

**Nomenclatural reassessment of the sea bass
Lateolabrax maculatus (McClelland, 1844)
(Percichthyidae) and a redescription of the species**

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Abstract. A reassessment of the nomenclature of the sea bass *Lateolabrax maculatus* (Percichthyidae), found in Chinese waters, the South China Sea and off the western coast of the Korean Peninsula, is given. An earlier suggestion that *Holocentrum maculatum* McClelland 1844 was preoccupied by *Holocentrus maculatus* Bloch 1790 was judged to have been invalid owing to a clear indication in the original description of *Holocentrum* Cuvier 1829 that the spelling of such was distinct from that of *Holocentrus* Scopoli 1777, rather than representing a misspelling or unjustified emendation. Although *Holocentrum* Cuvier 1829 may be regarded as a subjective synonym of *Holocentrus* Scopoli 1777, there are no problematic species taxa common to both genera. Thus, *Holocentrum maculatum* McClelland 1844 is regarded as valid, the presently accepted binomial for the species being *Lateolabrax maculatus* (McClelland 1844). A redescription of *Lateolabrax maculatus* is given on the basis of 169 specimens, collected primarily from Chinese waters.

Key words: sea bass, *Lateolabrax maculatus*, *Lateolabrax japonicus*, redescription, taxonomy, nomenclature

Introduction

Originally proposed by Bleeker (1854–57) for a single species, *Lateolabrax japonicus* (Cuvier, 1828) (Japanese sea bass), from Japan, the genus *Lateolabrax* (Percichthyidae: Perciformes) includes the sea basses distributed along the coasts of eastern Asia. A second Japanese species, *Lateolabrax latus* (flat sea bass), was described by Katayama (1957). More recently, Yokogawa and Seki (1995) concluded that differences between the Japanese and Chinese forms of *L. japonicus* were sufficient for them to be recognized as being specifically distinct, referring to the Chinese form as *Lateolabrax* sp. Subsequently, Yokogawa and Tajima (1996) proposed the common name “spotted sea bass” for the latter. Although the

name *Lateolabrax maculatus* has sometimes been applied to spotted sea bass (e.g., Kim et al., 2001; Zhao et al., 2005), a taxonomic basis for this has not been given. Accordingly, the present study reevaluated the taxonomic status of spotted sea bass and provided a redescription of the species.

Materials and methods

A total of 169 spotted sea bass specimens were examined in this study, most being deposited in the following institutions: Laboratory of Marine Biology, Faculty of Science, Kochi University (BSKU); Tokushima Prefectural Museum (TKPM) and Kanagawa Prefectural Museum of Natural History (KPM). Catalogue numbers and details of the specimens are as follows.

BSKU 100770–100787 (18), 101787–101826 (40), imported from China (Yantai) and cultured in

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Japan (Kagawa); TKPM-P 1655 (40), uncatalogued specimens (33), imported from China (locality unknown) as aquacultural seeds; BSKU 66398–66399 66401–66406(8), TKPM-P 6114, 6140, KPM-NI 9686–9689, 9691–9694(8), uncatalogued specimens (17), collected from Uwajima, Ehime (presumed escapees from nurseries); TKPM-P 16897, KPM-NI 9696, uncatalogued specimen (1), collected from eastern Seto Inland Sea (presumed escapee from nursery).

Most of the specimens had been previously genetically identified as spotted sea bass, using isozyme analysis (Yokogawa & Seki, 1995). Methods for morphological measurements totally followed Yokogawa & Seki (1995). Because growth-related proportional changes are common in this species (Yokogawa, unpubl.), proportional values have been omitted from the description.

Lateolabrax maculatus

(McClelland, 1844) (Figs. 1, 2)

Holocentrum maculatum: McClelland, 1844: 395, pl. 21(fig. 1) (in part; description and illustration) syntypes, type locality: China (Ningpo and Chusan).

Labrax japonicus (not of Cuvier): Richardson, 1846: 222 [in part; synonymy; China (Hong Kong, Canton, Peiho and Chusan)].

Labrax lyiuu: Basilewsky, 1855: 219 (in part; description; China); Möllendorff, 1877: 106 [in part; China (Peiho)].

Percalabrax japonicus (not of Cuvier): Günther, 1859: 71 [in part; brief description and synonymy; China (Chusan)]; Kner, 1867: 13–14 [in part; description; China (Shanghai)]; Günther, 1873: 240 [in part; brief description; China (Shanghai)]; Martens, 1876: 385 [list; China (Shanghai)]; Peters, 1881: 921 [list; China (Ningpo)]; Steindachner, 1892: 359 [in part; brief description; China (Yang-tse-kiang)].

Percalabrax poecilnotus: Dabry de Thiersant, 1872: 178, pl. 36 (fig. 2); [in part; brief description and illustration; China (Yangtsee River)];

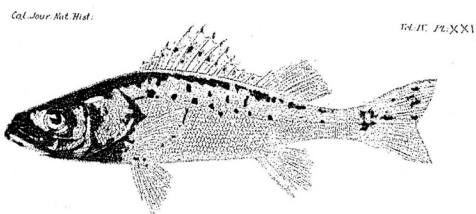


Fig. 1. Illustration of *Holocentrum maculatum* from McClelland (1844) (pl. 21, fig. 1).

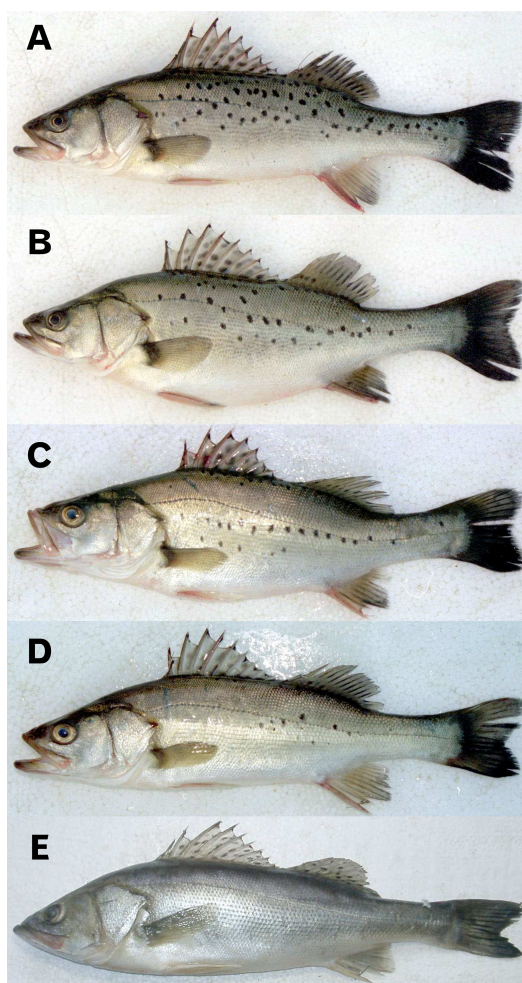


Fig. 2. Variations in spot numbers on the lateral body region of *Lateolabrax maculatus* (all specimens genetically identified) (A: BSKU 100773, TL 301.4 mm; B: BSKU 100782, TL 275.4 mm; C: BSKU 100772, TL 247.6 mm; D: BSKU 100775, TL 250.4 mm; E: Uncatalogued specimen, TL 443.0 mm).

- Sauvage, 1881: 104 [in part; list; China (Swatow)].
- Percalabrax spilonotus*: Dabry de Thiersant, 1872: 178, pl. 36 (fig. 3); [in part; brief description and illustration; China (Yangtsee River)].
- Lateolabrax japonicus* (not of Cuvier): Bleeker, 1872: 137 [in part; list; China (Canton, Hongkong, Chusan, Shanghai, Pei-ho)]; Boulenger, 1895: 122–124 [in part; description and synonymy; China (Chefoo, Shanghai, Hae-yoe, Amoy, Chusan and Formosa)]; Rutter, 1897: 73 [in part; list and synonymy; China (Swatow)]; Günther, 1898: 258 [in part; list; China (Newchwang)]; Jordan & Evermann, 1902: 341 [in part; Formosa (Keerun)]; Jordan & Seale, 1905: 521 [in part; brief description; China (Shanghai)]; Jordan & Starks, 1906: 517 [in part; brief description; China (Port Arthur)]; Jordan & Richardson, 1909: 183 [in part; list; Formosa (Keerun)]; Evermann & Shaw, 1927: 115 [in part; brief description; China (Hangchow and Woosung)]; Reeves, 1927: 9 [in part; list; China (Hong-kong)]; Mori, 1928a: 70 [in part; list; China (Yalu River)]; Mori, 1928b: 70 [in part; China (Tsi-nan)]; Nichols, 1928: 51 [in part; list; China (Fukien)]; Tchang, 1928: 36, fig. 41 [in part; description and illustration; China (Nanking)]; Fowler & Bean, 1930: 190–191 (in part; description and synonymy; Hong Kong); Shaw, 1930: 192–193, fig. 30 [in part; brief description, illustration and synonymy; China (Soochow)]; Sowerby, 1930: 185 [in part; synonymy; China (Pe-chi-li Gulf, Liao-tung Gulf, Corea Bay, Yellow Sea, Pei-tai-ho, Tientsin)]; Herre, 1932: 435 [in part; list; China (Kwangtung Prov.)]; Chow & Tchang, 1934: 89–90, fig. 56 [in part; brief description, illustration and synonymy; China (Hebei)]; Kimura, 1934: 196–199 [in part; description and synonymy; China (Kiukiang, Kiangsi Prov. and Kiangyin, Kiangsu Prov.)]; Mori & Uchida, 1934: 12 [in part; list; Korea (Incheon)]; Kimura, 1935: 20–21 [in part; brief description; China (Tsung-Ming Island)]; Wang, 1935: 418–419 [in part; description and synonymy; China (Chefoo)]; Fowler, 1938: 257–259, fig. 10 (in part; description and synonymy; Hong Kong); Miyadi, 1940: 79 [in part; brief description and illustration; China (Manchuria)]; Nichols, 1943: 245–246 [in part; brief description; China (Ningpo, Shanghai, Chinwangtao, Fukien and Canton)]; Mori, 1952: 83 (in part; list; Korea); Tchang et al., 1955: 96–97, fig. 64 [in part; description and illustration; China (Yellow and Bohai Seas)]; Zheng, 1955: 88, fig. 85 (in part; illustration; China); Wang, 1958: 271–272, fig. 279 (in part; brief description and illustration; China); Katayama, 1960a: 25–27, pl. 27 (in part; description, synonymy and illustration); Katayama, 1960b: 83–86, fig. 42(C) (in part; description, synonymy and illustration); Chu et al., 1962: 314, fig. 261 [in part; brief description, synonymy and illustration; China (Qinzhou, Beihai, Shanwei)]; Chen, 1963: 88, fig. 90(1) (in part; illustration; China); Chu et al., 1963: 225, fig. 173 [in part; brief description, synonymy and illustration; China (Zhoushan, Dongxiang, Kanmen)]; Chan & Tang, 1968: 52, pl. 26 (in part; brief description and illustration; Hong Kong); Wu et al., 1978: 250–251, fig. 265 (in part; brief description and illustration; China); Wu et al., 1979: 233, fig. 133 (in part; brief description and illustration; China); Tang et al., 1980: 487, figs. 1–2 (monochrome photo; Taiwan); Perng et al., 1980: 492–494, figs. A–M (illustration of eggs and larvae; Taiwan); Katayama, 1984: pl. 108(I) (in part; brief description and color photo); Shen, 1984: 37, pl. 37(288-1) (in part; brief description and color photo; Taiwan); Chu, Y. 1985: 34–35, fig. 369 [in part; brief description and illustration; China (Pingtan, Xiamen)]; Yamada, 1986: 130 (in part; brief description, color photo and pictorial key; East China Sea); Chen, 1987: 232–234, fig. 158 [in part; brief description, synonymy and illustration; China (Liaoning Prov.)]; Cheng & Zheng, 1987: 124 (in part; key and illustration; China); Zheng, 1987: 169 (in part; brief description and illustration; China); Wan & Chen, 1988: 209–210, pls. 1–4 (illustration of eggs and larvae; Bohai Sea); Zheng, 1989: 306, fig. 235 [in part; brief description, synonymy and illustration; China (Zhujiang)]; Chen et al., 1990: 179–180,

- fig. 168 [in part; brief description and illustration; China (Qiantang Jiang)]; Choi et al., 1990: 175 (in part; brief description and illustration; Korea); Choi, 1991: 40 (in part; brief description and illustration; Korea); Li & Zhang, 1991: 40–42, fig. 37 (in part; brief description and illustration; Bohai Sea); Mao et al., 1991: 185–186, fig. 148 [in part; brief description and illustration; China (Zhoushan, Zhenhai, Haimen, Ruian and Cangnan)]; Pan et al., 1991: 364, fig. 217 [in part; brief description, synonymy and illustration; China (Guangdong Prov.)]; Liang, 1992: 89–90, 179–180, fig. 41 (in part; brief description and illustration; China); Yang, 1992: 92–93, fig. 5-68(2) (in part; illustration; China); Kim & Kang, 1993: 68 (in part; brief description and color photo; Korea); Tchang et al., 1994: 96 [in part; description and illustration; China (Liaoning, Hebei and Shandong Provs.)]; Yamada et al., 1995: 30, 126 (in part; color photo and pictorial key; East China and Yellow Seas); Zhu, 1995: 169–170, fig. 904 (in part; key and illustration; China); Chen et al., 1997: 40 (in part; brief description and color photo; southern China); Cheng & Zhou, 1997: 251–252, fig. 184 [in part; brief description and illustration; China (Shandong Prov.)]; Kim, 1997: 410–412, fig. 145a, b (in part; description, illustration, color photos and synonymy; Korea); Ni & Kwok, 1999: (in part; list; Hong Kong); Randall & Lim, 2000: 608 (in part; list; South China Sea); Sadovy & Cornish, 2000: 74 (in part; brief description and color photo; Hong Kong); Kottelat, 2001: 58 (in part; list; northern Vietnam); Wang et al., 2001: 213–214, fig. 140 [in part; brief description and illustration; China (Hebei Prov.)]; Kim & Park, 2002: 330–331 (in part; description and color photos; southwest coast of Korea); Lou et al., 2002: 86, [monochrome photo, China (Weihai, Zhoushan, Fuzhou, Xiamen and Beihai)]; Zhao, 2002: 122 (in part; brief description and illustration; China); Yao & Yoshida, 2006: 21 (in part; brief description and color photo; China).
- Lateolabrax japonicus*, J-type** (spotted type on body surface): Park et al., 1996: 438, fig. 1(a) [monochrome photo; Korea (Yeocheong)].
- Lateolabrax* sp.:** Yokogawa & Seki, 1995: 438, fig. 1 (monochrome photo; China); Nakabo, 1995: 304–305, [color photos; China (Xiamen and Yantai)]; Yokogawa, 1995b: 27, 72 (color photos and pictorial key); Yokogawa & Tajima, 1996: [Taiwan (Changhua)]; Yokogawa et al., 1996: 32, fig. 1 [monochrome photo; Japan (around Shikoku)]; Kim & Jun, 1997: 109, fig. 1(B) [description, synonymy and monochrome photo; Korea (Puan-gun and Koheun-gun)]; Myoung et al., 1997: 18, fig. 7 [(monochrome photos of post-larvae; Korea (Koheun-gun)]; Kim et al., 1998: 80–83, figs. 1–3 [illustrations; Korea (Koheun-gun)]; Yokogawa, 1998: [China (Yantai)]; Mizuno et al., 1999: 8, fig. 35 [in part; monochrome photo; Japan (Uwajima)]; Hatooka, 2000: 683 (pictorial key); Chen et al., 2001: [China (Laizhou)]; Ruan et al., 2001: [China (Weihai)]; Yokogawa, 2002: 121 (pictorial key); Yoon, 2002: 307 (pictorial key; Korea); Yamada et al., 2007: 535, pl. 25(6) (in part; pictorial key and color photo; East China and Yellow Seas); Taki, 2008: 157 (in part; color photos; Japan); Ishikawa & Senou, 2010: 72 [color photo; Japan (Sukumo)].
- Lateolabrax maculatus*:** Feng & Jiang, 1998: (osteological, anatomical and larval illustrations; China); Kim et al., 2001: 90, 222, (in part; brief description and color photo; Korea); Wu, 2002: 554–555, color fig. 59, fig. 265 [in part; brief description, illustration and color photo; China (Shanghai, Xiamen, Shandong)]; Kim et al., 2005: 271–272 (in part; brief description, key and color photo; Korea); Zhao et al., 2005: 672, fig. 2(A, B) [illustration of juveniles; China (Hangzhou estuary)]; Liu et al., 2006: [China (Weihai, Zhoushan, Fuzhou, Xiamen and Beihai), Korea (Mokpo)]; Zhao & Zhong, 2006: 23, 99, fig. 156 [in part; brief description and color photo; China (Zhoushan)]; Hu et al., 2007: [China (Weihai, Zhoushan and Beihai)]; Yokogawa and Kishimoto, 2012.
- Diagnosis.** Generally, many clearly defined black spots, of similar size to pupil, on upper half of trunk

(even below lateral lines) and caudal peduncle. Body and caudal peduncle somewhat deeper. Dorsal head and pectoral fin base squamation not developed in smaller individuals. Pored scales on lateral line 66–84, gill rakers on first arch 3–9+13–18=18–26, vertebrae 15–16+18–20=34–36 (mode 35).

Description. Meristic counts are shown in Table 1. Body long and slender, compressed, elevated at middle of trunk. Entire body, except snout and jaw region, covered with small ctenoid scales. Lateral lines distinct, running from upper region of opercle to caudal base, with an upward curve. Head moderately large, pointing forward, becoming relatively shorter with growth. Interorbital space wide, slightly convex and rough. Eyes large, apparently becoming relatively smaller with growth, located at anterior upper border of head. Jaws large, becoming relatively shorter with growth, lower jaw projecting over upper jaw. Scale rows on ventral surface of lower jaw in some specimens, but usually absent. Teeth villiform, arranged in narrow bands on internal edge of jaw.

Table 1. Meristic counts of *Lateolabrax maculatus*.

	Range	Average
Dorsal fin spines	12–14	12.85
Dorsal fin soft rays	12–14	12.96
Anal fin spines	2–4	3.00
Anal fin soft rays	6–9	7.56
Pectoral fin soft rays	15–18	16.51
Pelvic fin spines	1–1	1.00
Pelvic fin soft rays	5–5	5.00
Pored scales on lateral line	66–84	74.09
Scales above lateral line	13–18	15.54
Scales below lateral line	16–23	19.30
Gill rakers (upper limb)	3–9	6.73
Gill rakers (lower limb)	13–18	15.49
Gill rakers (total)	18–26	22.22
Vertebrae (abdominal)	15–16	15.91
Vertebrae (caudal)	18–20	19.03
Vertebrae (total)	34–36	34.95
Number of spots on body	0–136	39.45

Two pairs of closely located nostrils in front of eyes, anterior nostrils with thin flaps. Preopercular edge vertical, serrated, with a few small spines at lower angle. Opercle rhombic, with two strong posteriorly directed spines at posterior angle and its upper site. Gill rakers comb-like, longest at middle of gill-arch, gradually shortening toward (and occasionally vestigial at) each end of arch. Two dorsal fins with bases barely connected, basal lengths almost equal. First dorsal fin comprising spines only, second dorsal fin including 1–2 spines and 12–14 soft rays. Caudal fin deeply notched at margin. Anal fin comprising 2–4 strong spines and 6–9 soft rays. Pectoral fins paddle-like, comprising 15–18 soft rays. Pectoral fin basal area covered with fine scales, scaly area becoming relatively larger with growth. Pelvic fins becoming relatively shorter with growth, comprising a single spine and 5 soft rays.

Coloration. When fresh, body dark silver, darker dorsally. Caudal fin blackish, other fins pale gray. Irregularly scattered black spots on upper half of trunk, caudal peduncle and both dorsal fins, number varying individually and occasionally entirely absent (Fig. 2, Table 1). When preserved in formalin or alcohol, body color somewhat yellowish, black spots remain evident.

Distribution. *Lateolabrax maculatus* is broadly distributed along the entire Chinese coast and west coast of the Korean Peninsula, also occurring in offshore waters of the Bohai and Yellow Seas, and southwards, in the South China Sea (Randall & Lim, 2000) and fresh waters of northern Vietnam (Kottelat, 2001). The species has relatively strong fresh water tolerance, it frequently occurs in rivers (>300 km from a river mouth in southern China – Zheng, 1989), being abundant in pools and rivers of Nanjing, which is located at deep inland (Tchang, 1928). Although the distribution of *L. maculatus* is almost completely distinct from that of *L. japonicus* (southern and eastern coasts of the Korean Peninsula, and Japan), the two species slightly overlap in waters off the southwestern extremity of the Korean Peninsula.

Remarks. Although *L. maculatus* has been regarded as identical with *L. japonicus* (e.g., Kata-

yama, 1960b; Yamada, 1986), a morphological and genetic examination by Yokogawa & Seki (1995) revealed that each represented a separate distinct species. Among the considerable morphological differences between them, particularly notable are 3 meristic characters (counts of lateral line scales, gill rakes and vertebrae), the combination of which provides complete separation of the two species (Yokogawa, 2002).

Eschmeyer (1998, 2013) suggested that *Holocentrum maculatum* McClelland (1844) was preoccupied by *Holocentrus maculatus* Bloch (1790), the genus *Holocentrum* (established by Cuvier, 1829) being a homonym of *Holocentrus* (established by Scopoli, 1777) owing to a misspelling or unjustified emendation. However, that argument is incorrect according to Cuvier's (1829, p.150) statement: "nous donnons comme lui à ce nom une terminaison neutre, pour qu'on ne le confonde pas avec les *Holocentrus* de Bloch et Lacépède, dans lesquels on a mêlé beaucoup d'autre espèces et surtout des serrans." [English translation: "we give a neutral termination to this name (*Holocentrum*) following him (Artedi), in order not to be confounded with *Holocentrus* of Bloch and Lacépède, which was a complex of many other species, including serranids above all"]. Because Cuvier (1829) recognized *Holocentrum* to be distinct from *Holocentrus*, the two genera cannot be regarded as identical (ICZN Art. 56.2).

On the other hand, *Holocentrum* Cuvier (1829) may be regarded as a subjective synonym of *Holocentrus* Scopoli (1777). However, this is of no concern since there are no problematic species taxa common to both genera. Accordingly, *Holocentrum maculatum* McClelland (1844) is now regarded as valid. Even if a valid senior synonym of McClelland's taxon existed, the latter would remain a presumed name owing to its adoption in some recent publications as *Lateolabrax maculatus* (see above synonymy), the senior synonym being a *nomen oblitum* (ICZN Art. 23.9).

Lateolabrax maculatus is not native to Japanese waters. However, in recent years, individuals have been recorded around Japan (e.g., Yokogawa et al.,

1996; Mizuno et al., 1999), apparently following their escape from Japanese nurseries, in which Chinese *L. maculatus* were being cultured (Yokogawa et al., 1996). At present, reproduction of *L. maculatus* in Japanese waters has not been demonstrated.

Although *L. maculatus* is characterized by pupil-sized black spots, some *L. japonicus* individuals possess similar small black dots (Yokogawa, 1995a), leading to their mis-identification as the former (e.g., Suzuki, 2008). In contrast, a few *L. maculatus* individuals entirely lack such spots (Fig. 2E, Table 1), appearing similar to sea bass without spots from the western coast of Korea (Kim, 1997). Hence, the former may be mis-identified as *L. japonicus*. Such mis-identifications may be more common when a simple criterion (presence or absence of black spots) is used (Youn, 2002). Therefore, identifications should be carefully made on the basis of several criteria, including not only presence or absence of black spots but also key meristic characters (see above).

Some recent Korean and Chinese literature incorrectly notes that *L. maculatus* is distributed also in Japan (Kim & Jun, 1997; Kang, 2000; Kim et al., 2001; Wu, 2002; Kim et al., 2005), possibly on the basis that sea bass morphologically somewhat similar to *L. maculatus* occur in the Ariake and Yatsushiro Seas, western Kyushu, Japan. In fact, sea bass populations inhabiting these waters have been shown to have resulted from introgressive hybridization between *L. japonicus* and *L. maculatus* (Yokogawa et al., 1997; Tanaka, 2000; Yokogawa, 2002, 2004; Nakayama, 2002), rather than being pure *L. maculatus*. Furthermore, the genetic contribution of *L. japonicus* to these populations is greater, resulting in greater morphological similarity to *L. japonicus* rather than *L. maculatus* (Yokogawa et al., 1997). Accordingly, the populations should be taxonomically treated as a local form of *L. japonicus*. Because the presence of similar hybrid populations has been suggested around the southwestern extremity of the Korean Peninsula (Yokogawa, 2004), where distributions of *L. maculatus* and *L. japonicus* overlap, further studies should be considered.

Acknowledgments

The author is deeply grateful to Dr. Hiroshi Senou (KPM) for his great contribution to this study, providing available taxonomic advice and the original description of *Lateolabrax maculatus*. Dr. Kunio Sasaki (BSKU), Dr. Yoichi Sato (TKPM) and Dr. Hiroshi Senou (KPM) registered the *L. maculatus* specimens used in this study. Dr. Hiromitsu Endo (BSKU), Dr. Shi Dong, Tianjin Normal University, China, Dr. Tianxiang Gao and Mr. Yanping Wang, Ocean University of China, and Ms. Bogyong Heo, Ulsan City, Korea, provided some literature. Finally, I wish to thank Dr. Graham S. Hardy, Ngunguru, New Zealand, for checking the manuscript.

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(Received June 30, 2013; Accepted July 17, 2013)