Review of the Scientific Name and Redescription of the Banded Moray Eel, Previously Reported as *Gymnothorax reticularis* (Muraenidae, Anguilliformes) in Korea

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**ABSTRACT** The banded moray eel, previously reported as *Gymnothorax reticularis*, is redescribed based on one specimen (469.0 mm TL) collected from a fish trap in Geoje-do, South Sea, Korea. It is characterized by 19 dark brown vertical bars; 139 total vertebrae; both jaw teeth large, strong, and slightly serrated; 1 median intermaxillary tooth; small and blunt vomerine teeth. Although the banded moray eel has been reported as *Gymnothorax reticularis* in Korea by some ichthyologists, this study suggests that its scientific name should be changed to *Gymnothorax minor* based on its number of vertebrae and presence of a median intermaxillary tooth.

**Key words**: Redescription, Muraenidae, *Gymnothorax minor*, *Gymnothorax reticularis*, South Sea, Korea

**INTRODUCTION**

The family Muraenidae, in the order Anguilliformes, is distributed in tropical and subtropical seas, and contains 15 genera and 185 species (Nelson, 2006; Eschmeyer, 2012). Member of the family inhabit holes and crevices ranging from shallow waters to the continental shelf (Smith, 2012). Their bodies are elongated and somewhat compressed, with a reduced gill opening, and a variety of color patterns, including spots, bars, and reticulations. A total of six species from two genera (*Enchelycore pardiis*, *Gymnothorax albimarginatus*, *G. isingteena*, *G. kidako*, *G. prionodon*, and *G. reticularis*) have been reported in Korea (Kim et al., 2005). The Korean name “Na-mang-gom-chi” was first assigned to *G. reticularis* by Yamada et al. (1995). Subsequently, Choi et al. (2002) reported the first occurrence of *G. reticularis* in Korean waters, giving only a brief description and picture, and following the Korean name assigned by Yamada et al. (1995). *Gymnothorax reticularis* has been confused with *G. minor* by many ichthyologists because their external shapes and colors are similar (Weber and deBeaufort, 1916; Masuda et al., 1984; Shen, 1990; Smith and Böhlke, 1997; Hatooeka, 2002; Kim et al., 2005). Smith and Böhlke (1997) then suggested that *G. minor* can be easily distinguished from *G. reticularis* by their numbers of vertebrae and their distribution ranges, i.e., the former has 129 ~ 143 vertebrae and is distributed from the north-western to the southwestern Pacific, whereas the latter has 114 ~ 126 vertebrae and is distributed from the Indian Ocean to the Red Sea. Therefore, the identity of the moray eel in Korean waters must be clarified based on actual specimen. A single specimen (469.0 mm TL) of the banded moray eel was collected from a fish trap in Geoje-do, South Sea of Korea in August, 2009. The specimen was preserved in 70% ethanol and deposited in the Ichthyology Laboratory Collection, Pukyong National University (PKU). Counts and measurements were made according to Böhlke (1989). Each body part was measured to the nearest 0.1 mm with a digital Vernier caliper. The vertebrae were counted from a radiograph (Hitex HA-100; Hitex Co., Tokyo, Japan). The mean vertebral formula (MVF) is expressed as the mean values for the predorsal-preanal-total counts of both species (Böhlke, 1982).

*Gymnothorax minor* (Temminck and Schlegel, 1846)

(Korean name: Na-mang-gom-chi)

(Fig. 1, Table 1)

*Muraena minor* Temminck and Schlegel, 1846: 269 (type

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http://www.fishkorea.or.kr
Fig. 1. Gymnothorax minor, PKU 2698, 469.0 mm TL, South Sea of Korea.

<table>
<thead>
<tr>
<th>Source</th>
<th>Gymnothorax minor</th>
<th>Gymnothorax minor</th>
<th>Gymnothorax minor</th>
<th>Gymnothorax reticularis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length (mm, TL)</td>
<td>469.0</td>
<td>450.0~463.0</td>
<td>245.0~508.0</td>
<td>207.0~256.0</td>
</tr>
<tr>
<td>In % of total length</td>
<td>7</td>
<td>11.6~11.9</td>
<td>10.0~15.2</td>
<td>12.2~15.4</td>
</tr>
<tr>
<td>Head length</td>
<td>12.3</td>
<td>11.6~11.9</td>
<td>10.0~15.2</td>
<td>12.2~15.4</td>
</tr>
<tr>
<td>Preanal length</td>
<td>46.7</td>
<td>44.8~45.5</td>
<td>14.7~47.6</td>
<td>45.5~50.0</td>
</tr>
<tr>
<td>Depth at gill opening</td>
<td>6.4</td>
<td>4.9~5.0</td>
<td>4.6~6.3</td>
<td>5.6~6.3</td>
</tr>
<tr>
<td>In % of Head length</td>
<td>7</td>
<td>7.1~8.9</td>
<td>7.7~14.9</td>
<td>10.0~12.8</td>
</tr>
<tr>
<td>Eye diameters</td>
<td>10.2</td>
<td>7.1~8.9</td>
<td>7.7~14.9</td>
<td>10.0~12.8</td>
</tr>
<tr>
<td>Snout length</td>
<td>12.6</td>
<td>14.4~15.0</td>
<td>12.1~20.0</td>
<td>12.8~17.9</td>
</tr>
<tr>
<td>Upper jaw length</td>
<td>32.6</td>
<td>29.1</td>
<td>27.0~43.5</td>
<td>28.6~43.5</td>
</tr>
<tr>
<td>Lower jaw length</td>
<td>30.2</td>
<td>30.2</td>
<td>30.2</td>
<td>30.2</td>
</tr>
<tr>
<td>Interorbital width</td>
<td>12.1</td>
<td>12.1</td>
<td>12.1</td>
<td>12.1</td>
</tr>
<tr>
<td>Gill opening length</td>
<td>9.2</td>
<td>9.2</td>
<td>9.2</td>
<td>9.2</td>
</tr>
<tr>
<td>Counts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total vertebrae</td>
<td>139</td>
<td>135~140</td>
<td>129~143</td>
<td>114~126</td>
</tr>
<tr>
<td>Predorsal vertebrae</td>
<td>6</td>
<td>6</td>
<td>5~8</td>
<td>5~6</td>
</tr>
<tr>
<td>Preanal vertebrae</td>
<td>57</td>
<td>53~56</td>
<td>51~57</td>
<td>48~51</td>
</tr>
<tr>
<td>Number of dorsal fin rays</td>
<td>331</td>
<td>331</td>
<td>331</td>
<td>331</td>
</tr>
<tr>
<td>Number of anal fin rays</td>
<td>227</td>
<td>227</td>
<td>227</td>
<td>227</td>
</tr>
<tr>
<td>Dorsal fin origin</td>
<td>before of gill opening</td>
<td>before of gill opening</td>
<td>before of gill opening</td>
<td>before of gill opening</td>
</tr>
<tr>
<td>Teeth</td>
<td>Stout serrate</td>
<td>Stout serrate</td>
<td>Stout serrate</td>
<td>Stout serrate</td>
</tr>
<tr>
<td>Dentition</td>
<td>Uniserial</td>
<td>Uniserial</td>
<td>Uniserial</td>
<td>Uniserial</td>
</tr>
<tr>
<td>Median intermaxillary teeth</td>
<td>1</td>
<td>1</td>
<td>0~2</td>
<td>0</td>
</tr>
<tr>
<td>Bars behind gill opening</td>
<td>19</td>
<td>18~20</td>
<td>15~22</td>
<td>16~20</td>
</tr>
</tbody>
</table>

Locality: Nagasaki, Japan


**Material examined.** PKU 2698, 469.0 mm TL, one specimen, Geoje-do (N 34° 43'10", E 128° 38'25"), South Sea of Korea, caught by fish trap at 20 m, 19 August, 2009, collected by H.S. Ji.

**Description.** Dorsal fin rays 331; anal fin rays 227; predorsal vertebrae 6; preanal vertebrae 57; total vertebrae 139; bars behind gill opening 19.
All counts and measurements are given in Table 1. Body elongate and somewhat compressed, and tapering toward the tail (Fig. 1). Head with many wrinkles, snout bluntly rounded, mouth terminal (Fig. 2). Nostril 2 pairs, anterior nostril narrow tubular, and posterior nostril small and oval. Cephalic pores minute; supraorbital pores 3; infraorbital pores 4 along the upper jaw; mandibular pores 6 along the lower jaw; branchial pores 2. Both jaw teeth large, strong, and slightly serrated (Fig. 3). Maxillary teeth 15 in a single row, tapering in size posteriorly. Mandibular teeth 14 in a single row, tapering in size posteriorly. Median intermaxillary tooth 1; vomerine teeth small blunt, 12 in a single row. Anus located in the middle of the body. Gill opening small slit (Fig. 2). Dorsal fin origin slightly in front of the gill opening. Pectoral fin absent. Caudal fin small, confluent with dorsal and anal fins. Lateral line greatly reduced, pores inconspicuous. Body naked.

Coloration. When fresh, head and body light whitish, with scattered irregular dark brown spots, 19 dark brown vertical bars from behind the gill opening to the caudal fin margin. Dorsal and anal fins with 21 and 11 dark blackish brown bars, respectively, on each side.

Distribution. South Sea of Korea (present study; Choi et al., 2002; Kim et al., 2005), northwestern and southwestern Pacific (Smith and Böhle, 1997), Japan (Hatooka, 2002), China (Shen, 1990), Taiwan (Smith and Böhle, 1997), Australia (Böhle and McCosker, 2001), Philippines and Indonesia (Smith and Böhle, 1997).

Remarks. The banded moray eel has previously been reported as Gymnotorhaz reticulatus in the Korean waters (Choi et al., 2002; Kim et al., 2005; NIBR, 2011). However, this study suggests that the banded moray eel in Korea is Gymnotorhaz minor, based on the following morphological characters: 15 ~ 17 irregular dark brown vertical bars, body with scattered small brown spots, and uniserial teeth on both jaws (Table 1). These characters are highly consistent with those in the original description (Temminck and Schlegel, 1846). Boeseman (1947) subsequently reported a morphological description of the lectotype of G. minor, which is consistent with ours. Because G. minor is most similar to G. reticulatus in its number of dark vertical bars (18 ~ 25 in G. minor vs. 15 ~ 22 in G. reticulatus; Smith and Böhle, 1997; Table 1), they have been confused by many ichthyologists (Weber and deBeaufort, 1916; Masuda et al., 1984; Shen, 1990; Kim et al., 2005). However, Smith and Böhle (1997) demonstrated that G. minor and G. reticulatus clearly differ from one another in their numbers of vertebrae (129 ~ 143 and 114 ~ 126, respectively). Hatooka (2002) later added G. minor to the fish fauna of Japan, but deleted G. reticulatus. Recently, Yamada et al. (2009) mistakenly assigned the new Korean name “Geu-mul-gom-ch’i” to G. minor, perhaps because they lacked information about the banded moray eel in Korea. The vertebral number in the present specimen is 139, within the range of the vertebrae of G. minor (Table 1). Gymnotorhaz minor and G. reticulatus are also easily distinguishable by their distributions, with G. minor distributed from the northwestern to the southwestern Pacific and G. reticulatus from the Indian Ocean to the Red Sea (Randall and Golani, 1999; Smith and Böhle, 1997; Smith, 2012). According to Smith and Böhle (1997), G. minor displays some geographic variation in the number of its vertebrae, e.g., 129 ~ 135 total vertebrae in Australia, but 135 ~ 143 in northeastern Asia. Therefore, further studies of the
genetic variations in the regional populations of *G. minor* are required.

**ACKNOWLEDGMENTS**

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**REFERENCES**


우리나라에서 과거 *Gymnothorax reticularis*로 보고된
나강곰치의 학명 검토 및 재기재

김성연 ⋅ 지환성1 ⋅ 김진구1

국립수산과학원 육종연구센터, 1부경대학교 자연생물학과

요 약 : 과거 우리나라에서 *Gymnothorax reticularis*로 보고되었던 나강곰치를 남해 거제도에서 동일로 체적
된 표본 1개체(전장 469.0mm)에 근거하여 재기재하였다. 본 표본은 19개의 암살개 수치며, 139개의 척추골수. 크고 강하며 약간 가깝고 얇지 않아, 1개의 간상악골치, 작고 무딘 사람형 둥근 모양을 보였다. 여러 어류학자들
에 의해 한국산 나강곰치는 *Gymnothorax reticularis*로 보고되어 왔으나 본 연구를 통해 한국산 나강곰치의 학
명은 *Gymnothorax minor*로 변경되어야 한다.

참여보기 날짜 : 재기재, 곰치과, 나강곰치, *Gymnothorax reticularis*, 남해