

New Record of *Sebastes nudus* and Redescription of *Sebastes pachycephalus* (Pisces: Scorpaenidae) from Korea

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Abstract

Using the criteria of previous study, we analyzed the morphological characters of 66 specimens of the *Sebastes pachycephalus* complex collected from Korea between 2008 and 2013. As a result, the 37 specimens were identified as *Sebastes nudus*, and the remaining specimens as *Sebastes pachycephalus*. *Sebastes nudus* is characterized by the absence of scales below the base of the dorsal fin spines; the absence of dark spots on the dorsal, anal, and caudal fins; and the presence of distinct yellow or brownish-red markings on the dorsum (when fresh). The most similar species *S. pachycephalus* differs from *S. nudus* in having minute scales below the base of the dorsal fin spines. We propose the new Korean name “Hwang-jeom-gae-bol-rak” for *S. nudus*, and redescribe *S. pachycephalus*.

Key words: *Sebastes nudus*, *Sebastes pachycephalus*, New record, Redescription, Korea

Introduction

Sebastes pachycephalus Temminck and Schlegel 1843 belonging to the family Scorpaenidae is commonly seen in shallow rocky areas in the northwestern Pacific including Korea and Japan (Nakabo, 2002; Nelson, 2006). Because of the great variations in coloration, its taxonomy has been confused (Jordan and Starks, 1904; Matsubara, 1943; Amaoka, 1984; Nakabo, 2002). Matsubara (1943) first divided *S. pachycephalus* into four subspecies (*Sebastes pachycephalus pachycephalus*, *S. p. nigricans*, *S. p. nudus*, and *S. p. chalcogrammus*), and then Nakabo (2002) further reassigned them into two groups (group *S. p. pachycephalus* and *S. p. nigricans*, group *S. p. nudus* and *S. p. chalcogrammus*). Recently, using morphological and molecular methods, Kai et al. (2011) and Kai and Nakabo (2013) demonstrated that only *S. pachycephalus* and *S. nudus* are distinct species. In Korea, *S. pachycephalus* was first reported as *Sebastichthys pachycephalus* by Jordan and Metz (1913). Later, Chyung (1961) redescribed the specimens as *S. pachycephalus*, subsequently many Korean Ichthyologists

used the scientific name (Chyung, 1977; Kim et al., 2005). In the present study, we detected the presence of two distinct species within the Korean *Sebastes pachycephalus* complex. Accordingly, we describe *S. nudus* as the first record in Korea and redescribe *S. pachycephalus* based on specimens.

Materials and Methods

A total of 66 specimens of *S. pachycephalus* complex were collected from the East Sea, the Korean Strait and water off Jeju Island, Korea between July 2008 and August 2013 (Fig. 1). Based on morphological comparisons, 37 specimens were identified as *S. nudus* and 29 specimens as *S. pachycephalus*. Counts and measurements were conducted according to the methods of Hubbs and Lagler (2004), with digital vernier caliper to the nearest 0.1 mm. Significant differences in the measurements were tested between *S. nudus* and *S. pachycephalus*.

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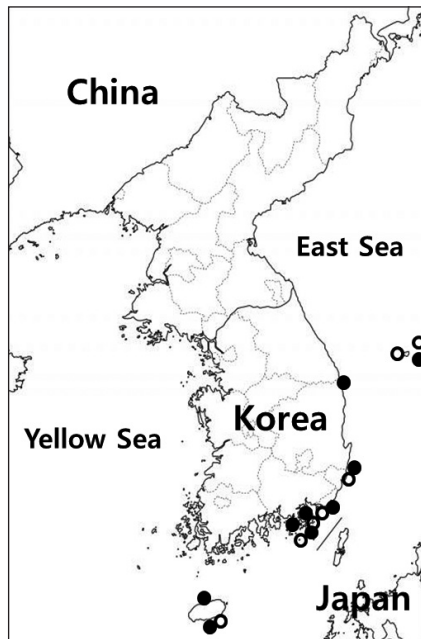


Fig. 1 Sampling sites of *Sebastes nudus* (●) and *Sebastes pachycephalus* (○).

lus with Student’s *t* test (version 18; SPSS Inc., Chicago, IL, USA). The specimens of *S. nudus* are deposited at the Department of Marine Biology, Pukyong National University (PKU) and in the National Institute of Biological Resources (NIBR), Korea.

Results and Discussion

Sebastes nudus Matsubara 1943

(new Korean name: Hwang-jeom-gae-bol-rak) (Table 1, Fig. 2)

Sebastes (Murasoius) pachycephalus, form. *nudus*: Matsubara 1943: 239 (type locality: Hakodate, Hokkaido, Japan and Busan, Korea).

Sebastes (Murasoius) pachycephalus, form. *chalcogrammus*: Matsubara 1943: 244 (type locality: Shimonoseki, Japan).

Sebastes pachycephalus nudus: Matsubara, 1955: 1077; Nakabo, 2002: 595.

Sebastes pachycephalus chalcogrammus: Matsubara, 1955: 1077; Nakabo, 2002: 595.

Sebastes pachycephalus (not of Temminck & Schlegel): Kim et al., 2005: 222.

Sebastes pachycephalus complex “species Nu-C”: Kai et al., 2011: 333.

Sebastes nudus: Kai and Nakabo, 2013: 551.

Materials examined

Thirty seven specimens, 100.5-179.6 mm in standard length (SL); NIBR P22474, 1 specimen, 170.4 mm SL, Tongyeong, Gyeongsangnam-do, Korea, 18 Jun 2013; PKU 208, 210-216, 8 specimens, 100.5-119.3 mm SL, Tongyeong, Gyeongsangnam-do, Korea, 22 Jul 2008; PKU 1585, 1 specimen, 128.4 mm SL, Udupo, Goseong, Gyeongsangnam-do, Korea, 25 Feb 2009; PKU 2006, 1 specimen, 115.7 mm SL, Geoje-do, Gyeongsangnam-do, Korea, 29 May 2009; PKU 2051, 1 specimen, 121.04 mm SL, Saeng-do, Busan, Korea, 31 May 2009; PKU 2090-2091, 2135, 2137-2138, 5 specimens, 121.6-136.6mm SL, Geoje-do, Gyeongsangnam-do, Korea, 11 Jun 2009; PKU 3404, 1 specimen, 153.2 mm SL, Seogwipo-si, Jeju-do, Korea, 4 Feb 2010; PKU 4045, 4047, 2 specimens, 133.1-163.1 mm SL, Uljin, Gyeongsangbuk-do, Korea, 22 Jun 2010; PKU 6174, 6192, 2 specimens, 153.4-179.6 mm SL, Dok-do, Gyeongsangbuk-do, Korea, 28 Aug 2011; PKU 8759-8761, 3 specimens, 133.6-162.3 mm SL, Geoje-do, Gyeongsangnam-do, Korea, 12 May 2013; PKU 9443-9444, 2 specimens, 132.3-141.3 mm SL, Jeongja-dong, Ulsan, Korea, 19 Jul 2013; PKU 9445, 1 specimen, 163.2 mm SL, Jeju-si, Jeju-do, Korea, 15 Jun 2013; PKU 9456, 1 specimen, 149.7 mm SL, Tongyeong, Gyeongsangnam-do, Korea, 18 Jun 2013; PKU 9458-9461, 4 specimens, 117.1-142.6 mm SL, Geoje-do, Gyeongsangnam-do, Korea, 25 May 2013; PKU 9462, 1 specimen, 120.3 mm SL, Tongyeong, Gyeongsangnam-do, Korea,

Table 1. Comparison of counts of *Sebastes nudus* among present study and others

	Present study	Matsubara (1943)		Kai and Nakabo (2013)
		Holotype of <i>S. nudus</i> FAKU 352	Holotype of <i>S. chalcogrammus</i> FAKU 6317	
No. of specimens	37	-	-	86
Standard length (mm)	100.5-179.6 (131.8)	198.5	261.8	23.2-212.8 (143.6)
Dorsal fin rays	X III, 11-14	X III, 12	X III, 13	X III, 10-13
Anal fin rays	III, 6	III, 5	III, 6	III, 5-7
Pectoral fin ray (right)	16-18	17	17	16-18
Pectoral fin ray (left)	16-18	17	18	16-18
Pored lateral-line scales	29-33	32	32	29-33

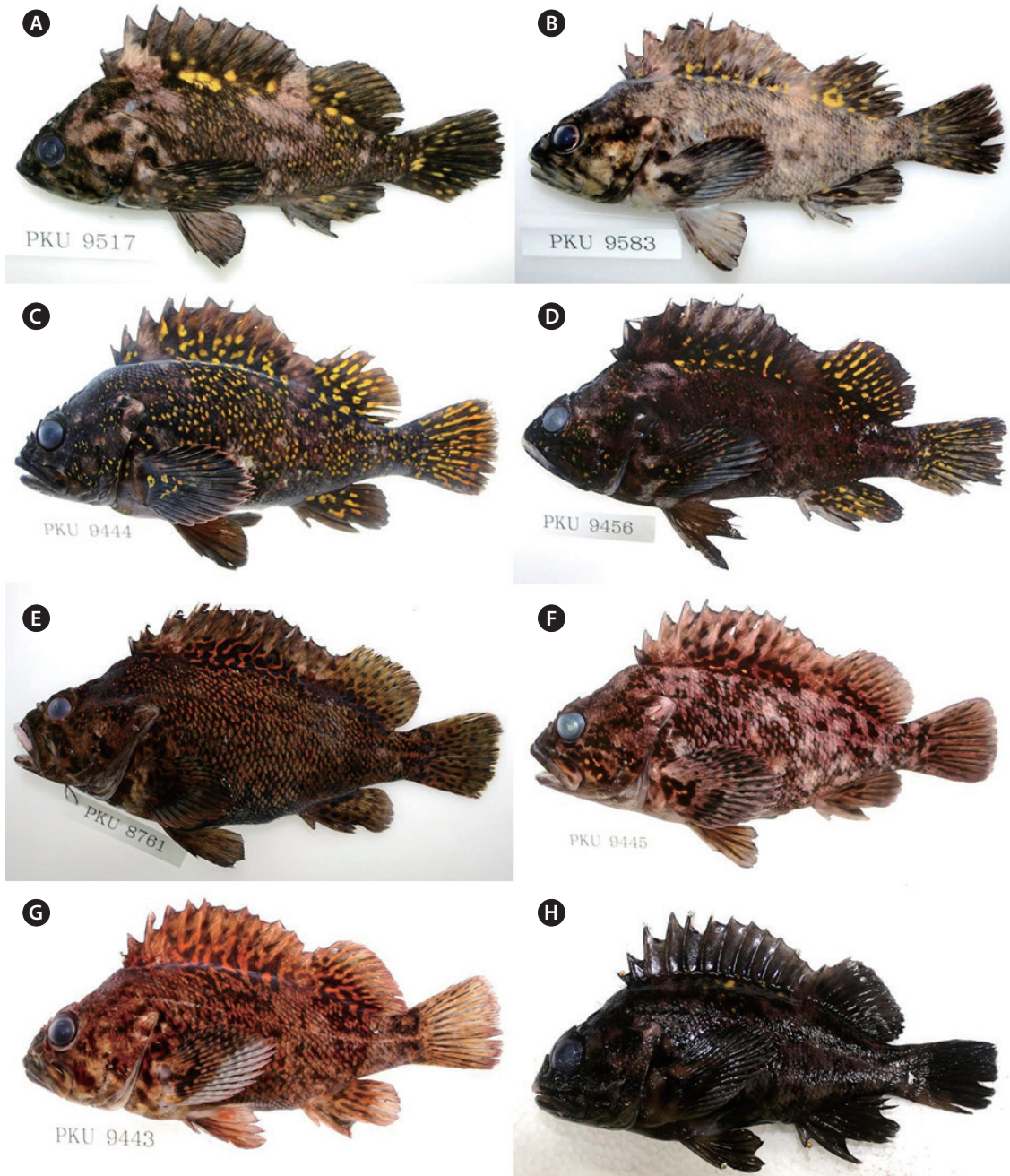


Fig. 2. *Sebastes nudus* when fresh. (A) PKU 9517, 126.51 mm standard length (SL), Saeng-do, Busan, Korea. (B) PKU 9583, 125.38 mm SL, Ulsan, Korea. (C) PKU 9444, 141.26 mm SL, Jeongja-dong, Ulsan, Korea. (D) PKU 9456, 149.66 mm SL, Tongyeong, Gyeongsangnam-do, Korea. (E) PKU 8761, 154.97 mm SL, Geoje-do, Gyeongsangnam-do, Korea. (F) PKU 9445, 163.17 mm SL, Jeju-do, Korea. (G) PKU 9443, 132.29 mm SL, Jeongja-dong, Ulsan, Korea. (H) PKU 9462, 120.31 mm SL, Tongyeong, Gyeongsangnam-do, Korea.

31 May 2013; PKU 9517, 1 specimen, 126.5 mm SL, Saeng-do, Busan, Korea, 24 Jul 2013; PKU 9582-9583, 2 specimens, 116.2-125.4 mm SL, Ulsan, Korea, 5 Aug 2013.

Description

D. X III, 11-14; A. III, 6; P₁. 16-18; P₂. I, 5; LLp. 29-33.

Counts and measurements are shown in Tables 1 and 2.

Body relatively deep, moderately compressed, steeply inclined from snout to origin of the dorsal fin (Fig. 2). Mouth large and slightly oblique upward. Posterior margin of the maxilla reaching to the posterior margin of the orbit. Head large and completely covered with ctenoid scales, except for

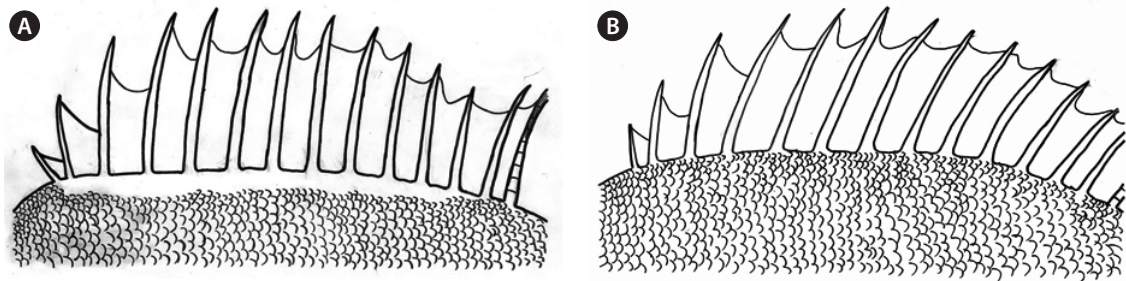


Fig. 3. *Sebastes nudus* (A) and *Sebastes pachycephalus* (B), showing the squamation pattern below the base of the dorsal fin spines.

the tip of the snout, maxillary, lacrimal, lower jaw, interopercle, and branchiostegal membranes. Eye relatively large and round. Interorbital region concave and covered with scales. A single pair of nostril presents in front of eye. Strong spines well developed in the head: nasal spine simple, sharp, directed dorsally; preocular spine robust, well developed; supraocular spine robust, well developed, tip of spine reaching or extending beyond the posterior margin of the orbit; postocular spines simple, directed dorsoposteriorly; parietal spine well developed; suborbital without spine or ridge; lacrimal with round lobe anteriorly and one spine posteriorly, the spine sharp, directed dorsally; preopercle with five spines, first and second spines large, well developed, directed posteriorly, fourth and fifth spines small, blunt, directed ventroposteriorly; opercle with two sharp spines, directed posteriorly, upper spine somewhat larger than lower spine. Body covered with ctenoid scales, except for the pectoral fin base, prepelvic region and ventral abdominal region. Pectoral fin base, prepelvic region and ventral abdominal region covered with cycloid scales, ventral abdominal usually surface with narrow naked area anteriorly. No minute scales below the base of the entire spinous portion of the dorsal fin, but sometimes with minute scales below the first to fifth spines or variously to posteriormost spine (Fig. 3). First dorsal spine short, fifth spine longest, last spine longer than the penultimate spine. All dorsal soft rays branched, entire margin rounded. Caudal fin slightly convex but close to truncate. Pectoral fin rounded, not reaching posteriorly to the anus. Second anal spine robust, longest.

Coloration

Sebastes nudus shows much variation in its coloration, including in the color, size, number, and distribution of the markings on the body, head, and fins (Fig. 2A-2H). When fresh, the body and head are generally brown or dark brown, sometimes with a light brown (Fig. 2A, 2B, and 2F) or reddish pattern on the body (Fig. 2F and 2G). The head has three dark brown irregular bands radiating from the eye. The dorsal, caudal, anal, and pectoral fins generally lack dark brown spots, sometimes present but then indistinct. Dorsum part of the body and dorsal, caudal, and anal fins have irregular yellow or brownish-red markings (Fig. 2A-2G), but sometimes small

and indistinct (Fig. 2H). Yellow or brownish-red markings occasionally occur on the head and pectoral fin base (Fig. 2C, 2D, and 2F). After fixation in formalin, the head and body are dark overall. Yellow and brownish-red markings when fresh, appearing as pale or white markings when preserved.

Distribution

East Sea, Korean Strait, and Jeju Island in Korea (present study), Japan (from southern Hokkaido southward along the Pacific coast of Japan to Kanagawa, the east coast of Japan to northern Kyushu Island, Seto Inland Sea) (Kai and Nakabo, 2013), and China (Bohai and Yellow Sea) (Kai and Nakabo, 2013).

Remarks

The present specimens were identified as *S. nudus*, based on the following characters: lack of scales below the base of the dorsal fin spines, and yellow or brownish-red markings on the dorsum (Kai and Nakabo, 2013). This species is very similar morphologically to *S. pachycephalus*, but they are easily distinguishable by the minute scales below the base of the dorsal fin spines (present in *S. pachycephalus* vs. absent in *S. nudus*), the dark spots on the dorsal, anal, and caudal fins (distinct in *S. pachycephalus* vs. faint in *S. nudus*), and the yellow or brownish-red markings on the dorsum (absent in *S. pachycephalus* vs. present in *S. nudus*) (Kai and Nakabo, 2013). *S. nudus* also differs from *S. pachycephalus* in the size of each fin (those of *S. nudus* are larger than those of *S. pachycephalus*) and the number of pectoral fin rays (17-19 in *S. pachycephalus* [mode = 18] vs. 16-18 in *S. nudus* [mode = 17]) (Tables 2, 3). Our results correspond well with the previous study (Kai and Nakabo, 2013). Therefore, we propose a new Korean name “Hwang-jeom-gae-bol-rak” for *S. nudus*.

Sebastes pachycephalus Temminck and Schlegel 1843

(Korean name: gae-bol-rak) (Table 4, Fig. 4)

Sebastes pachycephalus Temminck & Schlegel 1843: 47 (type locality: Nagasaki, Japan).

Sebastes (Murasoius) pachycephalus, form. *pachycephala-*

Table 2. Comparison of measurements between *Sebastes nudus* and *S. pachycephalus*

	<i>S. nudus</i>		<i>S. pachycephalus</i>	
	Present study	Kai and Nakabo (2013)	Present study	Kai and Nakabo (2013)
No. of specimens	37	86	29	101
Standard length (mm)	100.5-179.6 (131.8)	23.2-212.8 (143.6)	100.0-186.1 (143.2)	24.9-318.0 (122.2)
In % of standard length				
Head length	37.3-43.8 (40.1)	38.3-44.2 (40.9)	37.3-43.5 (39.6)	31.5-44.7 (39.4)
Snout length	8.9-12.8 (11.0)	9.0-12.4 (10.2)	8.8-12.1 (10.7)	8.5-11.9 (10.2)
Orbit diameter	7.8-11.2 (9.4)	8.2-12.3 (9.9)	7.8-12.3 (9.0)	7.8-12.8 (9.8)
Interorbital width	5.4-7.9 (6.5)	4.3-9.0 (5.7)	4.8-7.3 (6.0)	3.8-8.1 (5.2)
Body depth	33.2-42.6 (37.9)	33.4-43.8 (38.3)	32.8-41.5 (36.7)	28.6-44.4 (36.8)
Body width	17.5-25.4 (21.5)	14.5-37.4 (21.4)	18.4-24.9 (21.4)	15.2-32.3 (20.5)
Caudal peduncle depth	10.7-25.4 (21.5)	10.4-12.9 (11.8)	10.9-12.4 (11.7)	8.3-14.1 (11.3)
Upper jaw length	15.8-20.6 (19.1)	16.7-21.7 (19.5)	16.8-22.1 (18.7)	15.3-22.5 (19.2)
Predorsal-fin length	32.6-37.4 (35.2)	32.7-38.5 (35.4)	29.2-64.2 (35.8)	28.6-39.2 (35.1)
Preanal-fin length	19.2-77.6 (70.0)	41.7-80.5 (72.2)	66.6-76.6 (71.2)	55.7-80.9 (71.6)
Pectoral-fin length	25.3-32.4 (29.6)**	25.5-41.7 (30.4)	23.5-31.3 (27.6)**	22.9-34.8 (28.9)
Pelvic-fin length	20.7-26.1 (23.5)**	20.0-27.0 (23.4)	19.3-24.5 (21.8)**	19.8-28.1 (23.2)
Pelvic-fin spine length	10.3-17.2 (15.2)**	11.9-17.9 (15.1)	12.0-15.9 (13.8)**	10.3-17.3 (14.3)
1st dorsal-fin spine length	4.3-7.4 (5.8)	3.5-8.9 (6.6)	4.1-8.5 (5.4)	3.1-7.2 (5.5)
2nd dorsal-fin spine length	6.4-13.3 (10.3)**	7.4-13.4 (10.8)	7.0-11.4 (8.8)**	6.3-12.2 (9.1)
3rd dorsal-fin spine length	9.6-18.2 (14.3)**	11.2-17.6 (15.1)	3.6-15.0 (11.7)**	9.8-15.7 (12.7)
4th dorsal-fin spine length	12.0-18.9 (16.2)**	13.7-19.9 (16.7)	10.3-17.0 (13.7)**	11.2-17.3 (14.4)
5th dorsal-fin spine length	12.1-19.3 (16.7)**	13.1-20.1 (16.9)	11.0-17.9 (14.3)**	11.3-17.9 (14.7)
12th dorsal-fin spine length	8.5-13.3 (10.6)**	8.0-13.6 (11.0)	6.8-12.0 (9.0)**	7.6-12.0 (9.7)
13th dorsal-fin spine length	9.7-14.2 (11.8)**	9.4-14.1 (11.9)	8.0-12.9 (10.7)**	8.6-14.3 (11.4)
Longest dorsal-fin ray length	13.4-20.0 (17.0)**	14.8-21.0 (18.3)	10.3-18.2 (15.4)**	13.6-22.3 (17.6)
1st anal-fin spine length	6.4-10.8 (8.7)*	6.3-10.7 (8.7)	5.9-16.1 (7.8)*	4.9-9.7 (8.0)
2nd anal-fin spine length	13.2-21.7 (18.4)**	10.4-20.3 (17.2)	12.2-20.6 (16.1)**	11.9-21.5 (16.9)
3rd anal-fin spine length	13.0-19.1 (16.6)**	8.8-18.7 (15.3)	12.8-18.4 (15.0)**	10.8-18.9 (15.1)
Distance between pelvic and anal-fin	22.8-39.8 (32.3)	25.6-40.1 (33.2)	24.9-341.2 (32.9)	24.7-47.5 (33.1)

Parentheses indicate means.

Significant differences between *Sebastes nudus* and *Sebastes pachycephalus* in the present study (* $P < 0.05$, ** $P < 0.01$).

Table 3. Comparison of the frequency of number of pectoral fin rays between *S. nudus* and *S. pachycephalus*

	Pectoral-fin rays (right side)					Pectoral-fin rays (left side)				
	16	17	18	19	20	16	17	18	19	20
<i>S. nudus</i>										
Present study	1	29	7	-	-	2	29	6	-	-
Kai and Nakabo (2013)	6	70	9	-	-	9	67	12	-	-
<i>S. pachycephalus</i>										
Present study	1	1	20	7	-	-	1	24	4	-
Kai and Nakabo (2013)	-	23	60	18	2	1	18	64	17	2

lus: Matsubara 1943: 239 (Chiba, Kanagawa, Aichi, Wakayama, and Kobe, Japan).

Sebastes (Murasoius) pachycephalus, form. *nigricans*: Matsubara 1943: 242 (Shimonoseki and Nagasaki, Japan).

Sebastes pachycephalus pachycephalus: Matsubara, 1955: 1077 (Chiba southward to Kyushu, Japan, Busan, Korea, and China); Chyung, 1977: 500; Nakabo, 2002: 595.

Sebastes pachycephalus nigricans: Matsubara, 1955: 1077; Nakabo, 2002: 595.

Sebastes pachycephalus complex “Species P-Ni”: Kai et al., 2011: 333.

Sebastes pachycephalus: Kai and Nakabo, 2013: 542.

Materials examined

Twenty seven specimens, 100.0-186.1 mm in standard length (SL); PKU 200-206, 5 specimens, 100.0-173.8 mm SL, Tongyeong, Gyeongsangnam-do, Korea, 22 Jul 2008; PKU 4046, 4048, 2 specimens, 114.5-186.1 mm SL, Uljin, Gyeongsangbuk-do, Korea, 22 Jun 2010; PKU 5259, 5265, 2 specimens, 142.4-157.6 mm SL, Ulleung, Gyeongsangbuk-do, Korea, 27 Mar 2011; PKU 6168, 6170, 6172-6173, 6178-6180, 6188, 6190-6191, 6195, 6401, 6403, 13 specimens, 118.0-167.8 mm SL, Dok-do, Gyeongsangbuk-do, Korea, 27 Aug 2011; PKU 7094, 1 specimen, 170.1 mm SL, Dok-do, Gyeongsangbuk-do, Korea, 6 Sep 2012; PKU 8756-8757, 2 specimens, 138.9-145.6 mm SL, Geoje-do, Gyeongsangnam-do, Korea, 12 May 2013; PKU 9442, 1 specimen, 129.5 mm SL, Jeongja-dong, Ulsan, Korea, 19 Jul 2013; PKU 9638, 1 specimen, 153.8 mm SL, Dadepo, Bussan, Korea, 2 Jun 2013; PKU 9639-9640, 2 specimens, 137.9-158.8 mm SL, Seogwi-po-si, Jeju-do, Korea, 13 Jun 2013.

Description

D. X III, 11-14; A. III, 6; P₁, 17-19; P₂, I, 5; LLp. 29-33. Counts and measurements are shown in Tables 2 and 4.

Body relatively deep, moderately compressed, steeply inclined from snout to origin of the dorsal fin (Fig. 4). Mouth large and slightly oblique upward. Posterior margin of the

maxilla reaching to the posterior margin of the orbit. Head large and completely covered with ctenoid scales, except for the tip of the snout, maxillary, lacrimal, lower jaw, interopercle, and branchiostegal membranes. Eye relatively large and round. Interorbital region concave and covered with scales. A single pair of nostril presents in front of eye. Strong spines well developed in the head: nasal spine simple, sharp, directed dorsally; preocular spine robust, well developed; supraocular spine robust, well developed, tip of spine reaching or extending beyond the posterior margin of the orbit; postocular spines simple, directed dorsoposteriorly; parietal spine well developed; suborbital without spine or ridge; lacrimal with round lobe anteriorly and one spine posteriorly, the spine sharp, directed dorsally; preopercle with five spines, first and second spines large, well developed, directed posteriorly, fourth and fifth spines small, blunt, directed ventroposteriorly; opercle with two sharp spines, directed posteriorly, upper spine somewhat larger than lower spine. Body covered with ctenoid scales, except for the pectoral fin base, prepelvic region and ventral abdominal region. Pectoral fin base, prepelvic region and ventral abdominal region covered with cycloid scales, ventral abdominal surface usually with narrow naked area anteriorly. Base of entire spinous portion of the dorsal fin densely covered with minute scales, usually extending onto basal spines and membranes (Fig. 3). First dorsal spine short, fifth spine longest, last spine longer than the penultimate spine. All dorsal soft rays branched, entire margin rounded. Caudal fin slightly convex but close to truncate. Pectoral fin, rounded, not reaching posteriorly to the anus. Second anal spine robust, longest.

Coloration

Color variation of *Sebastes pachycephalus* is relatively smaller than *S. nudus* (Fig. 4A-4D). When fresh, the body and head are generally brown or dark brown, sometimes with light brown band (Fig. 4A and 4C) or light pattern on the body (Fig. 4B and 4D). The head has three dark brown irregular bands radiating from eye. The dorsal, pectoral, anal and caudal fins

Table 4. Comparison of counts of *Sebastes pachycephalus* among present study and others

	Present study	Temminck and Schlegel (1843)	Schmidt (1931)	Kai and Nakabo (2013)
		Holotype of <i>S. pachycephalus</i> FAKU 352	Holotype of <i>S. nigricans</i> FAKU 6317	
No. of specimens	29	-	-	101
Standard length (mm)	100.0-186.1 (143.2)	261.8	150.0	24.9-318.0 (122.2)
Dorsal-fin rays	X III, 11-14	X III, 12	X III, 12	X III, 10-13
Anal-fin rays	III, 6	III, 6	III, 6	III, 6
Pectoral-fin ray (right)	17-19	-	18	17-19
Pectoral-fin ray (left)	17-19	19	-	17-19
Pored lateral-line scales	29-33	-	31	29-33

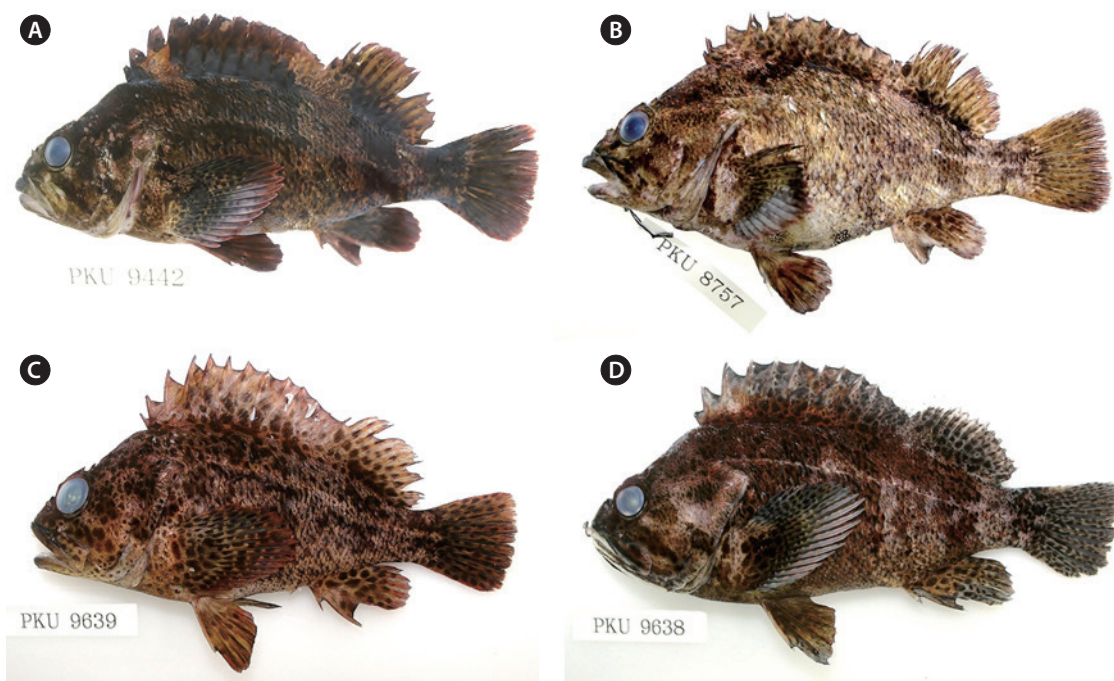


Fig. 4. *Sebastes pachycephalus* when fresh. (A) PKU 9442, 129.52 mm standard length (SL), Jeongja-dong, Ulsan, Korea. (B) PKU 8757, 145.6 mm SL, Geoje-do, Gyeongsangnam-do, Korea. (C) PKU 9639, 137.91 mm SL, Seogwipo-si, Jeju-do, Korea. (D) PKU 9638, 153.76 mm SL, Seogwipo-si, Jeju-do, Korea.

with distinct dark brown spots, sometimes indistinct. Dark brown spots occasionally occur on the head and pectoral fin base (Fig. 4C). After fixation in formalin, the head and body are dark overall. The dorsal, pectoral, anal and caudal fins with dark brown spots.

Distribution

East Sea, Korean Strait, and Jeju Island in Korea (present study), Japan (from Aomori, northern Honshu Island, southward to Kagoshima Bay, southern Kyushu Island) (Kai and Nakabo, 2013), and China (Yellow and Pohai Sea) (Kai and Nakabo, 2013).

Remarks

In Korea, *S. pachycephalus* was first reported as *Sebastes tichthys pachycephalus* by Jordan and Metz (1913). Later, Chyung (1961) redescribed the specimens as *S. pachycephalus*. However, Chyung (1977) presented sketch material using the scientific name of *S. pachycephalus pachycephalus*. His sketch was clearly identified as *S. pachycephalus* based on the following character: minute scales below the base of dorsal fin spines. In recent years, Kim et al. (2005) described *S. pachycephalus*, in which their photo was clearly identified as *S. nudus* because of the yellow markings on the dorsum. In this study, *S. pachycephalus* in Korea is clearly distinguished from *S. nudus* according to the criteria of Kai and Nakabo (2013). According to the rule for the priority of naming, therefore, we follow the fish name 'gae-bol-rak' for *S. pachycephalus*.

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