Synopsis of Codlet fishes (Gadiformes: Bregmacerotidae) in Taiwan

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Abstract

Species of the codlet fish family Bregmacerotidae of Taiwan are reviewed. A single genus, Bregmaceros, with 4 species are recognized: B. japonicus Tanaka, 1908, B. lanceolatus Shen, 1960, B. pescadorus Shen, 1960, B. pseudolancelatus Torii, Javonillo and Ozawa, 2004. The previous record of B. mcclellandi Thompson, 1840 is proved to be a misidentification of B. pseudolancelatus and should be excluded from the list of fauna in Taiwan. A key to all 4 species of Taiwan is provided.

Key words: Pisces, Gadiformes, taxonomy, ichthyofauna, Taiwan

Introduction

Members of the codlet family Bregmacerotidae are a group of small epipelagic or mesopelagic fishes (usually <10 cm in total length) living in tropical and subtropical waters, and are characterized by the first dorsal fin with a single long ray (occipital ray) on top of the head, second dorsal- and anal fins with well developed anterior and posterior lobes, pelvic fins inserts under the head, with long, thick rays, extending beyond the anterior lobe of anal fin, caudal fin well-developed and lateral line extends along dorsal margin of body (Cohen et al., 1990). Torii et al (2003a:136) listed 16 nominal species in the family Bregmacerotidae, but stated that some of them were not necessarily valid. Torii et al. (2003a, c) went further to include B. atripinnis (Tickell, 1865) in the synonym of B. mcclellandi Thompson, 1840, however, the number of valid species is still uncertain.
In Taiwan, Shen (1960) described two new species, *B. lanceolatus* and *B. pescadorus*, collected from southern and western Taiwan, respectively. D’Ancona and Gavina (1965) treated *B. pescadorus* as a junior synonym of *B. nectabanus* and Belyanina (1974) placed *B. lanceolatus* under *B. mcclellandi*, however, both were proven to be inadequate (Shen and Wang, 1991, Torii et al., 2003c). Shen (1984) added *B. japonicus* into the fish fauna of Taiwan, but did not provide a reference specimen. Chen and Yu (1986) followed previous references to record all five species mentioned above. Shen and Wang (1991) reviewed the family and recognized only three species from Taiwan, including specimens referred to as *B. mcclellandi*, but excluded *B. japonicus*; neotypes were designated for those two previously described species in compensation for the apparent loss of the holotypes. Shen et al. (1993) recorded four of five species mentioned above, in which *B. nectabanus* was excluded. Torii et al. (2004) re-examined part of the type series of *B. lanceolatus* and described another species, *B. pseudolanceolatus*, from the type series of *B. lanceolatus* and additional specimens collected from Bay of Bengal to East China Sea.

Torii et al. (2003a-c, 2004) introduced the characters of opercle morphology, shape of the axial flap at the pectoral-fin base and parapophysis to define the species. Three new characters were observed and described in the present study: the coloration of stomach and intestine, coloration of peritoneum and connection between the intestine and pyloric caeca.

Descriptions of all four currently recognized species were provided on the basis of new materials. A key to all known species is provided.

**Materials and Methods**

Standard length (SL) and head length (HL) are used throughout. Counts, measurements, and terminology followed Torii et al. (2003c). Specimens used in present study were deposited in the National Museum of Marine Biology and Aquarium (NMMB-P). Specimens of *B. mcclellandi* used for comparison were borrowed from National Science Museum,
Tokyo (NSMT-P). Vertebral count was made of all four *Bregmaceros* species in Taiwan by x-ray. Meristic and morphometric values of all four *Bregmaceros* species in Taiwan are provided in Table 1.

Table 1. Meristic and morphometric values of four *Bregmaceros* species in Taiwan. The values of *B. pescadours* in parentheses are those provided in Shen and Wang (1991).

<table>
<thead>
<tr>
<th></th>
<th>B. japonicus (n = 10)</th>
<th>B. pescadours (n = 1)</th>
<th>B. lanceolatus (n = 19)</th>
<th>B. pseudo-lanceolatus (n = 6)</th>
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<tr>
<td><strong>Standard length (mm)</strong></td>
<td>80.8-118.4</td>
<td>55.3</td>
<td>79.7-109.2</td>
<td>68.8-89.7</td>
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<tr>
<td><strong>Meristic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Dorsal fin rays</td>
<td>53-59</td>
<td>54 (45-55)</td>
<td>65-70</td>
<td>60-63</td>
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<tr>
<td>Anal fin rays</td>
<td>58-63</td>
<td>59 (45-51)</td>
<td>66-72</td>
<td>64-65</td>
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<tr>
<td>Abdominal vertebrae</td>
<td>13-14</td>
<td>14 (13-14)</td>
<td>13-15</td>
<td>12-13</td>
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<td>Caudal vertebrae</td>
<td>41-43</td>
<td>39 (38-40)</td>
<td>44-47</td>
<td>40-43</td>
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<tr>
<td>Total vertebrae</td>
<td>54-57</td>
<td>53 (51-53)</td>
<td>57-61</td>
<td>52-55</td>
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<tr>
<td>Pectoral fin rays</td>
<td>18-24</td>
<td>19</td>
<td>19-23</td>
<td>17-21</td>
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<td>Caudal fin rays</td>
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<td>29</td>
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<td>27-30</td>
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<td>Principal caudal fin rays</td>
<td>14-15</td>
<td>15</td>
<td>16-18</td>
<td>14-16</td>
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<tr>
<td>Transverse scales</td>
<td>14-16</td>
<td>-- (14-15)</td>
<td>16-19</td>
<td>14-15</td>
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<tr>
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<td>71-83</td>
<td>82 (82-85)</td>
<td>84-94</td>
<td>70-78</td>
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<td><strong>Proportion</strong></td>
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<tr>
<td><strong>In % SL</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Head length</td>
<td>12.1-14.0</td>
<td>13.4</td>
<td>10.7-13.9</td>
<td>13.7-15.8</td>
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<td>Maximum body depth</td>
<td>11.2-14.3</td>
<td>13.0</td>
<td>13.4-17.4</td>
<td>15.6-17.6</td>
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<td>Occipital ray length</td>
<td>23.8-28.0</td>
<td>25.0</td>
<td>21.7-27.4</td>
<td>18.8-26.9</td>
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<td>Preanal length</td>
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<td>36.9</td>
<td>34.3-37.5</td>
<td>36.0-39.7</td>
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<td>Predorsal length</td>
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<td>40.3</td>
<td>33.5-37.6</td>
<td>35.5-39.0</td>
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<td>Longest pelvic length</td>
<td>54.3-65.6</td>
<td>52.4</td>
<td>55.3-63.2</td>
<td>55.3-62.3</td>
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<tr>
<td>Pectoral fin length</td>
<td>11.6-13.3</td>
<td>12.1</td>
<td>12.9-16.5</td>
<td>13.2-16.1</td>
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<td>Caudal peduncle depth</td>
<td>4.2-5.1</td>
<td>5.1</td>
<td>3.0-4.1</td>
<td>3.9-4.8</td>
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<tr>
<td><strong>In %HL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Eye diameter</td>
<td>26.4-31.1</td>
<td>29.7</td>
<td>26.4-40.7</td>
<td>30.5-40.6</td>
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<td>Interorbital width</td>
<td>24.2-29.6</td>
<td>31.1</td>
<td>23.3-38.3</td>
<td>23.4-33.3</td>
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<td>Snout length</td>
<td>17.0-25.7</td>
<td>28.4</td>
<td>16.8-25.6</td>
<td>14.1-24.1</td>
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<td>45.2-55.1</td>
<td>55.4</td>
<td>55.2-57.4</td>
<td>48.4-54.6</td>
</tr>
</tbody>
</table>
Results

Family Bregmacerotidae

Key to species of Bregmacerotidae in Taiwan

1A. Caudal fin forked; dorsal-fin rays less than 53-59; anal-fin rays 58-63……2
1B. Caudal fin pointed or rounded; dorsal-fin rays 60-70; anal-fin rays 64-72……………………3

2A. Dorsal fin rays 53-59; anal fin rays 58-63; longitudinal scales 71-83; upper fork of opercle slender, not expanded posteriorly; entire ventral groove densely covered by small chromatophores; intestine brownish…….. B. japonicus
2B. Dorsal fin rays 54; anal fin rays 59; longitudinal scales 82; upper fork of opercle well-expended posteriorly; ventral groove covered by scattered punctuate chromatophores, dense alongside mid-line of the groove; intestine whitish……. B. pescadorus

3A. Dorsal fin rays 65-70; anal fin rays 66-72; longitudinal scales 84-94; scattered chromatophores on pectoral fin; scattered chromatophores on anterior half of caudal fin; ventral groove with

Fig. 1. A. Bregmaceros japonicus, NMMB-P9135, 85.7 mm SL. B. Bregmaceros pescadorus, NMMB-P12081, 54.6 mm SL. C. Bregmaceros lanceolatus, deep-body form, NMMB-P12082, 109.2 mm SL. D. Bregmaceros lanceolatus, narrow-body form, NMMB-P12083, 104.7 mm SL. E. Bregmaceros pseudolanceolatus, NMMB-P12084, 89.7 mm SL.
scattered chromatophores; intestine uniformly dark black...B. lanceolatus
3B. Dorsal fin rays 60-63; anal fin rays 64-65; longitudinal scales 70-78; solid black chromatophores on upper half of pectoral fin; posterior 1/3 to 2/3 of caudal fin rays dark brown; ventral groove milky-white, without chromatophores; intestine uniformly blackish anteriorly and colorless posteriorly............
.................................B. pseudolanceolatus

Bregmaceros japonicus Tanaka, 1908
Figs. 1A, 2A-C, 3A, 4A, 5A

Bregmaceros atlanticus japonicus Tanaka, 1908:42 (Type locality: Sagami Bay, Japan)

Bregmaceros japonicus Tanaka, 1908:

Material examined. NMMB-P9135 (4, 80.8-97.2), Tashi, Yi-lan, Taiwan, 7 Aug. 2008. NMMB-P9245 (2, 116.0-118.4), Kongkang, Pingtung, Taiwan, 18 Sept. 2008. NMMB-P9289 (1, 81.1), Kongkang, Pingtung, Taiwan, 27 Aug. 2008. NMMB-P11227 (2, 87.9-98.5), Tashi fish market, Taiwan, 4 May 2010. NMMB-P11863 (1, 81.0), Kongkang, Taiwan, 18 Feb. 2011.

Description. Dorsal fin rays 53-59; anal fin rays 58-63; pectoral fin ray 18-24; principal caudal fin rays 14-15; total caudal fin rays 32-37; abdominal vertebrae 13-14; caudal vertebrae 41-43; total vertebrae 54-57; longitudinal scales 71-83; transverse scales 14-16.

Body relatively slender, slightly compressed; snout rounded; mouth oblique, upper jaw slightly overhanging the lower jaw, mouth cleft ends below the rear margin of eye; eye covered by adipose eyelid dorsally. Two irregular rows of medium size teeth on each upper jaw and lower jaw; vomer with one row of medium size teeth on each side; tiny teeth present on first gill arch. Dorsal and anal fins with long base; origin of dorsal fin just above or slightly behind that of anal fin, preanal length:predorsal length ratio = 1.01-1.07; a narrow groove on dorsal surface that housed the occipital ray; a broad groove on ventral surface, which housed the pelvic fins, with a dermal flap on each side; caudal fin forked. Opercle bifurcate, upper fork slender, not posteriorly expended, lower fork triangular, rounded anteriorly and pointed ventrally, some forks may be present (Fig. 2A-C). Dermal flap on pectoral axial relatively broad, with a large triangular projection at lower margin (Fig. 3A). Small cycloid scales on body, nearly rounded and usually deciduous, scale surface very rough, circuli concentric around focus on exposed part, longitudinal ridges slightly oblique toward the axis at
Fig 2. Opercles of two *Bregmaceros* species. A-C. *B. japonicus*. A. NMMB-P9289, 81.1 mm SL. B. NMMB-P9135, 97.2 mm SL. C. NMMB-P9245, 118.4 mm SL. D. *B. pescadorus*, NMMB-P12081, 54.6 mm SL. Not to scale.

Fig 3. Axial flaps of pectoral fin of four *Bregmaceros* species. A. *B. japonicus*, NMMB- P9245, 118.4 mm SL. B. *B. pescadorus*, NMMB-P12081, 54.6 mm SL. C. *B. lanceolatus*, NMMB-P12081, 109.2 mm SL. D. *B.s pseudolanceolatus*, NMMB-P12084, 89.7 mm SL. Broken line shows the portion covered by pectoral fin.
Fig. 4. Dorsal view of scales taken from below pectoral fin base of four *Bregmaceros* species. A. *B. japonicus*, NMMPB 9135, 97.2 mm SL. B. *B. pescadorus*, NMMPB-P12081, 54.6 mm SL. C. *B. lanceolatus*, NMMPB-P12082, 109.2 mm SL. D. *B. pseudolanceolatus*, NMMPB-P12084, 89.7 mm SL. Not to scale.

Fig. 5. Ventral view of connection of intestine and polyric caeca in three *Bregmaceros*, including two forms in *B. lanceolatus*. A. *Bregmaceros japonicus*. B. *Bregmaceros lanceolatus*, deep-body form. C. *Bregmaceros lanceolatus*, narrow-body form. D. *Bregmaceros pseudolanceolatus*. Not to scale.
Fig. 6. Opercles from two forms of *Bregmaceros lanceolatus*. A-C. Deep-body form. D-F. Narrow-body form. A. NMMB-P12082, 79.7 mm SL. B. NMMB-P12082, 85.3 mm SL. C. NMMB-P12082, 109.2 mm SL. D. NMMB-P12083, 81.0 mm SL. E. NMMB-P12083, 93.6 mm SL. F. NMMB-P12083, 104.7 mm SL. Not to scale.

Fig. 7. Opercle variation of *Bregmaceros pseudolanceolatus*. A. NMMB-P12084, 68.8 mm SL. B. NMMB-P12258, 78.7 mm SL. C. NMMB-P1269, 81.1 mm SL. D. NMMB-P1269, 85.3 mm SL. E. NMMB-P12084, 89.7 mm SL. Not to scale.
anterior border on covered part (Fig. 4A); no scales on cheek; a pair of relatively slender pyloric caeca, the one on the right connects to intestine laterally (Fig. 5A); canine-like anterior parapophysis on abdominal vertebrae.

Coloration. In preservation of ethonal, body uniformly colored in deep brown with dorsal surface of snout, head and central dorsal surface solid black; black scale pockets on entire body forming a mask-like pattern; a small whitish patch on interorbital space; the entire dorsal and pectoral fins densely covered by chromatophores, those on anal, pelvic and caudal fins relatively scattered; ventral groove densely covered by small chromatophores. Peritoneum pale with large scattered chromatophores; pyloric caeca and intestine brownish.

Distribution. Western Pacific Ocean off Japan, Taiwan, and Hawaii.

Remarks. Based on our examination, all specimens have a whitish patch on the interorbital space and brownish pyloric caeca and intestine, which were not observed in the other three species in Taiwan, nor mentioned in any previous references. These two characters can be used for diagnosis of present species. It is notable that two specimens have 71 and 74 longitudinal scales, respectively, whereas 79-83 scales in the rest specimens and ca. 76-81 in Torii et al (2003). These specimens are still recognized as *B. japonicus* because of the similarity in other characters and the range of longitudinal scales is extended accordingly.

*Bregmaceros pescadorus* Shen, 1960

Fig. 1B, 2D, 3B, 4B


Material examined. NMMB-P12081 (1, 55.3), Kaohsiung, Taiwan, 2 Aug. 2001.

Description. Dorsal fin rays 54 (45-55 in Shen and Wang, 1991); anal fin rays 59 (45-51); pectoral fin ray 19; principal caudal fin rays 15; total caudal fin rays 29; abdominal vertebrae 14 (13-14); caudal vertebrae 39 (38-40); total vertebrae 53 (51-53); longitudinal scales 82 (82-85); transverse scales not observable (14-15).

Body moderately elongate, slightly compressed; snout rounded; mouth oblique, upper jaw slightly overhanging the lower jaw, mouth cleft ends below posterior half of eye; eye covered by adipose eyelid dorsally. Two irregular rows of medium size teeth on both the upper and lower jaw; vomer with one row of medium size teeth on each side; tiny teeth present on first gill arch. Dorsal and anal fins with long base; origin of dorsal fin behind that of anal fin,
pre-anal length:pre-dorsal length ratio = 1.09; a narrow groove on dorsal surface that houses the occipital rays; a broad groove on ventral surface, which housed the pelvic fins, with a dermal flap on each side; caudal fin forked. Opercle bifurcate; the upper fork slender anteriorly and well-expended posteriorly; the lower fork relatively narrow and oval, tapering ventrally (Fig. 2D). Dermal flap on pectoral axial narrow with a small lower projection (Fig. 3B). Small cycloid scales on body, nearly rounded and usually deciduous; circuli concentric around focus on exposed part, incomplete at posterior margin, longitudinal ridges widely spaced and nearly parallel at anterior border on covered part (Fig. 4B); no scales on cheek; three most-posterior abdominal vertebrae with small triangular parapophysis.

Coloration. In preservation of ethonal, body uniformly colored in creamy white, black scale pockets on dorsal aspect that are restricted to about one-fourth of body surface; occipital densely covered by chromatophores; no black patch on the gill cover; well-developed chromatophores on two-third of anterior lobe and base of posterior lobe of dorsal fin; pectoral fin colorless; a few scattered chromatophores on inner pelvic-fin rays, as well as both lobes of the anal and caudal fins; dorsal groove densely covered by chromatophores; ventral groove whitish, with scattered punctuate chromatophores and a dense band in the middle of the groove. Peritoneum, pyloric caeca, and intestine uniformly whitish.

Distribution. Known only from western Taiwan off Punghu (Pescadores Is.) and southwestern Taiwan off Tongkang.

Remarks. The anal-fin ray in our specimen is 59, more than 45-51 provided by Shen and Wang (1991), which may be attributed to individual variation. Although B. pescadorus is morphologically similar to B. japonicus, it can be separated from B. japonicus by having a well-expanded upper fork of opercle (vs. slender), lower two-third of body pale (vs. blackish), uniformly pale peritoneum (vs. pale with scattered chromatophores), and uniformly pale pyloric caeca and intestine (vs. brownish).

*Bregmaceros lanceolatus* Shen, 1960
Figs. 1C-D, 3C, 4C, 5C,


Description. Dorsal fin rays 65-70; anal fin rays 66-72; pectoral fin ray 19-23; principal caudal fin rays 16-18; total caudal fin rays 27-31; abdominal vertebrae 13-15; caudal vertebrae 44-47; total vertebrae 57-61; longitudinal scales 84-94; transverse scales 16-19.

Body moderately elongate to slender, slightly compressed; snout rounded; mouth oblique, upper jaw slightly overhanging the lower jaw, mouth cleft ends below the posterior half of eye; eye covered by adipose eyelid dorsally. Two irregular rows of medium size teeth on each upper jaw and lower jaw; medium conical teeth on vomer arranged irregularly; tiny teeth present on first gill arch. Dorsal and anal fins with long base; origin of dorsal fin just above or slightly anterior to that of anal fin, preanal length:predorsal length ratio = 0.95-1.06; a narrow groove on dorsal surface that housed the occipital rays; a broad groove on ventral surface, which housed the pelvic fins, with a dermal flap on each side; caudal fin pointed, the middle rays longest. Opercle bifurcate; the upper fork slender anteriorly and well-expended posteriorly, usually with some secondary forks; the lower fork oval but irregular in shape, relatively broad, tapering ventrally with a blunt margin that was usually forked (Fig. 6). Dermal flap on pectoral axial ranging from narrow to very broad, with a large lower triangular projection or without (Fig. 3B). Small cycloid scales on body, nearly rounded and usually deciduous; circuli concentric around focus on exposed part, longitudinal ridges slightly oblique toward axial at central part, straight and parallel at anterior border on covered part (Fig. 4C); no scales on cheek. Two large pyloric caeca, the one on the right connects to intestine either laterally or dorsally (Figs. 5B-C, see remark below); canine-like anterior parapophysis on abdominal vertebrae; small posterior parapophysis on 3 or 4 posteriormost abdominal vertebrae.

Coloration. In preservation of ethonal, body uniformly colored creamy white or light brown, black scale pockets distributed from dorsal aspect to the entire body surface; dorsal surface of snout and head loosely to densely covered by chromatophores; ventral surface of head with scattered chromatophores; black patch at upper part of gill cover; areas of chromatophores developed with size, in sequential order from the base of each fin, anterior lobe of dorsal fin, caudal fin, anterior lobe of anal fin, posterior lobe of dorsal fin, posterior lobe of anal fin, and then pectoral fin; middle portions of dorsal and anal fin colorless; on pelvic fin, punctate chromatophores only appear on
the innermost rays and become denser with growth; dorsal groove densely covered by chromatophores; ventral groove whitish, with scattered chromatophores. Peritoneum uniformly whitish; pyloric caeca and intestine blackish.

**Distribution.** Western Pacific Ocean, collected from all around Taiwan.

**Remarks.** Shen and Wang (1991) described three color types that were also observed in our materials. Moreover, two body forms sharing similar morphometric and meristic values were found in our materials. The deep-body form has relatively scattered chromatophores on the ventral part of the body in corresponding to their Type 1. The narrow-body form has denser chromatophores on the ventral part of the body in corresponding to their Type 2. Type 3, with black color on caudal fin, might have been described as *B. pseudolanceolatus* by Torii et al. (2004). The connection between intestine and pyloric caeca are different in both body forms. The intestine of deep-body form is connected to pyloric caeca laterally (Fig. 5B), as shown in two other species (Figs. A and D), whereas the narrow-body form is connected to pyloric caeca dorsally (Fig. 5C). We may assume that these two forms are two different species, but it requires more scientific support to confirm the statement.

**Bregmaceros pseudolanceolatus** Torii, Javonillo and Ozawa, 2004

Fig. 1A-C


**Material examined.** NMMB-P1269 (2, 81.1-85.3), Chun-chou, Kaohsiung, Taiwan, 29 Oct. 1984. NMMB-P3177 (1, 76.9), Taichong harbor, Taichong, Taiwan, 6 Apr. 2002. NMMB-P12084 (2, 68.8-89.7), Tongkang fish market, Taiwan, 25 Dec. 2007. NMMB-P12260 (1, 78.7), Da Nang, Vietnam, 11 Apr. 2011.

**Description.** Dorsal fin rays 60-63; anal fin rays 64-65; pectoral fin ray 17-21; principal caudal fin rays 14-16; total caudal fin rays 27-30; abdominal vertebrae 12-13; caudal vertebrae 40-43; total vertebrae 52-55; longitudinal scales 70-78; transverse scales 14-15.

Body moderately elongate, slightly compressed; snout rounded; mouth oblique, upper jaw slightly overhanging the lower jaw, mouth cleft ends posteriorly below the rear margin of eye; eye covered by adipose eyelid dorsally. Two irregular
rows of medium size teeth on each upper jaw and lower jaw; a row of irregular medium conical teeth on vomer; tiny teeth present on first gill arch. Dorsal and anal fins with long base; origin of dorsal fin just above that of anal fin, preanal length:predorsal length ratio = 0.97-1.03; a narrow groove on dorsal surface that housed the occipital rays; a broad groove on ventral surface, which housed the pelvic fins, with a dermal flap on each side; caudal fin rounded or slightly pointed, the middle rays longest. Opercle bifurcate; the upper fork slender anteriorly and well-expended posteriorly, usually with some secondary forks; the lower fork relatively narrow with posterior margin somewhat irregular, tapering ventrally with a blunt margin or sometimes forked (Fig. 7). A relatively broad dermal flap on pectoral axis, usually with a lower triangular projection (Fig. 3D). Small cycloid scales on body, nearly rounded and usually deciduous; circuli concentric around focus on exposed part; longitudinal ridges slightly oblique toward the axial at anterior border on covered part (Fig. 4D); no scales on check. Two large pyloric caeca, the one on the right connected to intestine laterally (Fig. 5D). A board-like parapophysis on three posteriormost abdominal vertebrae.

Coloration. In preservation in preservation, body uniformly colored creamy white or light brown, black scale pockets on dorsal half and uniformly pale on ventral half of lateral body; areas of chromatophores developed with age/size; dorsal surface of snout and head scatteredly to densely covered by chromatophores; a brown to black patch above the opercle; distal part of anterior lobe of dorsal fin with punctate chromatophores to uniformly black; punctate chromatophores on middle portion of posterior lobe of dorsal fin or not; upper part of pectoral fin solid black, ventral 5-8 rays colorless; anal fin colorless or with few chromatophores on base of anterior lobe; pelvic fin pale; chromatophores developed with age and size from the tip of caudal fin and spread anteriorly, posterior 1/3 to 2/3 of caudal fin rays or all rays dark brown; ventral groove pale, without any chromatophore. Peritoneum whitish; pyloric caeca blackish; intestine blackish anteriorly and pale posteriorly.

Distribution. Eastern Indian Ocean to western Pacific Ocean, collected from all around Taiwan.

Remarks. This species has long been misidentified as *B. mcclellandi* due to its black pectoral fin. However, Torii et al. (2004) mentioned that part of the specimens of *B. pseudolanceolatus* showed consistently black in color on dorsal part of pectoral fin. All our specimens with this character are identical to *B. pseudolanceolatus*, which differs from *B. mcclellandi* in having a rounded caudal fin (vs. forked); pectoral
fin pale or upper half with solid black color (vs. uniformly solid black); dorsal fin rays 60-63 (vs. 52-59); and anal fin rays 64-65 (vs. 54-60). The data referred to *B. mcclellandi* by Shen and Wang (1991) were identical to the present species.

Acknowledgement

We thank M. Matsumura (Kagoshima University) for providing valuable references and S.-I. Wang for curatorial assistance. This study is supported by the National Museum of Marine Biology & Aquarium to HCH (NMMBA100200354). We thank S. P. Yim and J. H. Tham for reading the manuscript and for improving the writing.

References


台灣產犀鱈（鱈形目：犀鱈科）之重新檢視

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摘 要

本文重新檢視台灣產犀鱈科物種，共計確認有一屬四種，分別為日本犀鱈、尖尾犀鱈、澎湖犀鱈及擬尖尾犀鱈。過去所記錄的麥氏犀鱈經重新鑑定，確認為擬尖尾犀鱈之誤鑑，因此不產於台灣。本文並提供台灣產四種犀鱈之檢索資料。

關鍵詞: 魚類、鱈形目、分類學、魚類相、台灣