spread ..... *G. herzensteini*
- 8b. Caudal fin truncate or slightly convex, when spread ..... 9
- 9a. Cleithrum developed; interorbital width approximately 12% in head length  
..... *G. intermedius*
- 9b. Cleithrum not developed; interorbital width approximately 18% in head length  
..... *G. pistilliger*
- 10a. Each dorsal spines with a fringe of tentacles at extreme base ..... genus *Porocottus*  
..... *P. tentaculatus*
- 10b. Dorsal spines without a fringe of tentacles at extreme base ..... 11
- 11a. Preopercle with three or four spines, the uppermost one strong, long, and straight ..... 12
- 11b. Preopercle with three or four spines, all spines soft and short ..... genus *Triglops* ..... 14
- 12a. Preopercle with three spines ..... genus *Myoxocephalus* ..... 13
- 12b. Preopercle with four spines ..... genus *Ainocottus*  
..... *A. ensiger*

- 13a. Protracted bony plates parallel with lateral line exposed at side of body ..... *M. jaok*
- 13b. Neither bony plates nor scales exposed at side of body, buried under skin ... *M. stelleri*
- 14a. Male sexual organ always face forward ..... *T. pingeli*
- 14b. Male sexual organ does not face forward ..... 15
- 15a. Caudal fin deeply forked ..... *T. jordani*
- 15b. Caudal fin slightly convexed ..... *T. scepticus*
- 16a. Head long, exceedingly prominent toward snout end ..... genus *Vellitor*  
..... *V. centropomus*
- 16b. Head slightly depressed ..... 17
- 17a. Bony plates and villiformed prickles arranged at side of body, forming a rough lateral body ; the dermal fringes always not present on lateral pores ..... 18
- 17b. Without bony plates and villiformed prickles at side of body ; each lateral pore with dermal fringe ..... 25
- 18a. Several small bony plates arranged at side of body, parallel with lateral line ..... 19
- 18b. Small prickles covered all region of body, forming rough lateral body ..... 23
- 19a. Upper lateral body covered with spiny plates from base of pectoral fin to base of caudal fin ; one or two pairs of sharp spines appear between postorbital and base of dorsal ..... genus *Icelus* ..... 20
- 19b. Side of body covered with flattened bony plates, parallel with lateral line ; no sharp spines appear between postorbital and base of dorsal spine ..... 22
- 20a. One pairs of sharp spines appear between postorbital and base of dorsal spine  
..... *I. ochotensis*
- 20b. Two pairs of sharp spines appear between postorbital and base of dorsal spine ..... 21
- 21a. Each bony plates have one strong spine toward caudal ..... *I. cataphractus*
- 21b. Each bony plates have rough process ..... *I. uncinalis*
- 22a. Spinous dorsal notched ; one pairs of dermal fringe present on tip of maxillary ; ventral rays 1, 4 ..... genus *Hemilepidotus*  
..... *H. gilberti*
- 22b. Spinous dorsal not notched ; no dermal fringe at tip of maxillary ; ventral rays 1, 3-4  
..... genus *Ricuzenius*  
..... *R. pinetorum*
- 23a. Each fin elongate ; several pairs of filiform processes present on postoccipital region and maxillary ..... genus *Blepsias* ..... 24
- 23b. Each fin not elongate ; dorsal fin separated into three portions ; several pairs of leaflike dermal processes present on postoccipital region and maxillary ..... genus *Hemitripterus*  
..... *H. villosus*
- 24a. Spinous dorsal notched ..... *B. cirrhosus*

- 24b. Spinous dorsal not notched ..... *B. bilobus*
- 25a. Preopercle with three or four spines, first spine prolonged, straighted and sharp, extended to base of pectoral fin; several pairs of fringe present on lower part of maxillary ....  
..... genus *Taurocottus*  
..... *T. bergi*
- 25b. Preopercle with two or three spines, first spine short, curved and uppermost spines seperated into two or three parts ..... 26
- 26a. Uppermost preopercle spine curved, terminal separated ..... 27
- 26b. Uppermost preopercle spine curved, terminal not separated ..... 31
- 27a. Remarkly elongated three pairs of dermal fringe present between postorbital region and dorsal spines ..... genus *Alcichthys*  
..... *A. alcicornis*
- 27b. One or two pairs of dermal fringe present between postorbital region and dorsal spines ..... 28
- 28a. First spine of preopercle somewhat large; one or two pairs of dermal fringe present on postorbital region; no male sexual organ; ventral rays I, 3 ..... genus *Cottiusculus* ..... 29
- 28b. First spine of preopercular spines somewhat small; two pairs of dermal fringe presnet on postorbital region; externally displayed male sexual organ; ventral rays I, 2 .....  
..... genus *Furcina* ..... 30
- 29a. Gill membrane formed large gill fold; nasal spine simple and no separation ..... *C. gonez*
- 29b. Gill membrane formed small gill foled; nasal spine divided into two regions .....  
..... genus *C. schmidti*
- 30a. Spinous dorsal slightly notched; dorsal rays X, 17-18; anal soft rays 14-15 *F. oshimae*
- 30b. Spinous dorsal not notched; dorsal rays X, 19-20; anal soft rays 17-18 ..... *F. ishikawae*
- 31a. Small dermal fringe present on lateral line pore ..... genus *Ocynectes*  
..... *O. mashalis*
- 31b. No dermal fringe present on lateral line pore ..... 32
- 32a. One pairs of dermal fringe present between postoccipital region and base of spinous dorsal ..... genus *Pseudoblennius* ..... 33
- 32b. Three pairs of dermal fringe present between postoccipital region and base of spinous dorsal ..... genus *Bero*  
..... *B. elegans*
- 33a. Spinous dorsal notched ..... *P. marumoratus*
- 33b. Spinous dorsal not notched ..... 34
- 34a. Black spots present on anterior and posterior of spinous dorsal; vertebrae less than 34; no nasal spine ..... *P. zonostigma*
- 34b. No black spot on spinous dorsal; vertebrae more than 35; nasal spine present ..... 35

- 35a. No silver-white stripe on side of body; end of premaxillary extends slightly backwards beyond eye..... *P. percoides*  
35b. Silver-white stripe on the side of body; end of premaxillary extends beneath posterior end of pupil ..... *P. cottooides*

### Systematic Accounts

Order Scorpaeniformes  
Suborder Cottoidei  
Family Cottidae  
Genus 1. **Cottus** Linnaeus, 1758

#### 1. **Cottus czerskii** Berg, 1913

*Cottus czerskii* Berg, 1913. p. 17(type locality: Vladivostok); Mori, 1952, p. 161(Tumen R.).

No specimens examined.

Distribution: N. Korea (Tuman River) and Japan.

#### 2. **Cottus poecilopus** Heckel, 1836 (Pl. 1A)

*Cottus poecilopus* Heckel, 1836. p. 145 (Type locality: Vistula, Hungary): Mori, 1952, p. 161(Rivers of the Yalu, Chongchon, Taedong and Han).

*Cottus poecilopus volki* Berg, 1965. p. 228(Yalu R.)

**Materials:** 1 specimen, SL. 60.6 mm, St. 29, Apr. 4, 1977; 4 specimens, SL. 47.3-56.3 mm, St. 38, Aug. 1, 1983; 3 specimens, SL. 51.0-53.6 mm, St. 37, May 30, 1992; 9 specimens, SL. 51.0-53.6 mm, St. 37, May 30, 1992; 9 specimens, SL. 58.1-104.4 mm, St. 36, May 29, 1992.

**Distribution:** Korea, Arctic Ocean Basin, Southern Norway, Baltic Sea Basin, Basin of Danube and Dniester, and Amur

**Remarks:** Berg(1965) reported that the present specimens of Korea may be *Cottus poecilopus volki*, however we could not observed the narrow patch of teeth on the palatines in the Korean specimens and the specimens agree well with the original description of *C. poecilopus*.

#### 3. **Cottus hangiongensis** Mori, 1930 (Pl. 1B)

*Cottus hangiongensis* Mori, 1930. p. 39. (Type locality: Kai-nei, Tuman R.).

**Materials:** 6 specimens, SL. 46.3-55.5 mm, St. 7, Jun. 27, 1984; 1 specimen, SL. 80.7 mm, St. 10, Jun. 21, 1975; 11 specimens, SL. 45.2-78.7 mm, St. 11, Nov. 10, 1991.

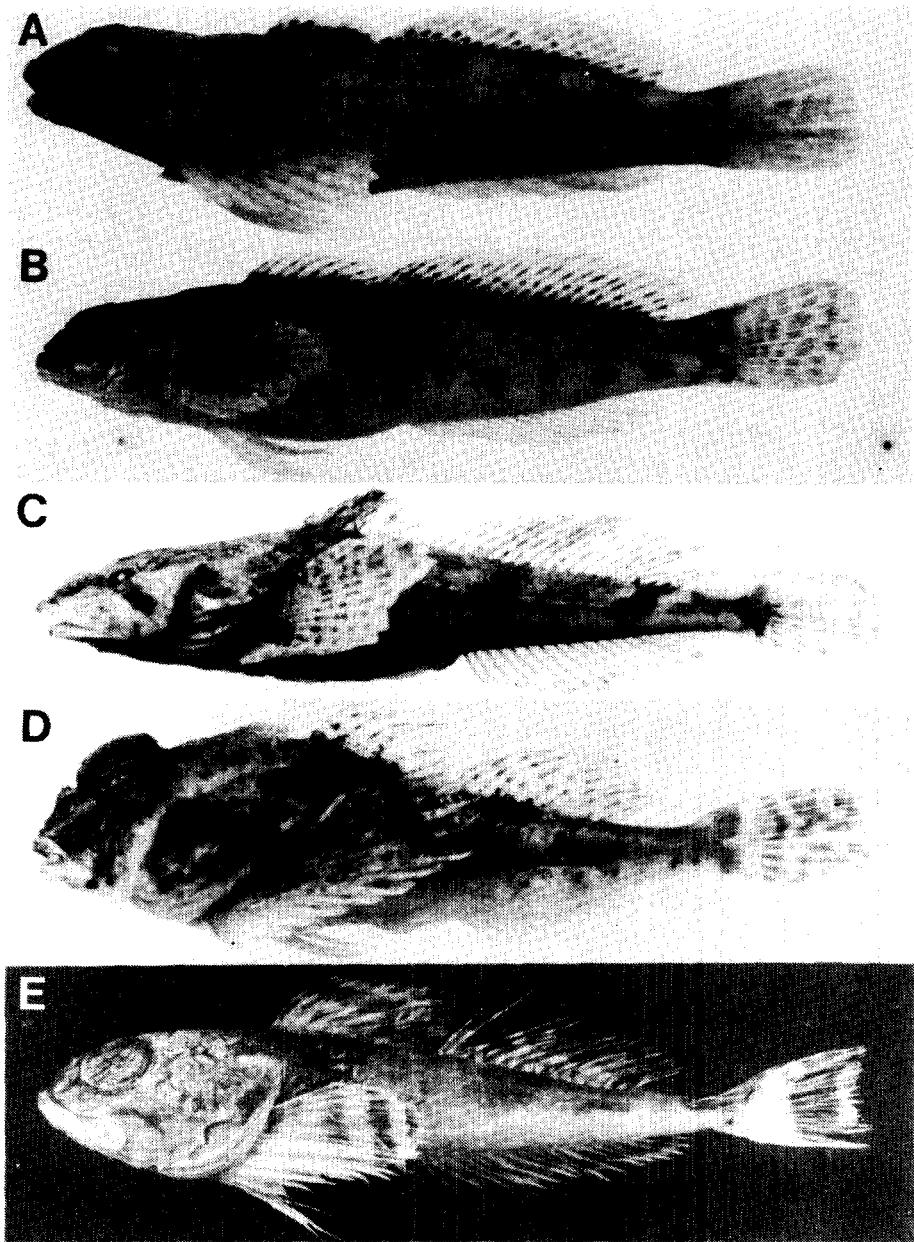


Plate 1. A; *Cottus poecilopus* Heckel, 56.3 mm SL, B; *Cottus hangiongensis* Mori, 55.0 mm SL, C; *Trachidermus fasiatus* Heckel, 72.5 mm SL, D; *Enophrys diceraus* (Pallas), 68.3 mm SL, E; *Gymnocaanthus herzensteini* Jordan et Starks, 185.5 mm SL.

**Distribution:** Korea and Hokkaido.

**Remarks:** The present species inhabit lower courses of the rivers, but *C. pocilopus* occurs the fresh waters of the upper and middle courses in the rivers flowing in the East Sea of Korea.

Genus 2. ***Trachidermus*** Heckel, 1840

4. ***Trachidermus fasciatus*** Heckel, 1840 (Pl. 1C)

*Trachidermus fasciatus* Heckel, 1840. p. 160 (Type locality: Philippines); Mori, 1952. p. 161 (Seoul, Uiju, Pyongyang, Chemulpo).

**Materials:** 3 specimens, SL. 69.6-96.5 mm, St. 32, May 22, 1985; 1 specimen, SL. 100.4 mm, St. 33, Sep. 28, 1988; 9 specimens, SL. 69.7-112.0 mm, St. 35, Oct. 25, 1989; 6 specimens, SL. 56.5-64.6 mm, St. 25, Jun. 25, 1988; 4 specimens, SL. 47.2-55.3 mm, St. 34, Aug. 13, 1991; 2 specimens, SL. 100.0-100.2 mm, St. 31, Feb. 10, 1985; 7 specimens, SL. 35.8-41.6 mm, St. 30, Feb. 10, 1986; 5 specimens, SL. 30.4-52.6 mm, St. 28, Jul. 5, 1986.

**Distribution:** Western and Southern Korea, Japan, and China.

**Remarks:** The present species collected at the western coast and the southern coast of Korea, but not collected at the eastern coast of Korea.

Genus 3. ***Enophrys*** Swainson, 1939

5. ***Enophrys diceraus*** (Pallas), 1783 (Pl. 1D)

*Cottus diceraus* Pallas, 1783, p. 354. (Type locality: Kamchatka)

*Enophrys claviger* Jordan et Gilbert, 1883, p. 711.

*Ceratocottus diceraus* Jordan et Starks, 1904. p. 258; Chyung, 1977. p. 543

*Enophrys diceraus* Masuda *et al.*, 1984. P. 328; Lindberg and Krasyukova, 1987. p. 229.

*Ceratocottus diceraus namiyei* Chyung, 1977. p. 542

**Materials:** 2 specimens, SL. 68.3-103.3 mm, St. 1, Jul. 1, 1991; 5 specimens, SL. 95.3-114.1 mm, St. 2, Jul. 2, 1991; 2 specimens, SL. 102.0-102.4 mm, St. 5, Oct. 10, 1991; 4 specimens, SL. 98.7-112.9 mm, St. 2, Oct. 10, 1991; 5 specimens, SL. 98.7-112.9 mm, St. 2, Oct. 10, 1991; 5 specimens, SL. 88.2-96.5 mm, St. 1, Oct. 10, 1991.

**Distribution:** Korea (east coast), Japan (Hokkaido), Okhotsk, and Bering Sea.

**Remarks:** *Ceratocottus diceraus namiyei* and *C. d. diceraus* are a junior synonym of *Enophrys diceraus* (Watanabe, 1978).

Genus 4. ***Gymnophanthus*** Swainson, 1839

6. ***Gymnophanthus herzensteini*** Jordan et Starks, 1904 (Pl. 1E)

*Gymnophanthus herzensteini* Jordan et Starks, 1904. p. 294 (Type locality: Hakodate, Hokkaido); Mori, 1952. p. 163 (Chongjin); Chyung, 1977 (Wonsan).

**Materials:** 7 specimens, SL. 144.0-185.5 mm, St. 9, Nov. 25, 1989; 4 specimens, SL. 190.7-245.8 mm, St. 2, Jan. 24, 1992.

**Distribution :** Korea (east coast), Japan, and the Okhotsk sea.

7. ***Gymnocanthus intermedius*** (Sechlegel), 1843 (Pl. 2A)

*Cottus intermedius* Schlegel, 1843 (in Temminck and Schlegel) p. 38 (Type locality Coast of Jezo, Japan)

*Gymnocanthus intermedius* Jordan et Starks, 1904. p. 292 ; Jordan and Metz, 1913. p. 52 (Pusan) ; Mori, 1952, pp. 162-163 (Chongjin).

*Gymnocanthus ventralis* Chyung, 1977. p. 534.

**Materials :** 7 specimens, SL. 116.5-150.5 mm, St. 4, Nov. 7, 1990 ; 8 specimens, SL. 129.7-150.9 mm, St. 9, Jul. 1, 1991 ; 3 specimens, SL. 126.4-138.8 mm, St. 12, Jul. 1, 1991 ; 2 specimens, SL. 103.5-113.0 mm, St. 13, Jul. 3, 1991 ; 3 specimens, SL. 122.4-145.6 mm, St. 5, Oct. 10, 1991 ; 12 specimens, SL. 109.3-130.8 mm, St. 1, Oct. 10, 1991 ; 3 specimens, SL. 134.7-145.4 mm, St. 10, Oct. 10, 1991 ; 1 specimen, SL. 134.7-145.4 mm, St. 10, Oct. 10, 1991 ; 1 specimen, SL. 140.1 mm, St. 2, Feb. 24, 1992.

**Distribution :** Korea(east coast), and northern Sea of Japan.

8. ***Gymnocanthus pistilliger*** (Pallas), 1814

*Cottus pistilliger* Pallas, 1814. p. 43 (Type locality : Unalaska).

*Gymnocanthus pistilliger* Jordan et Starks, 1904. p. 291 ; Chyung and Kim, 1959, pp. 2-10 (Pusan).

**No specimens examined**

**Distribution :** Korea (Pusan), Japan, and Gulf of Alaska.

Genus 5. ***Porocottus*** Gill, 1895

9. ***Porocottus tentaculatus*** (Kner), 1868

*Cottus tentaculatus* Kner, 1868. p. 28. (Type locality : Hakodate)

*Crossias alliti* Mori, 1952. p. 163.

*Crossias tentaculatus* Matsubara, 1955. p. 1153 ; Chyung, 1977. p. 535.

*Porocottus tentaculatus* Masuda *et al.*, 1984. p. 327 ; Lindberg and Krasyukova, 1987. p. 224.

**No specimens examined**

**Distribution :** Korea and the northern sea of Japan.

Genus 6. ***Ainocottus*** Jordan et Starks, 1904

10. ***Ainocottus ensiger*** Jordan et Starks, 1904

*Ainocottus ensiger* Jordan et Starks, 1904. p. 283 (Type locality : Hakodate, Japan).

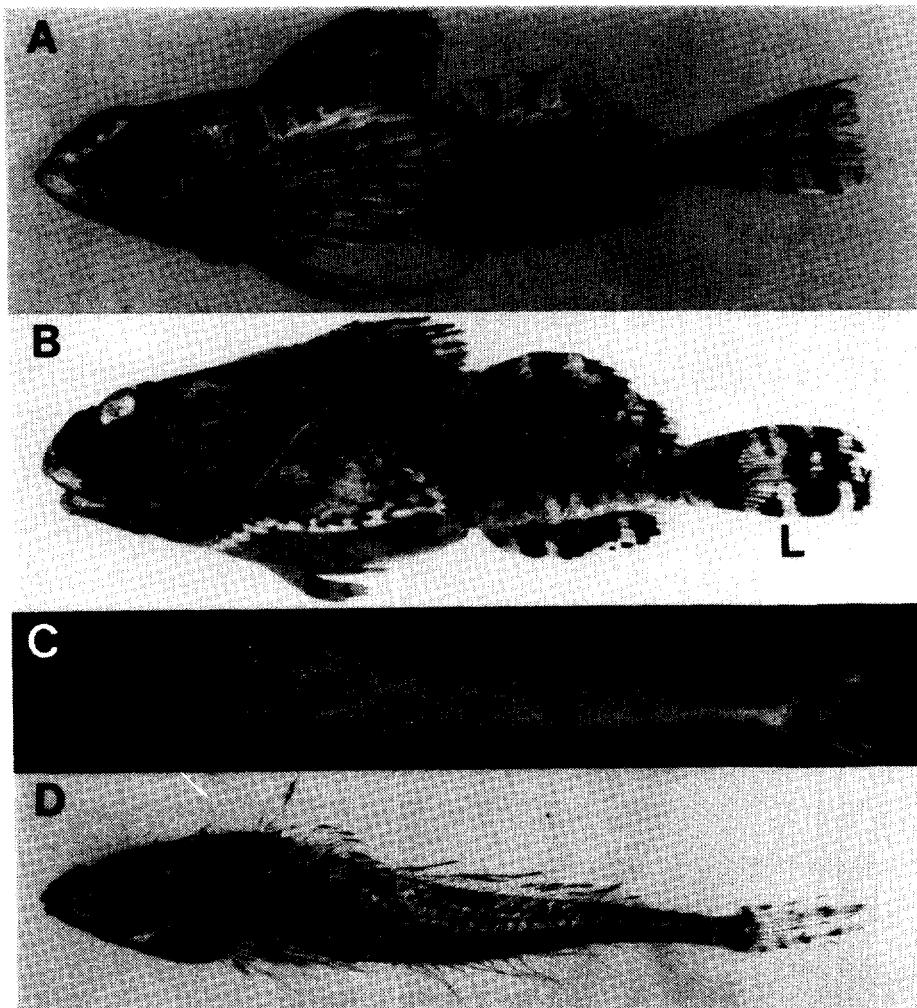


Plate 2. A; *Gymnoanthus intermedius* (Cuvier et Valenciennes), 150.5 mm, SL, B; *Myoxocephalus stelleri* Tilesius, 174.1 mm SL, C; *Triglops jordani* (Schmidt), 105.5 mm SL, D; *Icelus cataphractus* Pavlenko, 110.4 mm SL.

No specimens examined

Distribution: Korea, the northern sea of Japan, and Okhotsk Sea.

Genus 7. ***Myoxocephalus*** Tilesius, 1811

11. ***Myoxocephalus jaok*** (Cuvier et Valenciennes), 1829

*Cottus jaok* Cuvier et Valenciennes, 1829. p. 172. (Type locality: Kamchatka)

*Myoxocephalus jaok* Mori, 1952. p. 161 (Tumen R.)

*Myoxocephalus jaok jaok* Chyung, 1979. p. 532.

*Myoxocephalus jaok edomius* Chyung, 1979. p. 532.

**No specimens examined**

**Distribution :** Korea, Japan, and Bering Sea.

12. ***Myoxocephalus stelleri*** Tilesius, 1811. (Pl. 2B)  
(New korean name ; Kaeguri-ggogjungi)

*Myoxocephalus stelleri* Tilesius, 1811. p. 273 (Type locality : Kamchatka).

**Materials :** 6 specimens, SL. 127.9-238.2 mm, St. 1, Jul. 1, 1991; 1 specimen, SL. 174.1 mm, St. 6, Nov. 10, 1991; 4 specimens, SL. 164.3-192.3 mm, St. 1, Nov. 10, 1991.

**Description :** D; VIII-X, 12-13, A; 10-11, P; 17-18, Vert; 33-36, L.L; 34-36.

Head length 2.18-2.40 in standard length; from tip of mouth to anus 1.59-1.75; eye diameter 6.1-7.8 in head length; interorbital width 5.5-7.0; caudal peduncle length 3.2-3.9; length of pectoral fin 1.6-2.2.

Body fusiformed, head more or less depressed; very short one pairs of dermal fringe at postoccipital region; preopercle spines have three spines, uppermost one straighted and short. Maxillary slightly protracted more than mandible. Palatines without teeth, jaws and vomer with teeth, length of 1-2 spines of dorsal short than 4-6 spines. Entire body pale black, ventral region of isthmus and anus light yellow. Ventral region have slightly light yellow circle larger than eye diameter.

Four pale blackish vertical stripe present at the side of body.

**Distribution :** Japan, Okhotsk, and the East of Korea.

**Remarks :** The present species have some problems in using the scientific name. But in this paper *Myoxocephalus stelleri* is presented for the scientific name according to Lindberg and Krasyukova (1987) and Masuda *et al.*(1984).

Genus 8. ***Triglops*** Reinhardt, 1832  
13. ***Triglops pingeli*** Reinhardt, 1838

*Triglops pingeli* Reinhardt, 1838. p. 114 (Type locality : Aleutian Isl and Bristol Bay).

*Triglops beani* Mori, 1952. p. 166(Wonsan): Chyung, 1977. p. 541 (Chongjin).

**No specimens examined**

**Distribution :** Korea, Japan, and Bering Sea.

14. ***Triglops scepticus*** Gilbert, 1893

*Triglops scepticus* Gilbert. 1893. p. 428 (Type locality: Aleutian Isl.); Mori, 1952. p. 166(Wonsan).

**No specimens examined**

**Distribution:** Korea, Japan, and Bering Sea.

15. ***Triglops jordani*** (Schmidt), 1902. (Pl. 2C)

(New Korean name; Jordan-hotdae)

*Elanura jordani* Schmidt, 1902. p. 518. (Type locality: Vladivostok, Aniva Bay, Sagkalin)  
*Triglops jordani* Jordan, Tanaka, and Snyder, 1913. p. 259 (In Lindberg and Krasyukova, 1987).

**Materials:** 1 specimens, SL. 105.5 mm, St. 9, Jan. 25, 1992.

**Description:** D; X, 26, A; 28, P; 20, L.L; 49, Vert; 48.

Head length 3.73 in standard length, body depth 7.85, snout length 4.36 in head length, eye diameter 3.63, interorbital width 9.24, caudal peduncle length 2.57.

Body very elongated, no dermal fringe at head; preopercle consist of four small soft spines; dorsolateral region densely covered with small scales. Lateral and ventral region to the base of anal fin arranged with oblique folds. Lateral line have a row of small bony scales. Dorsal fins clearly separated into spinous and soft ray part. Caudal fin deeply forked. Gill membrane separated into the isthmus, forming fold. Vomer with teeth.

Color in formalin pale grey besides ventral region. In ventrolateral region, about 8 vertical black band present.

**Distribution:** Korea, Japan, and Bering Sea.

**Remarks:** This species is recorded for the first time from Korea and here described it.

Genus 9. ***Vellitor*** Jordan et Starks, 1904

16. ***Vellitor centropomus*** (Richardson). 1850

*Podabrus centropomus* Richardson, 1850. p. 11. (Type locality: Misaki, Tokyo)

*Vellitor centropomus* Jordan et Starks. 1904. p. 319; Mori, 1952. p. 164(Pohang); Iwata, 1983. pp. 1-9.

**No specimens examined**

**Distribution:** Korea and Japan.

Genus 10. ***Icelus*** Kroyer, 1845

17. ***Icelus cataphractus*** Pavlenko, 1910. (Pl. 2D)

*Agonocottus cataphractus* Pavlenko, 1910. p. 23.

*Icelus spiniger* Jordan et Starks, 1904. p. 246; Mori 1952. p. 166.

*Icelus spiniger spiniger* Chyung, 1977. p. 542(Wonsan, Chongjin).

*Icelus spiniger cataphractus* Lindberg and Krasyukova, 1987. pp. 190-191.

*Icelus cataphractus* Masuda et al., 1984. p. 324.

**Materials:** 2 specimens, SL. 107.9-110.4 mm, St. 9, Nov. 25, 1989; 7 specimens, SL. 100.5-108.6 mm, St. 2, Nov. 16, 1991; 1 specimen, SL. 143.6 mm, St. 1, Nov. 16, 1991.

**Distribution:** Korea, Japan, and Okhotsk coast.

**Remarks:** Two pairs of well developed spines present on postoccipital region.

18. ***Icelus uncinalis*** Gilbert et Burke, 1910

*Icelus uncinalis* Gilbert et Burke, 1910. p. 39 (Type locality : Commander Island); Mori, 1952. p. 166.

*Icelus uncinalis uncinalis* Matsubara, 1979. p. 1139; Chyung. 1977. p. 542.

**No specimens examined**

**Distribution:** Korea, Bering Sea, and Okhotsk Sea.

19. ***Icelus ochotensis*** Schmidt, 1927 (Pl. 3A)

(New Korean name ; Hug-jomjul-gasihoetdae)

*Icelus ochotensis* Schmidt, 1927. p. 1; Masuda et al., 1984.

*Icelus spatula ochotensis* Schmidt, 1927. p. 1; Masuda et al., 1984.

*Icelus spatulaochotensis* Matsubara, 1979. p. 1139

**Materials:** 6 specimens, SL. 72.6-120.9mm, St. 9, Jan. 25, 1992.

**Description:** D; II X-IX, 16-18, A; 13-14, P; 16-17, L. L; 40-42, Vert; 37-38.

Head length 2.69-3.01 in standard length, body depth 4.8-6.41, snout length 5.69-6.72 in head length, eye diameter 2.89-3.57, caudal peduncle length 1.54-1.83, caudal peduncle depth 6.1-8.48.

Body fusiformed; no dermal fringe at occipital region and the side of body, one pair of spines present on nasal region and postoccipital region; preopercle consists of 4 spines, the terminal of uppermost one divided into two part. From posterior of gill membrane to caudal peduncle and lateral line covered with several rows of bony scales with small sharp spine at its terminal. The posterior end of mandible reached slightly behind center of eye. Vomer and palatine with teeth; mandible protracted than maxillary. Gill membrane free from isthmus, make folding. Dorsal fins clearly separated into spinous and soft rays part. In male, slightly small cornical sexual organ longer than eye diameter protracted externally.

Besides occipital region and ventral region grey. Besids anal fin and ventral fin, and all fins with several black band spots.

**Distribution:** Korea and Okhotsk Sea.

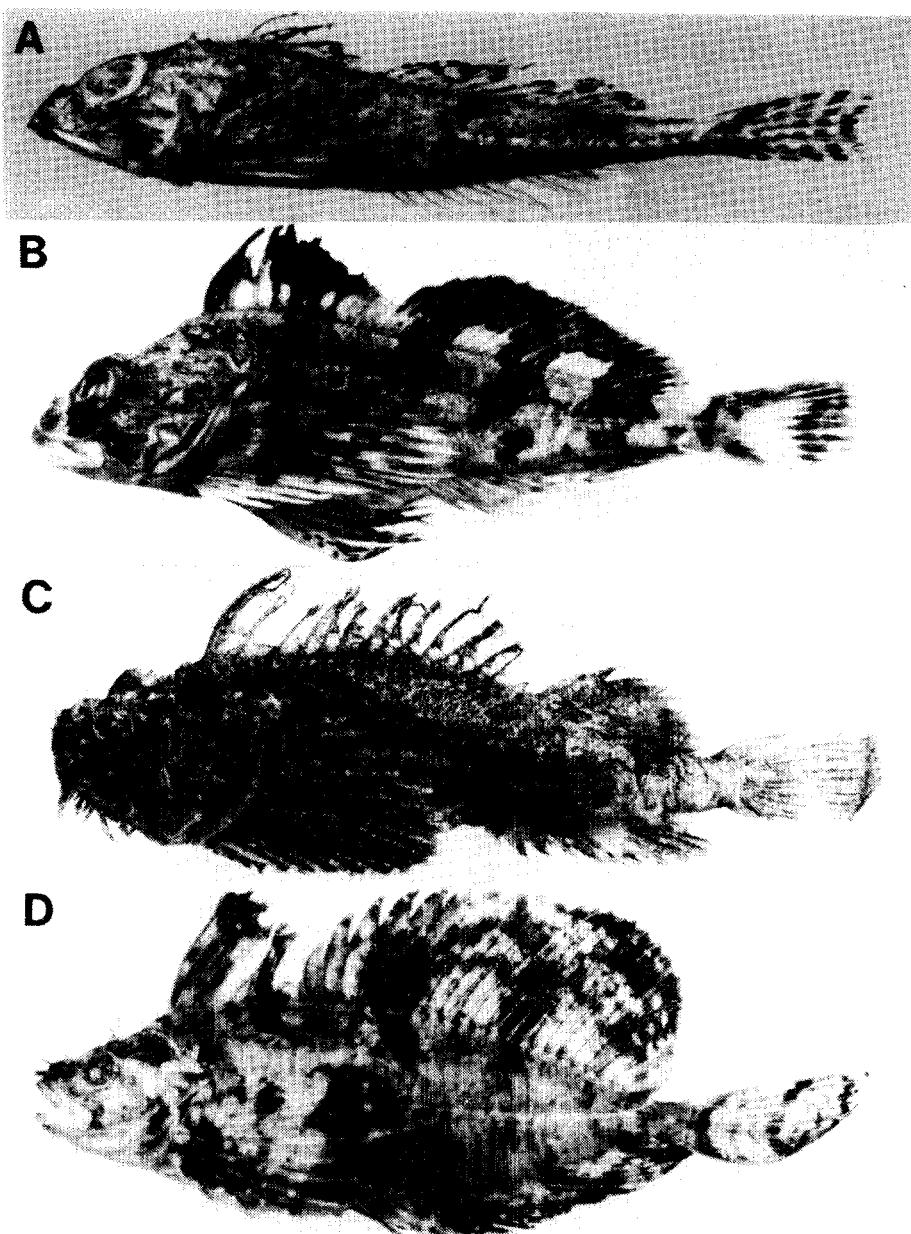


Plate 3. A; *Icelus ochotensis* Schmidt, 72.6 mm, SL. B; *Hemilepidotus gilberti* Jordan et Starks, 117.8 mm SL, C; *Hemitripterus villosus* (Pallas), 155.3 mm SL, D; *Blepsias cirrhosus* (Pallas), 155.3 mm SL, D; *Blepsias cirrhosus* (Pallas), 166.8 mm SL.

Genus 11. ***Hemilepidotus*** Cuvier, 1829

20. ***Hemilepidotus gilberti*** Jordan et Starks, 1904

*Hemilepidotus gilberti* Jordan et Starks. 1904. p. 254 (Type locality; Hakodate); Mori, 1952. p.

165 (Tumen R.).

**Materials**: 6 specimens, SL. 102.2-117.8 mm, St. 1, Oct. 10, 1991.

**Distribution**: Korea, Hokkaido of Japan, and Bering Sea.

Genus 12. ***Ricuzenius*** Jordan et Starks, 1904

21. ***Ricuzenius pinetorum*** Jordan et Starks, 1904

*Ricuzenius pinetorum* Jordan et Starks, 1904. p. 243 (Type locality: Matsushima Bay); Mori, 1952. p. 165 (Wonsan).

**No specimens examined**

**Type locality**: Matsushima Bay.

**Distribution**: Korea and Japan.

Genus 13. ***Hemitripterus*** Cuvier, 1820

22. ***Hemitripterus villosus*** (Pallas), 1811 (Pl. 3C)

*Cottus villosus* Pallas, 1811. P. 129. (Type locality: Hakodate)

*Hemitripterus villosus* Jordan et Starks, 1904. p. 326; Mori, 1952. p. 168 (Songjin, Chinnampo).

**Materials**: 1 specimen, SL. 155.3 mm, St. 12, Jul. 2, 1991; 1 specimen, SL. 169.3 mm, St. 2, Oct. 10, 1991; 1 specimen, SL. 162.9 mm, St. 1, Jul. 1, 1991; 3 specimens, SL. 180.5-200.7 mm, St. 1, Oct. 10, 1991; 1 specimen, SL. 141.2 mm, St. 10, Oct. 10, 1991.

**Distribution**: Korea, the northern of the Japan, and Bering Sea.

Genus 14. ***Blepsias*** Cuvier, 1829

23. ***Blepsias cirrhosus*** (Pallas), 1814 (Pl. 3D)

*Trachinus cirrhosus* Pallas, 1814. p. 237 (Type locality: Aomori, Hakodate)

*Blepsias cirrhosus draciscus* 1929. p. 397.

*Blepsias draciscus* Mori, 1952. p. 167 (Chongjin).

*Blepsias cirrhosus* Masuda *et al.*, 1984. p. 323.

**Materials**: 1 specimen, SL. 166.8 mm, St. 8, May 17, 1991; 1 specimen, SL. 172.0 mm, St. 1, Jul. 1, 1991; 2 specimens, SL. 154.2-171.8 mm, St. 3, Jul. 1, 1991; 1 specimen, SL. 165 mm, St. 1, Nov. 16, 1991.

**Distribution**: Korea, the northern of Japan, and the eastern of North Pacific.

24. ***Blepsias bilobus*** Cuvier et Valenciennes, 1829

*Blepsias bilobus* Cuvier et Valenciennes, 1829. p. 379 (Type locality: Kamchatka).  
*Histiocottus bilobus* Mori, 1952. p. 167 (Chongjin).

**No specimens examined**

**Distribution:** Korea, the northern of Japan, and the eastern of North Pacific.

Genus 15. ***Taurocottus*** Soldatov et Pavlenko, 1915

25. ***Taurocottus bergi*** Soldatov et Pavlenko, 1915 (Pl. 4A)  
(New Korean name: Songgot-hoetdae)

*Taurocottus bergi* Sodatov et Pavlenko, 1915. p. 149.

**Materials:** 1 specimen, SL. 115.3 mm, St. 2. Jul. 1, 1991; 1 specimen, SL. 152.8 mm, St. 6, Nov. 10, 1991; 1 specimen, SL. 139.5 mm, St. 2, Nov. 11, 1991.

**Description:** D; X, 12-14, A; 9-10, P; 18-19, Vert; 35, L. L; 25-36.

Head length 2.17-2.48 in standard length, from tip of mouth to anus 1.70-1.80, length of maxillary 2.41-2.59 in head length, eye diameter 4.71-5.50, interorbital width 9.84-10.42, caudal peduncle length 2.45-2.99.

Body fusiformed, head slightly depressed. One pairs of dermal fringe present on nasal region and cheek, several pairs of dermal fringe present on side of body. Protracted mandible than maxillary; preopercle consist of three spines, long uppermost one stretched backward; vomer and palatine with teeth.

Color on head and ventral region is dark brown. Dorsal spines, dorsal soft rays and caudal peduncle part have broadly drak brown spots. Besides ventral fin and anal fin, and all fins have horizontal row of spots.

**Distribution:** Korea, Hokkaido of Japan, and Okhotsk Sea.

**Remarks:** This species is reported for the first time from Korea.

Genus 16. ***Alcichthys*** Jordan et Starks, 1904

26. ***Alcichthys alcicornis*** (Herzenstein), 1890 (Pl. 4B)

*Centridermichthys alcicornis* herzenstein, 1890. p. 115 (Type locality: Hakodate).  
*Alcichthys alcicornis* Mori, 1952. p. 165(Chongjin)

**Materials:** 1 specimen, SL. 190.5 mm, St. 9, Nov. 25, 1989; 2 specimens, SL. 141.2-183.4 mm, St. 4, Nov. 9, 1990; 3 specimens, SL. 126.5-146.8 mm, St. 1, Jul. 1, 1991; 1 specimen, SL. 196.8 mm, St. 9, Jul. 2, 1991; 4 specimens, SL. 102.1-191.2 mm, St. 2, Oct. 10, 1991; 2 specimens, SL. 92.8-93.1 mm, St. 13, Oct. 10, 1991.

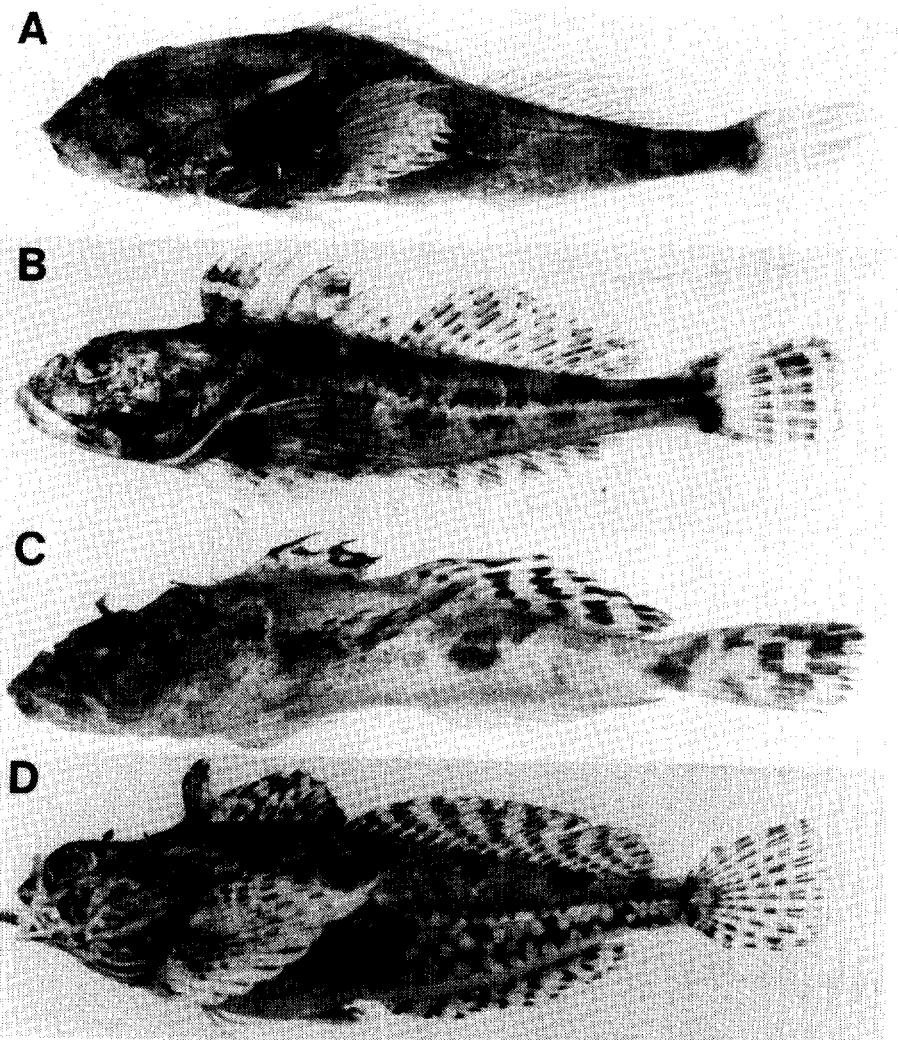


Plate 4. A; *Taurocattus bergi* Soldatov et Pavlenko, 115.3 mm SL, B; *Alcichthys alcicornis* (Herzenstein), 190.5 mm SL, C; *Cottiusculus schmidti* Jordan et Starks, 77.0 mm SL, D; *Furcina oshimae* Jordan et Starks, 75.3 mm SL.

**Distribution:** Korea, Japan and Okhotsk Sea.

Genus 17. ***Cottiusculus*** Schmidt, 1904

27. ***Cottiusculus gonez*** Schmidt, 1904

*Cottiusculus gonez* Schmidt, 1904. (Type locality: Peter the Great Bay); Mori, 1952. p. 167(Chongjin).

**No specimens examined**

**Distribution:** Korea, Japan, and Russia.

28. ***Cottiusculus schmidti*** Jordan et Starks, 1904(Pl. 4C)

*Cottiusculus schmidti* Jordan et Starks, 1904. p. 299(Type locality: Matsushima Bay.); Mori, 1952. p. 167 (Chongjin).

**Materials:** 1 specimen, SL. 77.0 mm, St. 19, Aug. 3, 1991.

**Distribution:** Korea, Japan, and the Okhotsk Sea.

Genus 18. ***Furcina*** Jordan et Starks, 1904

29. ***Furcina oshimae*** Jordan et Starks, 1904 (Pl. 4D)

*Furcina oshimae* Jordan et Starks, 1904. p. 350 (Type locality: Hakodate); Mori, 1952. p. 163(Pusan).

**Materials:** 4 specimens, SL. 427-75.3 mm, St. 17, Aug. 10, 1986; 7 specimens, SL. 32.6-48.3 mm, St. 16, Aug. 4, 1986; 2 specimens, SL. 54.0-54.3 mm, St. 20, Oct. 4, 1986; 6 specimens, SL. 35.5-41.3 mm, St. 26, Aug. 5, 1986.

**Distribution:** Korea and Japan.

30. ***Furcina ishikawae*** Jordan et Starks, 1904

*Furcina ishikawae* Jordan et Starks, 1904. p. 303 (Type locality: Myiako, Hakodate); Mori, 1952. p. 163 (Pusan).

**No specimens examined**

**Distribution:** Korea and Japan.

Genus 19. ***Ocynectes*** Jordon et Starks, 1904

31. ***Ocynectes maschalalis*** Jordan et Starks, 1904 (Pl. 5A)

*Ocynectes maschalalis* Jordan et starks, 1904. p. 307 (Type locality: Enoshima, Wakanoura).

**Materials:** 3 specimens, SL. 31.5-35.1 mm, St. 26, Aug. 5, 1986; 5 specimens, SL. 40.7-58.7 mm, St. 15, Aug. 11, 1986.

**Distribution:** Korea and Japan.

Genus 20. ***Bero*** Jordan et Starks, 1904

32. ***Bero elegans*** (Steindachner), 1881 (Pl. 5B)

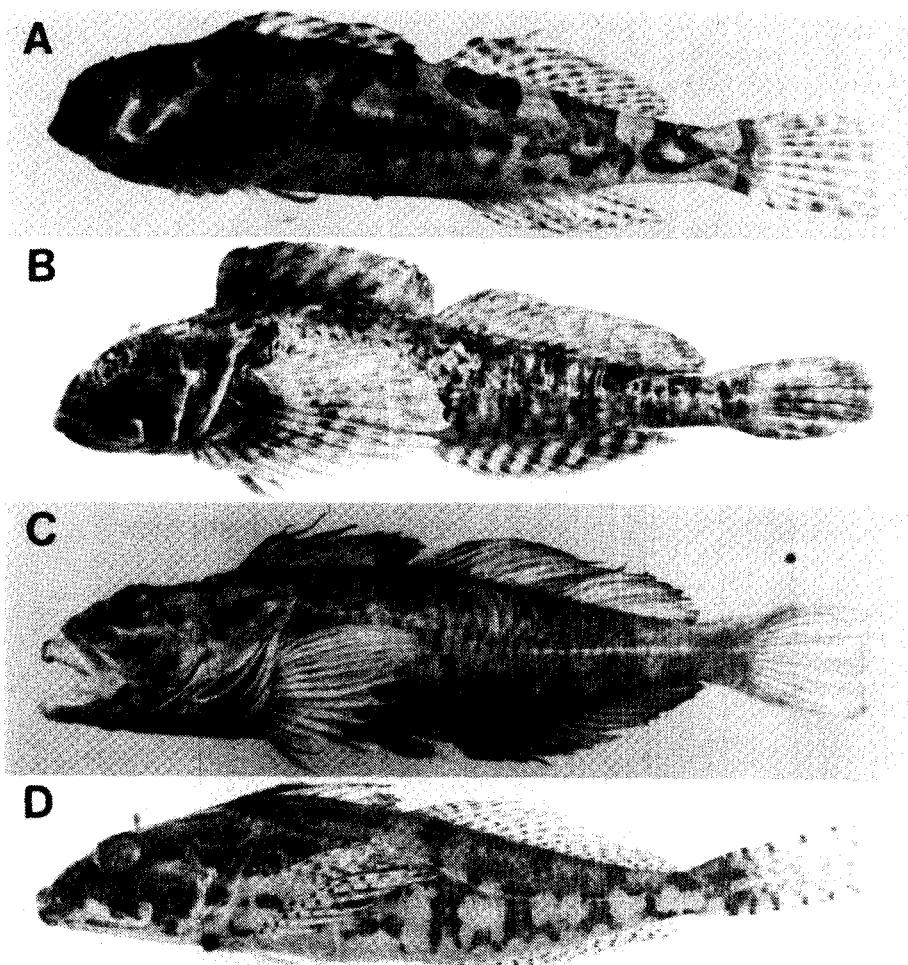


Plate 5. A ; *Ocynectes maschalis* Jordan et Starks, 35.1 mm SL, B ; *Bero elegans* (Steindachner), 194.9 mm SL, C ; *Pseudoblennius zonostigama* Jordan et Starks, 123.0 mm SL, D ; *Pseudoblennius cottoides* (Richardson), 146.8 mm SL.

*Centridermichthys elegans* Steindachner, 1881. p. 7 (Type locality: Strielok, near Vladivostock)  
*Bero elegans* Jordan et Starks, 1904. p. 317; Mori, 1952. p. 164 (Chemulpo).

**Materials** : 2 specimens, SL. 131.1-194.9 mm, St. 14, Jul. 1, 1991 ; 4 specimens, SL. 112.9-190.1 mm, St. 1, Nov. 16, 1991.

**Distribution** : Korea, Japan, and the Peter the Great Bay.

Genus 21. ***Pseudoblennius*** Schlegel, 1850

33. ***Pseudoblennius marumoratus*** (Doderlein), 1884

*Centridermichthys marmoratus* Doderlein, 1884. p. 210 (Type locality: Misaki)

*Pseudoblennius marumoratus* Jordan et Starks, 1904. p. 314; Mori, 1952. p. 164 (Pusan).

**No specimens examined.**

**Distribution:** Korea and the southern of Japan.

34. ***Pseudoblennius zonostigma*** Jordan et Starks, 1904. (Pl. 5C)  
(New Korean name ; Tti-jom-hoetdae)

*Pseudoblennius zonostigma* Jordan et Starks, 1904. p. 312 (Type locality : Misaki).

**Materials:** 5 specimens, SL. 105.7-123.0 mm, St. 27, Aug. 3, 1986.

**Description:** D; IX-X, 17-18, A; 15-16, P; 15, L. L; 39-41, Vert; 36-38.

Head length 2.59-2.65 in standard length, body depth 4.0-4.74, snout length 4.75-5.63 in head length, length of maxillary 2.25-2.73, eye diameter 4.81-5.20, interorbital width 5.16-7.16, caudal peduncle depth 4.34-6.14.

Body slightly compressed, head fusiformed. One pairs of small leaflike dermal fringe present on postoccipital region. No spine at nasal region ; preopercle spines does not wholely developed, even the uppermost one tiny. Vomer and palatine with teeth. Very dark black spots at front part and posterior part of dorsal spines. Male have sexual organ as larger as eye.

Color in formalin is wholely light brown ; the side of body have six and eighth slightly brown spots.

**Distribution:** Korea(Cheju-do) and the southern coasts of Japan.

**Remarks:** This species is reported for the first time from Korea.

35. ***Pseudoblennius percoides*** Günther, 1860

*Pseudoblennius percoides* Günther, 1860. p. 297 (Type locality : Tokyo, Matsushima); Mori, 1952. p. 164(Pusan).

**No specimens examined.**

**Distribution:** Korea and Japan

36. ***Pseudoblennius cottoides*** (Richardson), 1848 (Pl. 5D)

*Podubrus cottoides* Richardson, 1848. p. 13. (Type locality : Misaki)

*Centridermichthys japonicus* Steindachner, 1881. p. 187.

*Centridermichthys affinis* Steindachner et Doderlein, 1887. p. 257.

*Pseudoblennius coffoides* Jordon et Starks, 1904. p. 311

**Materials:** 3 specimens, SL. 75.4-146.8 mm, St. 14, Aug. 11, 1986; 3 specimens, SL. 116.4-120.

6 mm, St. 21, Nov. 19, 1989 ; 1 specimen, SL. 146.9 mm, St. 21, Feb. 10, 1989 ; 1 specimen, SL. 78.8 mm, St. 22, Aug. 12, 1987 ; 1 specimen, SL. 90.4 mm, St. 21, Jan. 25, 1989 ; 1 specimen, SL. 59.6 mm, St. 24, Aug. 11, 1987 ; 9 specimens, SL. 50.6-101.9 mm, St. 18, Jul. 4, 1991 ; 5 specimens, SL. 80.9-125.4 mm, St. 5, Oct. 10, 1991.

**Distribution:** Korea and Japan.

### Distribution of the Korean Cottid Species

Most species of the family Cottidae are typically marine fishes in cold waters of the Northern Pacific coastlines. A few freshwater members, mainly in the genus *Cottus*, whose species are also common in cold streams(Bond, 1979). This family includes about 300 species and 80 genera in the world(Nelson, 1984).

In Korean waters 36 species and 21 genera of the family Cottidae are known to distribute. This paper includes five species recorded for the first time in Korea. They are *Triglops jordani* (Schmidt), *Myoxocephalus stelleri* Tilesius, *Taurocottus bergi* Soldatov et Pavlenko, *Icelus ochotensis* Schmidt, and *Pseudoblennius zonostigma* Jordan et Starks.

*Vellitor centropomus* and *Pseudoblennius zonostigma* are distributed only in the southern coast of Korea and Japan (Masuda *et al.*, 1984), however, most cottid fishes are found along the north-eastern coast of Korea as shown in Table 1.

Many cottid fishes also occurred in the northern sea waters of Hokkaido, the Okhotsk Sea, and the Bering Sea (Masuda *et al.*, 1984). This distribution pattern seems to be related to the cold currents from the Okhotsk Sea of pacific-western boreal region between about 30°N to 35°N and about 42°N (Briggs, 1974). In this region, there are about 40 to 50 species of typical northern pacific fishes as the main resident species of the families Cottidae, Hexagrammidae, Pleuronectidae etc. (Briggs, 1974).

Although the scientific names of some cottid fishes were formerly designated as subspecies ranks in Korea such as *Triglops pingeli beani*, *Icelus uncinalis uncinalis*, *I. spiniger spiniger*, *Ceratocottus diceraus namiyei*, *C. d. dicerus*, *Blepsias cirrhosus draciscus*, *Myoxocephalus jaok jaok*, *M. j. edomius* (Mori, 1952; Chyung, 1977). they are elevated to the species level in this paper based on the fact that the subspecies taxa in the conspecific species occurred together in the North-cold temperate waters without the geographic subdibivisions.

Seven cottid fishes recorded from the east coast of North Korea (Mori, 1951) are newly known from the east coast of south Korea. They are *Gymnoanthus herzensteini*, *G. intermedius*, *Alcichthys alcicornis*, *Icelus spiniger*, *Blepsias cirrhosus*, *Hemitripterus villosus* and *Cottiusculus schmidti*. Although 3 species of *Furcina oshimaiae*, *Ocyneutes maschalalis* and *Pseudoblennius cottoides* have been reported only from the vicinity of Pusan (Mori, 1952), they are collected in the several other areas from the coast of Cheju-do Island to Kyongsangbuk-do province in the present study.

Table 1. Distribution of family Cottidae in the Korea and its adjacent waters

Species	Localifres		E	E	S	S	S	Y	J	H	O	B
	N	S	S	S	S	C	C	C	C	S	S	
	K	K										
1. <i>Cottus czerskii</i>			+									
2. <i>Cottus poecilopus</i>				+								
3. <i>Cottus hangiongensis</i>			+							+		
4. <i>Trachidermus fasiatus</i>					+	+		+				
5. <i>Enophrys diceraus</i>			+						+	+	+	+
6. <i>Gymnophathus herzensteini</i>			+						+	+	+	
7. <i>Gymnophathus intermedius</i>			+						+			
8. <i>Gymnophathus pistilliger</i>					+				+			+
9. <i>Porocottus tentaculatus</i>			+						+	+		
10. <i>Ainocottus ensiger</i>			+						+	+	+	
11. <i>Myoxocephalus jaok</i>			+						+	+	+	+
12. <i>Myoxocephalus stelleri</i>									+	+	+	+
13. <i>Triglops pingeli</i>			+						+			+
14. <i>Triglops scepticus</i>			+						+			+
15. <i>Triglops jordani</i>									+			+
16. <i>Vellitor centropomus</i>					+			+				
17. <i>Icelus cataphractus</i>				+					+	+	+	+
18. <i>Icelus uncinalis</i>			+						+	+	+	+
19. <i>Icelus ochotensis</i>									+	+		
20. <i>Hemilepidotus gilberti</i>	+	+							+			+
21. <i>Ricuzenius pinetorum</i>	+							+	+			
22. <i>Hemitripterus villosus</i>	+	+		+		+			+			
23. <i>Blepsias cirrhosus</i>	+								+			+
24. <i>Blepsias bilobus</i>	+								+			+
25. <i>Taurocottus bergi</i>									+			+
26. <i>Ichthys alcicornis</i>	+							+	+	+		
27. <i>Cottiusculus gonez</i>	+								+	+	+	+
28. <i>Cottiusculus schmidti</i>	+	+				+				+		
29. <i>Furcina oshimaiae</i>			+					+	+	+		
30. <i>Furcina ishikawai</i>			+					+	+	+		
31. <i>Ocynectes maschalis</i>			+					+				
32. <i>Bero elegans</i>			+					+	+	+		
33. <i>Pseudoblennius marumoratus</i>			+	+				+				
34. <i>Pseudoblennius zonostigma</i>				+				+				
35. <i>Pseudoblennius percoides</i>			+	+				+				
36. <i>Pseudoblennius cottoides</i>			+	+				+	+			

\* referred from Mori(1952) and \*\* referred from Masuda et al., 1984

ESNK: East Sea (N. Korea)\* ESSK: East Sea (S. Korea) SS: South Sea YS: Yellow Sea  
JC: Japan coast\*\* HC: Hokkaido coast\*\* OS: Okhotsk Sea\*\* BS: Bering Sea\*\*

The number of Korean cottid species seems to be smaller compared to about 80 cottid species of Japan. This is probably due to the fact that east coast of Korea is located geographically at the southern extremity of cold current of the Okhotsk Sea.

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韓國產 둑중개科 魚類

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1989年 부터 1992년 까지 우리나라 전 연안과 담수역에서 둑중개科 魚類의 표본을 채집하여 분류학적으로 검토하였다. 본 조사에서 채집된 21種을 포함하여 모두 21屬 36種의 屬 및 種으로 정리하고 이들의 屬과 種의 檢索表를 제시하면서 분류학적 위치와 미세분포를 기록하였다. 그 가운데 줄단 횟대 *Triglops jordani* (Schmidti), 개구리 횟대 *Myoxocephalus stelleri* Tilesius, 송곳횟대 *Taurocottus bergi* Solatov et Pavlenko, 흑점줄가시횟대 *Icelus ochotensis* Schmidt 및 띠점횟대 *Pseudoblennius zonostigma* Jordan et Starks의 5종은 韓國 未記錄種으로 그 형태적 특징을 再記載하였다. 둑중개科 魚類 가운데 *Furcina oshimaae*, *Ocynects maschalis* 및 *Pseudoblennius cottoides*의 3種을 재외한 대부분의 어류는 우리나라 동해연안의 中北部 沿岸에서 출현되었는데 이것 은 Okhotsk 한류의 영향과 관련되기 때문이라고 생각된다.