Taxonomic Review of Flathead Fishes (Platycephalidae, Scorpaeniformes) from Korea

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The taxonomic review of the family Platycephalidae from Korea was made based on the morphological characteristics of specimens collected in the Korean coasts from December 1987 to April 1998. The family Platycephalidae from Korea was classified into 10 species belonging to 7 genera: Onigocia macrolepis, O. spinosa, Rogadius asper, Sugu缀us meerdervoorti, Inego-cia japonica, I. guttata, Cociella crocodila, Ratabulus megacephalus, Platycephalus indicus and Platycephalus sp. Of them, Onigocia macrolepis was recorded for the first time in Korea and Platycephalus sp. was demanded to recheck its taxonomic position comparing with other Asian specimens in future.

A new key to the genera and species of the family Platycephalidae from Korea was reported, with description of their morphological characteristics and distribution.

Introduction

The flathead fishes were chiefly distributed in Indo-Pacific, eastern Atlantic and eastern Mediterranean, and were consisted of 17 genera (Imamura, 1996) and 60 species (Nelson, 1994). They are usually sluggish bottom-dwellers, spending most of their time on sea-floor of shallow or moderately deep waters not far from the shore (Matsubara and Ochiai, 1953). They are plentiful in Korean waters, some of them are valuable and popular food fishes in the fish markets for the Koreans.

The first report of the Korean flatheads was made in 1913 by Jordan and Metz, who reported 2 species and 2 genera without any description for them: Platycephalus indicus and Thysanophrys crocodilus (=Cociella crocodila). Mori (1952) and Chyung (1977) described that Platycephalidae from Korea was classified into 5 species belonging to 5 genera. Recently Jeon (1992) and Lee and Joo (1994, 1995) have added 3 species as new records of Korean flatheads: Sugu缀us meerdervoorti, Rogadius asper and Inegocia guttata. But flathead fishes from Korea did not study hitherto enough to their taxonomic status.

The flathead fishes largely differed from other by having the following characters: head much depressed and armed with strong spines, projected lower jaw than upper one, body surface covered with ctenoid scales, two dorsal fins, and iris lappet.

The aim of this study is to review morpholog-

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ical characters and their distribution of Korean flathead fishes, to add two species as a new record and *Platycephalus* sp. and to propose a new key of *Platycethalidae* from Korea. The examined specimens were collected in the coastal waters or fish–markets for small fishing boats of Korea from December 1987 to April 1998. And two species were used from National Fisheries Research Development Agency of Korea (NFRDA). The measurements and counts follow Hubbs and Lagler (1964). The counts of vertebrae and vertical fin rays were taken from skeletal specimens (Taylor, 1967) and radiograph. The collected sites and date, individual number and standard length of specimens were recorded at the examined materials of each species. The examined specimens were deposited at the Department of Biology, Kunsan National University (BKNU).

**Family Platycethalidae**

**Genus RogADIUS Jordan et Richardson**

(Korean name: Banul – Yangtæ – sok)

*Rogadius* Jordan et Richardson, 1908, 33: 630 (Type specimen: *Platycethalus asper* Cuvier et Valenciennes).

*Rogadius asper* (Cuvier et Valenciennes, 1829)

(Korean name: Banul – Yangtæ) (Fig. 1)

*Platycethalus asper* Cuvier et Valenciennes,

1829, p. 257, Japan (original description). *Rogadius asper* Jordan and Richardson, 1908, p. 63, fig. 1, Swatow, China (description); Lee and Joo, 1994, pp. 1–6, Pusan, Korea.


**Description**: Dorsal fin rays (D) I – VII – 11–12; anal fin rays (A) 11; pectoral fin rays (P̀) 20–23; ventral fin rays (P̄) 1, 5; pored scales of lateral line (LLP) 52–55; gill rakers (GR) 1+6–7=7–8; diagonal scales (DS) 7–11; vertebrae (Vert) 27.

Ocular cirrus absent; iris lapped bilobed, but never cirrosed. Anterior nostril with a dermal flap posteriorly. Preopercle armed with an antrose spine in lower face and 4 spines at angle, lowermost one usually rudimentary and uppermost one much longer than second one. Uppermost preopercular spine with a sharp accessory spine.

**Color in 10% formalin**: Head and body surface nearly yellow brownish, with 4 to 5 dark vertical bands or brownish, but belly pale. Caudal fin darkish, with 3 to 4 black bands.

**Distribution**: South Sea of Korea, Japan, China, Red Sea, Pakistan, Philippines and Australia.

**Remarks**: *Rogadius asper* was reported by Lee and Joo (1994), as a first record from Korea.

**Genus OnigOcia Jordan et Thompson, 1913**

(Korean name: Binul – Yangtæ – sok)

*Onigoca* Jordan et Thompson, 1913, p. 70 (original description, type specimen: *Platycethalus macrolepis* Bleeker).

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*Fig. 1. Rogadius asper* (Cuvier and Valenciennes), 180.5 mm SL.
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Fig. 2. *Onigocia spinosa* (Temminck and Schlegel), 109.2 mm SL

*Onigocia spinosa* (Temminck et Schlegel, 1842)

(Korean name: Binul – yangtae) (Fig. 2)

*Platyccephalus spinosus* Temminck et Schlegel, 1842, p. 40, pl. 16, figs. 1, 2, Nagasaki (original description).


**Description**: D I—VIII~IX—11~12 (rarely I~VIII—11~12); A 12; P 1 20~21; P 2 1, 5; L Lp 35~42; DS 5; GR 1+3~5=4~6; Vert. 27.

Ocular cirri present and largely developed. Iris lappet developed, bilobed and finely cirrrose. No pit behind eye. Anterior 10~16 pored lateral line scales quadrated and spined anteriorly. Interopercular flap absent. Perforating duct of scales robust, communicated with exterior through ends of 2 thick tubes.

**Color in 10% formalin**: Surface of body red~brownish, with 4 distinct dark brown bands vertically. All fins with brown spots except anal fin. Middle part of ventral blackish, and its margin yellowish. Caudal fin with about 4 vertical bands.

**Distribution**: South Sea of Korea, Japan, China and Taiwan.

**Remarks**: This species was used specimens collected at 1935, which were stored in National Fisheries Research Development Agency of Korea. *Onigocia spinosa* was frequently appeared on the coastal area of Japan.

**Onigocia macrolepis** (Bleeker, 1854)

(New Korean name: Kunbinul~Yangtae) (Fig. 3)

*Platyccephalus macrolepis* Bleeker, 1854, p. 399 (Original description, type locality: Nagasaki).

Fig. 3. *Onigocia macrolepis* (Bleeker), 104.0 mm SL


**Materials examined**: BKNU 4184~4186 (3), 78.6~104.0 mm SL, Nampo-dong, Chunggu, Pusan, Feb. 12, 1996.

**Description**: D I—VII~VIII—11~12; A 11~12; P 1 21; L Lp 39~40; GR 1+4~5=5~6; DS 4; Vert. 27.

Head and body depressed. Caudal peduncle slightly compressed. Eye large, but its diameter shorter than snout length. Side of head uicarinate. Upper side of head armed with a number of largely strong and somewhat blunt spines. Sides of head with one row of saw~like carinatus. Lower jaw slightly protruded than upper one. Tip of ventral fin reaching below base of about second soft ray of dorsal fin. Interopercular flap absent. Pored scales of lateral line with 39 to 40, and anterior 3 to 4 scales in lateral line spined. Scales large and deciduous. Antorbital margin armed with 3 antrorse strong spines. Iris lappet largely developed and bilobed with many cirri. Subor-
bital spino us ridge deeply incised below middle of eye.

**Color in 10% formalin**: Surface of body usually brown. Dorsal surface of body with about 4 to 5 indefinite and vertical dark brown bars. All fins with several dark crossing bands except anal fin. Ventral fin with numerous black spots. Posterior part of first dorsal fin membrane black.

**Distribution**: South Sea of Korea, Japan, China and Taiwan.

**Remarks**: *O. macrolepis* is reported for the first time in Korea. This species was very similar to *O. spinosa* in their morphology. But *O. macrolepis* is well distinguished from *O. spinosa* in having 3 to 4 spino us scales in lateral line (10 to 16 in *O. spinosa*), 4 scales above lateral line (3), 20 to 23 suborbital spines (25 to 31), deciduous scales of body surface (adhesive) and 2 anrorse spine at antorbital margin (3) (Table 1).

**Genus Ratabulus Jordan and Hubbs**

(Korean name: Bongori – Yangtae – sok)

*Ratabulus* Jordan and Hubbs, 1925, p. 286 (type by original description *Thysanophrys megacephalus* Tanaka).

**Ratabulus megacephalus** (Tanaka, 1917)

Korean name: Bongori – Yangtae) (Fig. 4)

*Thysanophrys megacephalus* Tanaka, 1917, p. 9, Tokyo market (original description).

*Ratabulus megacephalus* Jordan and Hubbs,

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**Table 1. Comparison of meristic characters and their proportional measurement between *Onigocia macrolepis* and *O. spinosa***

<table>
<thead>
<tr>
<th>Characters</th>
<th>Present study</th>
<th>Matsubara and Ochiai (1953)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>O. macrolepis</em></td>
<td><em>O. spinosa</em></td>
</tr>
<tr>
<td>Number of specimens</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Dorsal soft rays</td>
<td>11–12(11.67)</td>
<td>11–12(11.75)</td>
</tr>
<tr>
<td>Anal fin rays</td>
<td>11–12(11.76)</td>
<td>12(12)</td>
</tr>
<tr>
<td>Pectoral fin rays</td>
<td>21(21)</td>
<td>20–21(20.75)</td>
</tr>
<tr>
<td>Pored scales in lateral line</td>
<td>39–40(39.33)</td>
<td>39–40(39.33)</td>
</tr>
<tr>
<td>Spinous scales in lateral line</td>
<td>3–4(3.33)</td>
<td>10–16(11.50)</td>
</tr>
<tr>
<td>Scales above lateral line</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Number of suborbital spines</td>
<td>20–23(22)</td>
<td>25–31(27.00)</td>
</tr>
<tr>
<td>Preopercular spines</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Gill raker</td>
<td>14–5=5–6</td>
<td>13–5=4–6</td>
</tr>
</tbody>
</table>

In % to the standard length

| Head length                            | 2.72–2.85(2.77) | 2.66–2.75(2.68) | 2.76–3.10(2.91) | 2.21–2.89(2.55) |
| Body depth                             | 5.92–7.06(6.62) | 4.95–5.33(5.09) | 5.51–8.25(6.67) | 5.18–7.70(6.24) |
| Caudal penuncle depth                  | 17.75–19.80(18.46) | 18.52–19.50(19.07) | 15.80–21.60(17.60) | 15.00–20.50(17.71) |

In % to the head length

| Snout length                           | 3.76–4.08(3.89) | 3.58–3.71(3.65) | 3.38–4.54(3.64) | 3.00–4.50(3.77) |
| Eye diameter                           | 3.81–4.20(4.02) | 3.97–4.11(4.05) | 3.47–4.63(3.85) | 3.00–4.50(3.77) |
| Interorbital width                     | 10.78–12.49(11.61) | 12.91–14.44(13.67) | 9.86–16.00(11.92) | 11.26–18.50(13.92) |
Fig. 4. *Rotabulus megacephalus* (Tanaka), 180.7 mm SL.


**Description**: D I - VIII - I - 11; A 12; P 1 19-20; P 2 1, 5; GR 1+7=8; LLp 53-55; DS 14-16.

Eye very large, about 2.8 times of interorbital width. Iris lappet small, simple without cirrus. Interorbital region moderately concave, armed with a pair of posteriorly diverged longitudinal keels on each side of median line. A preocular spine in front of eye backward directed and stout. 3 prepercular spines, uppermost one much longer than others, lowermost one very small, immediately below middle one. Anterior 3 scales in lateral line with weak spines. Perforating duct of scales slender, and their length with about three times of its width, communicated with exterior through end of it. Scales small and adhesive.

**Color in 10% formalin**: Body surface brown or grayish brown. Back and sides of body inclusive of head specked with darker spots and crossed with defined broad dark bars. Pectoral fin rays with dark spots and with several distinct cross bars. Caudal and pelvic fin pale, with dark spots.

**Distribution**: South Sea of Korea, Japan, China and Taiwan.

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**Genus Suggrundus Whitley**

(Korean name: Kunnoon - Yangtae - sok)

*Suggrundus* Whitley, 1930, p. 26 (type species: *Platycephalus rudis* Günther).

**Suggrundus meerdervoorti** (Bleeker, 1860)

(Korean name: Kunnoon - Yangtae) (Fig. 5)

Fig. 5. *Suggrundus meerdervoorti* (Bleeker), 175.5 mm SL.

*Platycephalus meerdervoorti* Bleeker, 1860, p. 80, pl. 1, fig. 3, (original description; type locality: Nagasaki; Yedo).


**Description**: D I - VII - 11; A 11; P 1 19-21; P 2 1, 5; LLp 52-55; GR 1+7=9; DS 10-13=8-10; Vert. 27.

Dorsal surface of head with spines and tubercles. Eye large, but its diameter shorter than snout length. Ocular cirrus absent. Suborbital ridge usually with four or more distinct spines.
Lappet of iris bilobed, without cirrode. Pored scales of lateral line nearly quadrate, anterior 7 to 12 scales in lateral line with spinule, the perforating duct robust, communicated with exterior through ends of two thick tubes. Interopercular flap absent.

**Color in 10% formalin**: Surface of body brown or dark grayish brown, but below pale. The membrane of first dorsal fin black and with numerous small black spots.

**Distribution**: South and West Sea of Korea, Japan, China and Taiwan.

**Remarks**: Matsubara and Ochiai (1953), Shao and Chen (1987) and Nakabo (1993) described that *S. meerdervoorti* from Japan and China had interopercular flaps, but specimens from Korea hitherto had not it. *S. meerdervoorti* was reported for the first time from Korea by Jeon (1992). Kim and Kang (1993) described that this species was collected in only Komso, Chinso-myon, Puan-gun, but it was confirmed that *S. meerdervoorti* was plentifully distributed in South Sea of Korea.

**Genus Cociella Whitley, 1940**

(Korean name: Kkaji – Yangtae – sob)

*Cocius* Jordan and Hubbs, 1925, p. 285 (original description, type species: *Platyccephalus crocodilus* Tiliusius).

*Cociella* Whitley, 1940, p. 243 (substitute for *Cocius* Jordan and Hubbs, 1925 preoccupied).

**Cociella crocodila Tiliusius, 1812**

(Korean name: Kkaji – Yangtae) (Fig. 6)

*Platyccephalus crocodilus* Tiliusius, 1812, pl. 59, fig. 2, Nagasaki (original description); Cuvier and Valenciennes, 1829, p. 188; Mori, 1952, p. 159.

*Thysanophrys crocodilus* Jordan and Metz, 1913, p. 54.


![Fig. 6. Cociella crocodila (Tiliusius), 325.0 mm SL.](image-url)

**Description**: D I - VII - VII - 10-12 (rarely I - VII - I - 11); A 11-12; P1 18 - 21; P2 I, 5; GR 1+2+4-7=6-8; LLp 52-55; DS 12-19; Vert. 25-27.


**Color in 10% formalin**: Back and side of body grayish brown or dark brown, with 4 to 5 cross dark bars broadly, which generally becoming fainter with growth of fish. In small specimens, back and side with numerous small roundish spots of dusky. Under side uniformly pale.

**Distribution**: West and South Sea of Korea, China, Japan, Taiwan, Indonesia and Philippines.

**Genus Inegocia Jordan et Thompson, 1913**
(Korean name: Jum - Yangtae - sok)
Inegocia Jordan et Thompson, 1913, p. 70 (type specimen: *Platycephalus japonicus* Tilesius).

**Inegocia japonica** (Tilesius, 1812)
(Korean name: Jum - Yangtae) (Fig. 7)
*Platycephalus japonicus* Tilesius, 1812. p. 59, pl. 59, fig. 1, (original description, type locality: Nagasaki).

*Inegocia japonica* Jordan and Thompson, 1914, p. 278, Misaki; Mori and Uchida, 1934, p. 28, Pusan, Korea; Chyung, 1977, p. 526.

**Materials examined**: no specimen.

**Distribution**: West and South Sea of Korea, China, Japan, Taiwan, Indonesia and Philippines.

**Inegocia guttata** (Cuvier et Valenciennes, 1829)
(Korean name: Akoyangtæ) (Fig. 8)

![Fig. 8. Inegocia guttata (Cuvier and Valenciennes), 416.0 mm SL.](image)

*Platycephalus guttata* Cuvier et Valenciennes, 1829, pp. 389-392 (original description, type locality: Japan).


**Description**: D I - VII - 11; A 11; P1 21; P2 I, 5; GR 1+5; LLp 50-51; DS 14-15.

**Distributions**: South Sea and Cheju Island of Korea, Japan, China.

**Remarks**: *Inegocia guttata* was collected from Cheju Island, and was described for the first time by Lee and Joo (1995).

**Genus Platycephalus Bloch, 1795**
(Korean name: Yangtæ - sok)
*Platycephalus* Bloch, 1795, p. 96 (type by
original designation *Platyccephalus spathula* Bloch=C*Allionymus indicus* Linnaeus, 1758).

*Platyccephalus indicus* (Linnaeus, 1758)  
(Korean name : Yangtae) (Fig. 9)

![Fig. 9. Platyccephalus indicus (Linnaeus), 328.0 mm SL.](image)

*Callionymus indicus* Linnaeus, 1758, p. 250, Asia (original description).


**Description**: D 1~7, | V | V | - | L - | 13~14; A. 13; P1 18~20; P2 5; LLp 70~80; GR 3~4+7~9 = 10~13; DS 13~19; Vert. 27.

Head very broad and extremely depressed, with several minute spines. Ocular cirrus absent; iris lappet simple, some bluntly pointed, neither bilobed nor cirrus. Interorbital width much broader, and longer than eye diameter. Interopercular flap present and V-shaped. Scales very small; pored scales in lateral line 70 to 80 (mean 73.6). Scales in lateral line oval in shape. Anterior nostril has a flap posteriorly. Perforating duct of lateral line scales slender and communicated with exterior through end of a single tube. 2 spines of first dorsal fin minute, anteriormost one hardly visible with naked eye; dorsal last spine also minute, free from preceding one. Teeth mostly villiform or granular, some of them enlarged. Teeth on upper jaw in broad bane. Teeth on lower jaw in 2 or 3 series. Those of innermost series large and stout. Palatine teeth in 2 series. Discal tubercles on arch small, and set in 2 series. Preopercular spines 2, stout, subequal or lower one even longer than upper.

**Color in 10% formalin**: Dark brown or gray brown above and side of body, whitish below. Back and side of body specked with darker and crossed with several defined broad bars. Dorsal fins spotted, anal white, pectoral and ventral fin blotched. Caudal fin with 3 to 4 black bars.

**Distribution**: West, South and East sea of Korea, Japan, China, Taiwan, India, Srilanka, Indonesia, Maley, Thailand, Philippines, Australia, Pakistan, Gulf Bay, Red Sea, eastern Mediterranean.

**Remarks**: *Platyccephalus indicus* was originally reported by Linnaeus(1758). But his description was not enough contents for identification between *P. indicus* and their allied species in *Platyccephalus* except number of pectoral fin rays (Table 2). So we think, the classification of *P. indicus* complex based on description of Linnaeus (1758) was very difficult prob-
Table 2. Comparisons of taxonomic characters of the genus *Platycephalus* from Korea

<table>
<thead>
<tr>
<th>Characters</th>
<th>Present specimens</th>
<th><em>P. indicus</em> Linnaeus(1758)</th>
<th><em>P. indicus</em> Knapp(1986)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsal fin rays</td>
<td>I<del>II - VII - I - 13</del>14</td>
<td>I - VII,13</td>
<td>I - VIII - I+13</td>
</tr>
<tr>
<td>Pectoral fin rays</td>
<td>18~20</td>
<td>20</td>
<td>18~20</td>
</tr>
<tr>
<td>Anal fin rays</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Pored lateral line scales</td>
<td>70 - 80</td>
<td>-</td>
<td>68~82</td>
</tr>
<tr>
<td>Gill rakers</td>
<td>3<del>4+7</del>9</td>
<td>-</td>
<td>2<del>3+5</del>7</td>
</tr>
</tbody>
</table>

Problem. Sakashita (1992) reported that distribution of *P. indicus* was from South Africa, Indian Ocean and Australia to Ryukyus. Also he mentioned that *P. indicus* identified by Linnaeus (1758) may be specimen from India. Imamura (1996) mentioned that the genus *Platycephalus* includes at least 15 species in world. But Korean flatheads had been identified as a single species, *P. indicus*, by many authors (Mori, 1952; Chyung, 1977; Kim and Kang, 1993; Kim and Kim, 1997). Knapp (1986), Sakashita (1992) and Imamura (1996) reported that *P. indicus* has two black bars in caudal fin, but Korean species has 3 to 4 black bars. Sakashita (1992) described that *P. indicus* was distributed in Indian Ocean, South Africa, India, Burma, Thailand, western Pacific Ocean, Australia, Philippines and Ryukyus, not costal region of Korea and Japan. Accordingly identification and distribution for *Platycephalus* from Korea were largely demanded to recheck in future.

*Platycephalus* sp.

(New Korean name : Cham - Yangtae) (Fig. 10)


**Description**: D I - II - III - IV - I - 12~14; A 12~14; P: 16~18; Pz 1, 5; LLp 83~100; GR 3~5 + 7~11 = 11~14; DS 16 ~ 20; Vert. 27.

Head very broad and much depressed, with smooth bony ridges. Two preopercular spines, upper a little shorter than lower. Body depressed anteriorly, tapering posteriorly, around caudal peduncle compressed. Head and body covered with ctenoid scales, small, but base of caudal fin with cycloid scales. Interorbital width broader than eye diameter or almost same. Eye small, iris lappet simple, without bilobed. No ocular cirrus. 83 ~ 100 (average 89.0) pored lateral line scales and oval and rectangular in their shapes. Teeth mostly villiform except for some canine-like on inside of upper jaw tip. All scales in lateral line without spines. Caudal fin truncate.

**Color of body**: Surface of body brownish or greyish above, whitish below; without dark bands crossing back, but numeral small dark spots on head and all over the back of body. Dorsal fin spotted and anal fin white. Ventral of body pale or bright brownish. Pectoral and pelvic fins with numerous brown blotches. Caudal fin with 2 or 3 horizontal black bars.

**Distribution**: West and South Sea of Korea, China and Japan.

**Remarks**: *Platycephalus* sp. is very similar to *P. indicus* from Korea in their exomorphology. However, *Platycephalus* sp. differs from *P. indicus* in having 2 pungent spines at the lower anterior margin of preorbital (3 blunt spines in *P. indicus*), pored scales in lateral line 83 to 100 (70 to 80), pectoral fin rays 16 to 18 (18 to 20), low caudal peduncle depth 25.7 to 32.5% to standard length (23.9 to 27.2), widemost side lateral process of urohyal bone present (absent), small eye diameter 7.7 to head length (large 8.6) and no band or indistinct cross bands on the body (distinct). On the other hand, in the description

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**Table 3. Comparison of meristic and morphological characters between the Platycephalus indicus and Platycephalus sp.**

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>Platycephalus indicus</em></th>
<th><em>Platycephalus sp.</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of individuals</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>Standard length (mm)</td>
<td>220.5 - 365.0</td>
<td>195.0 - 423.0</td>
</tr>
<tr>
<td>Pored scales of lateral line</td>
<td>70 - 80</td>
<td>83 - 100</td>
</tr>
<tr>
<td>Gill rakers</td>
<td>3 - 4 + 7 - 9 = 10 - 13</td>
<td>3 - 5 + 7 - 11 = 11 - 14</td>
</tr>
<tr>
<td>Diagonal scales</td>
<td>13 - 19</td>
<td>16 - 20</td>
</tr>
<tr>
<td>Pectoral fin rays</td>
<td>18 - 20</td>
<td>16 - 18</td>
</tr>
</tbody>
</table>

% to standard length

- Head length                      3.34 (3.22 - 3.47) | 3.42 (3.22 - 3.68)
- Body depth                       9.01 (6.74 - 10.63) | 9.92 (6.90 - 12.50)
- Caudal peduncle depth            25.67 (23.90 - 27.21) | 29.52 (25.66 - 32.46)

% to head length

- Snout length                      4.38 (4.15 - 4.59) | 4.23 (3.82 - 6.60)
- Eye diameter                      8.68 (7.63 - 9.89) | 7.65 (6.47 - 9.20)
- Interorbital width                6.25 (5.54 - 6.92) | 6.76 (5.60 - 8.48)
- Lower anterior margin of preorbital 3 blunt spines | 2 pungent spines
- Widemost side lateral process of urohyal bone absent | present
- Subpelvic keel                    pointed | blunt
- Discal tubercles on the first gill arch thick | sparse
- Cross bands of body               present | absent or indistinct
of Linneaus (1758), P. indicus was largely differed from Platycephalus sp. in having 20 pectoral fin rays (16 to 18 in Platycephalus sp.). The genus Platycephalus from Korea surely includes at least two species at present: P. indicus Linneaus and Platycephalus sp., But Platycephalus from Korea had been hitherto identified as a single species (P. indicus) by many authors (Mori, 1952; Mori and Uchida, 1934; Chyung, 1977; Kim and Kang, 1993; Kim and Kim, 1997). Sakashita (1992) mentioned that Platycephalus sp. (= Platycephalus sp.2 in Sakashita, 1992) distributed only in southern waters of Korea and Japan and East and South China Sea. We think, P. indicus and Platycephalus sp. from Korea need to recheck their taxonomic position comparing with other Asian specimens.

Key to the genera and species

1a. Vomerine teeth in 2 parallel longitudinal bands. Head armed with strong spines or granules. Interorbital width narrow. Pored scales of lateral line fewer than 62
   ........................................ 2

1b. Vomerine teeth in a crescentic band. Head nearly smooth. Interorbital width broad. The pored scales of lateral line more than 70. ........ genus Platycephalus ........ 9

2a. Side of head unicarinate, suborbital bone denticulated. .................................. 3

2b. Side of head bicarinate, process of suborbital bone very sharp. ....................... 5

3a. A stout anterose spine on lower face of preopercle. Pored scales of lateral line about 50. .......... genus Rogadius .... R. asper

3b. No anterose spine on lower face of preopercle. Pored scales of lateral line about 40 to 50. .... genus Onigocia .................. 4

4a. 3 scales above lateral line and anterior 10-16 pored lateral line scales armed with upstanding spines. ........ O. spinosa

4b. 4 scales above lateral line and anterior 3-4 pored lateral line scales armed with upstanding spines. ........ O. macrolepis

5a. Teeth highly specialized, some of teeth canine-like, last dorsal spine minute, free from the penultimate one, caudal truncated. .... genus Rotabulus ........
   ..................... R. megacephalus

5b. Teeth either villiform or granular. Last dorsal spine connected with penultimate one by membrane. Caudal rounded. ........ 6

6a. Upper side of head largely granulated. Preopercular spines 3, distinct and well developed. Iris lappet bilobed and not cirrose. .... genus Sugugrundus ........
   ..................... S. meedervoorti

6b. Upper side of head not granulated. Preopercular spine 2 or 3 (if present, the one-third from upper, rudimentary). Iris lappet not bilobed. ......................... 7

7a. Interopercular flap absent. Iris lappet not cirrose. Perforating duct of lateral line scales communicated with exterior through end of a single slender tube. ....
   ..................... genus Cociella .... C. crocodila

7b. Interopercular flap present. Iris lappet cirrose. Perforating duct of lateral line scales communicated with exterior through ends of 2 tubes. ........
   ..................... genus Inegocia .......... 8

8a. Dorsal and anal fin rays each 12, anterior 6-8 pored scales of lateral line. Body surface with 6 distinct dark bands. Dorsal surface of body without small dark spots.
   ........................................ I. japonica

8b. Dorsal and anal fin ray each 11, anterior 2 pored scales of lateral line. Body surface with 7 distinct dark bands. Dorsal surface of body with small dark spots. ....
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.................. \textit{I. guttata} \\
9a. Pored scales of lateral line less than 80. \\
Body surface dark brown or grayish, without dark spots, and with cross several dark bands. .............. \textit{P. indicus} \\
9b. Pored scales of lateral line more than 80. \\
Body surface bright brownish or grayish, with small dark spots, and without cross dark bands. .......... \textit{Platyecephalus} sp.

Systematic discussion

Members of the flathead fishes are characterized by largely compressed head, projected lower jaw than upper jaw, two dorsal fins and iris lappet. The family Platyecephalidae was reported the earliest by Linnaeus (1758). After that, it has continually studied about the flathead fishes by many workers (Cuvier and Valenciennes, 1829; Temmick and Schlegel, 1842; Bleeker, 1854, 1877; Jordan and Snyder, 1900; Jordan and Hubbs, 1925). Matsubara and Ochiai (1955) and Shao and Chen (1987) mentioned that \textit{Suggrundus meerdervoorti} from Japan has an interopercular flap, but the Korean flatheads had not it. On the other hand, Imamura (1996) mentioned that character of interopercular flap is not homologous.

Matsubara and Ochiai (1955) described that the Rogadiinae (Jordan and Hubbs, 1925) and Cymbacephalinae (Fowler, 1938) were united under the Onigociniinae (Jordan and Hubbs, 1925), and the Thysanophrynae (Whitley, 1931) and Grammoptilinae (Fowler, 1938) were placed under the Inegociniinae (Jordan and Hubbs, 1925). Many authors have variously classified the platyecephalids into subfamilies and genera. Jordan and Hubbs (1925) recognized 4 subfamilies, Onigiciniinae, Rogadiinae, Inegociniinae and Platyecephalinae. Keenan (1991) separated the Australian platyecephalids into 5 subfamilies: Cymbacephalinae, Onigociinae, Inegociinae, Elatinae and Platyecephalinae. However, Imamura (1996) did not recognized Inegociinae, because it was paratypic comprising \textit{Inegocia}, \textit{Suggrundus}, \textit{Cociella} and \textit{Ratabulus}. Recently, Imamura (1996) recognized two subfamilies: Onigociinae and Platyecephalinae, based on apomorphic characters in 32 transformations series for examined platyecephalids. According to method of Imamura (1996), Platyecephalidae from Korea was also composed of two subfamilies: Onigociinae and Platyecephalinae. The former comprised six genera: \textit{Onigocia}, \textit{Rogadius}, \textit{Suggrundus}, \textit{Inegocia}, \textit{Cociella} and \textit{Ratabulus}. The latter, one genus: \textit{Platyecephalus}. While presently \textit{Platyecephalus} distributed in the world is involving many problems in their taxonomic position. \textit{Platyecephalus} from Korea, Japan, Taiwan and China reported only one species until now: \textit{P. indicus}, which reported by Linnaeus (1758) for the first time. Because original description of \textit{P. indicus} reported by Linnaeus (1758) was not given a full explanation, many ichthyologists are falling into difficult situation for classification of \textit{P. indicus} and their allied species. And much more, type specimen of this species has not been found, also Linnaeus described about distribution (type locality) merely "Asia". Sakashita (1992) and Imamura (1996) described that Japanese flatheads represent \textit{P. indicus} and other two undescribed species. Knapp (1984) and Sakashita (1992) mentioned that \textit{P. indicus} was widely distributed from Red Sea and eastern Mediterranean, India, Indian Ocean and Western Central Pacific to Japan, Indonesia, Philippines and Australia. On the other hand, Sakashita (1992) described that \textit{P. indicus} reported by Linneaus (1758) may indicate the \textit{Platyecephalus} fish caught from India. In this studies, 10 species and 7 genera of the family Platyecephalidae from Korea including

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Platyccephalus sp. are rechecked. Here O. macrolepis is reported for the first time in Korea. Present Platyccephalus species from Korea were showed two type specimens in their morphological features. P. indicus and Platyccephalus sp. from Korea were largely differed from several morphometric and exomorphological characters (Table 1, 2). So we considered that P. indicus and Platyccephalus sp. are another species.

References


Linnaeus, C. 1758. Systema naturae sive regna tria naturae, systematice proposita per classes, ordines, genera et species, cum characteribus, differentiis, synonymis, locis, etc., 10th ed. pp. 249–250.


한국산 양태과 어류(농어목)의 분류학적 제검토

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1987년 12월부터 1998년 4월까지 우리나라 연안에 서식하고 있는 양태과 어류에 대한 분류학적 위치를 제검토한 결과 모두 7속 10종 즉 큰비늘양태 Onigocia macrolepis, 비늘양태 O. spinosa, 비늘양태 Rogadius asper, 큰눈양태 Suggrundus meerdervoorti, 젤양태 Inegocia japonica, 악어양태 I. guttata, 가지양태 Cocilia crocodila, 봉오리양태 Ratabulus megacephalus, 양태 Platypcephalus indicus 및 참양태 Platypcephalus sp. 등이었다. 이들 어류 중에서 Onigocia macrolepis는 아직까지 우리나라의 미기록종이고, Platypcephalus sp.는 외부형태적 특징 및 주요 계수계측에서 P. indicus와는 다르게 나타나는 미확인종으로써 추후 면밀한 검토가 요구된다.

아울러 이들 종들의 각종 분류학적 주요 형태 형질을 중심으로 한국산 양태과 어류의 속, 종 검색 표를 작성하였고, 각종들의 형태적 특징 및 계수 계측 형질들을 기재하면서 한국산 양태과 어류의 지리적 분포에 대하여 보고하였다.