

## *Glossanodon kotakamaru*, a New Argentine Fish from Southern Japan (Protacanthopterygii: Argentinidae)

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**Abstract** A new species of argentinid, *Glossanodon kotakamaru*, is described on the basis of 11 specimens (57–125 mm SL) from Tosa Bay and off Amami Oshima Island, southern Japan. The new species differs from its congeners in having the following combination of characters: dorsal-fin rays 12–13; anal-fin rays 11–13; pectoral-fin rays 21–23; pelvic-fin rays 13–14; branchiostegal rays 5; gill-rakers on first arch 37–40; vertebrae 49–50; 2–4 small conical teeth on middle of lower jaws and 1–3 on tongue; predorsal length 48–49% SL, prepectoral length 29–30% SL, prepelvic length 55–56% SL; caudal peduncle depth 5.5–5.9% SL; head length 29–30% SL; eye diameter 32–33% HL; snout length 33% HL; maxillary depth 12% HL (in 3 larger specimens); anus immediately anterior to anal-fin origin; a longitudinal black stripe dorsal to lateral line; isthmus to thorax pigmented. The new species is a benthopelagic dweller on muddy and sandy bottoms in depths of about 150–300 m.

**Key words:** Argentinidae, *Glossanodon*, new species, *Kotaka-maru*, Southern Japan.

The genus *Glossanodon* Guichenot, 1867 contains small benthopelagic argentinids (ca. 6–20 cm SL), inhabiting the outer continental shelf to upper slope, and seamounts and ridges in tropical to temperate waters worldwide (Kobilyansky, 1998). The genus consists of two subgenera: *Glossanodon* Guichenot, 1867 with 12 species, and *Prosoarchus* Cohen, 1958 containing only *Glossanodon pygmaeus* Cohen, 1958 (Table 1). Further, the subgenus *Glossanodon* is divided into three groups by Kobilyansky (1998): “*polli*” group (7 species) with *Glossanodon australis* Kobilyansky, 1998 (off eastern Australia), *Glossanodon nazca* Parin and Shcherbachev, 1982 (off Peru), *Glossanodon struhsakeri* Cohen, 1970 (off Hawaii), *Glossanodon elongatus* Kobilyansky, 1998 (off northwestern Australia), *Glossanodon melanomanus* Kobilyansky, 1998 (off Somalia), *Glossanodon mildredae* Cohen and Atsides, 1969 (off East Africa), and *Glossanodon polli* Cohen, 1958 (equatorial, off Amazon and

Guinea); “*leioglossus*” group (2 species) with *Glossanodon leioglossus* (Valenciennes in Cuvier and Valenciennes, 1848) (Mediterranean Sea and northwestern Africa) and *Glossanodon semifasciatus* (Kishinouye, 1904) (off Japan and Taiwan); “*lineatus*” group (3 species) with *Glossanodon danieli* Parin and Shcherbachev, 1982 (off Peru), *Glossanodon lineatus* (Matsubara, 1943) (off Japan), and *Glossanodon pseudolineatus* Kobilyansky, 1998 (off northwestern Australia). In the western North Pacific around Japan, *G. semifasciatus* is one of the commercially important fishes in the local demersal fishery (Yamada, 1986; Nashida *et al.*, 2007). Conversely, *G. lineatus* is rare in museum collections.

During bottom trawl surveys by the R/V *Kotaka-maru* in central Tosa Bay, 10 small *Glossanodon* specimens (45–64 mm SL) with a lateral black stripe reminiscent of *G. lineatus* were collected from depths of ca. 150–230 m. The species represented by these specimens differs from two

Japanese species and other congeners. In June of 2009, we subsequently examined 4 large (101–125 mm SL) and 1 small (68 mm SL) specimens deposited in KSHS fish collection, which were collected from Tosa Bay and off Amami Oshima Island between 1965 and 1972. These subsequent specimens were considered conspecific with the specimens recently collected by the R/V *Kotaka-maru*, and we herein describe these specimens as a new species.

### Materials and Methods

Specimens examined are deposited in the following institutions: Australian Museum, Sydney (AMS); Laboratory of Marine Biology, Faculty of Science, Kochi University (BSKU); Faculty of Agriculture, Kyoto University (FAKU); National Museum of Nature and Science (NSMT, formerly National Science Museum, Tokyo); Kochi Senior High School (KSHS). Otter trawls by the R/V *Kotaka-maru* (NRIFS: National Research Institute of Fisheries Science, Japan) in central Tosa Bay were planned and operated by H. Honda (FSF: National Research Institute of Far Sea Fisheries, Fisheries Research Agency), H. Sakaji and K. Nashida (NRIFS).

Counts and measurements follow Cohen (1958) and Kobilyansky (1998) with adipose fin length: its origin to the tip when lay back. In particular, Cohen (1958: 94) noted the following:

“eye is the horizontal diameter of the cornea”; “interorbital is the shortest distance across the top of the skull between the lateral edges of the bony orbit”; “vertebral counts do not include the urostyle”; “in dorsal and anal fin ray counts the double ray at the end of each fin (the last ray is closely appressed to its anterior neighbor) is counted as two”. Proportions in the diagnosis and description are based on the holotype and 2 large paratypes. The longest ray of each fin is not measured because of damaged (lacking) distal sections. Total length, standard length, and head length are abbreviated as TL, SL, and HL, respectively. Fin rays and vertebrae were counted from radiographs.

### *Glossanodon kotakamaru* sp. nov.

[New English name: Kotaka's argentine]

[New Japanese name: Kotaka-nigisu]

(Figs. 1–4, Tables 1, 2)

**Holotype.** NSMT-P 95588 (formerly KSHS 5945), 125 mm SL, female, Mimase fish market, Kochi City, Kochi Prefecture, Japan, offshore trawl, coll. by T. Yamakawa, 1 Apr. 1967.

**Paratypes.** 10 specimens from Tosa Bay: AMS I. 44774-001 (formerly BSU 76029-5), 57 mm SL, Tosa Bay, 33°12.9'N, 133°34.9'E–33°11.5'N, 133°33.1'E, 200–204 m, R/V *Kotaka-maru*, bottom trawl, St. 5-2, 13 Oct. 2004; AMS I. 44880-001 (formerly KSHS 6865), 101 mm SL, Mimase fish market, Kochi City, Kochi Pre-



Fig. 1. *Glossanodon kotakamaru*, holotype in preserved condition, NSMT-P 95588, 125 mm SL (above) and paratype in fresh condition, NSMT-P 95589, 62 mm SL (below). Photographed by H. Endo.

fecture, Japan, offshore trawl, coll. by T. Yamakawa, 27 Apr. 1968; BSKU 76029, 61 mm SL, BSKU 94412, 64 mm SL, BSKU 94413, 57 mm SL, BSKU 94414, 60 mm SL, collected with AMS I. 44774-001; BSKU 97082, 58 mm SL, Tosa Bay, 33°14.9'N, 133°37.9'E–33°13.3'N, 133°35.4'E, 202–193 m, R/V *Kotaka-maru*, bottom trawl, St. 5-1, 11 Dec. 2008; BSKU 97305, 62 mm SL, Tosa Bay, 33°14.64'N, 133°37.79'E–33°12.75'N, 133°35.44'E, 220–234 m, R/V *Kotaka-maru*, bottom trawl, St. T5-1, 4 Sep. 2006; BSKU 99830 (formerly KSHS 6866), 105 mm SL, same data as AMS-I. 44880-001; NSMT-P 95589 (formerly BSKU 73138), 62 mm SL, collected with AMS I. 44774-001.

**Non-types.** 4 specimens. BSKU 78520, 45 mm SL, Tosa Bay, 33°13.87'N, 133°34.22'E–33°12.38'N, 133°32.61'E, 146–149 m, R/V *Kotaka-maru*, bottom trawl, 6 June 2006; BSKU 97306, 45 mm SL, Tosa Bay, 33°13.81'N, 133°34.27'E–33°11.91'N, 133°32.89'E, 148–176 m, R/V *Kotaka-maru*, bottom trawl, St. T3-2, 5 Sep. 2006; KSHS 5297, 68 mm SL, Mimase fish market, Kochi City, Kochi Prefecture, Japan, offshore trawl, coll. by T. Yamakawa, 16 Dec. 1965; KSHS 15067, 116 mm SL (head and body partly damaged), off Amami Oshima Island, Kagoshima Prefecture, bottom trawl survey by Marine Fisheries Resource Research and Development Center, Fisheries Research Agency (formerly JAMARC: Japan Marine Resource Research Center), 26 June 1972.

**Diagnosis.** A species of *Glossanodon* with the following combination of characters: dorsal-fin rays 12–13; anal-fin rays 11–13; pectoral-fin rays 21–23; pelvic-fin rays 13–14; branchiostegal rays 5; gill-rakers on first arch 37–40; vertebrae 49–50; 2–4 small conical teeth on middle of lower jaws, and 1–3 teeth on tongue; predorsal 48–49% SL; prepectoral 29–30% SL; prepelvic 55–56% SL; distance from pelvic to anal-fin origins 30–31% SL; caudal peduncle depth 5.5–5.9%; HL 29–30% SL; eye diameter 32–33% HL; snout length 33% HL; maxillary depth 12% HL; anus located immediately anterior to anal-fin origin; two large black blotches on upper and lower opercular region; a black longitudinal stripe, running dorsal to lateral line; isthmus to thorax and fin bases pigmented. No melanophores externally on chest to anus.

**Description.** Proportions and counts are shown in Tables 1, 2. Body slender, not deep, its depth at dorsal-fin base about 11–12% SL, square in cross-section at pectoral-fin origin. Dorsal-fin origin above 17th or 18th vertebrae

[17th in holotype], predorsal length slightly shorter than postdorsal. Adipose fin slender, its length about 11–14% HL [14], located dorsal to middle of anal-fin base. Anal-fin origin below 38th vertebrae. Dorsal-fin base somewhat shorter than anal-fin base. Caudal peduncle moderately long and deep, depth 61–65% of length [61]. Pectoral fin positioned ventrolaterally, its base at an angle of about 40 degrees. Prepectoral length almost equal to HL. Pelvic-fin origin below 7th or 8th dorsal-fin rays [7th] and 21st vertebra; length from pectoral- to pelvic-fin origins somewhat shorter than that from pelvic to anal fins. Caudal fin forked.

Head relatively small, length slightly less than 30% SL. Nape flattened, almost square in cross-section. Lateral profile of snout nearly an equilateral triangle, its length almost equal to eye diameter. Eye moderately large, about one-third or less of HL. Interorbital width slightly less than two-thirds of eye diameter. Mouth moderately large, most part of maxillary covered dorsolaterally with lachrymal. Lower jaw projecting slightly beyond upper, extended posteriorly to vertical line at anterior rim of eye. No teeth on upper jaws. Two to 4 small conical teeth on the middle of lower jaw [(left/right) 2/3]. One row and 2–3 irregular rows of small conical teeth arrayed on vomer and palatines, respectively [2 irregular rows on palatines]. One to three small conical teeth present anteriorly on tongue [1]. Gill rakers elongate, lath-like, closely arranged. Anus immediately anterior to anal-fin origin. Pyloric caeca 8 (paratype, BSKU 76029).

Scales deciduous; all scales of the specimens examined are absent; lateral-line scales about 50 in holotype and one paratype (AMS I. 44880-001) (counts based on scale pockets, with those of other types damaged).

**Color in alcohol** (Figs. 1–4). Body light yellow to ochre. Anterior part of snout, premaxillary, anterior rim of maxillary, mandibular rami, and orbital roofs heavily pigmented. Buccal cavity partly pigmented on jaws, vomer, palatines, and ectopterygoids. No melanophore on gular and brachiostegal membrane. Two blackish

Table 1. Counts, dentition and depth ranges of 14 species of the genus *Glossanodon*. Data from the followings: 1—Matsubara (1943), 2—Cohen (1958), 3—Cohen (1964), 4—Cohen and Atsaides (1969), 5—Cohen (1970), 6—Parin and Sheherbachev (1982), 7—Kitagawa and Okiyama (1997), 8—Kobilyansky (1998), and 9—this study. Numbers of teeth on lower jaw in parentheses. The asterisk indicates variation of pectoral-fin rays based on the paratype of *G. australis* re-examined in this study.

No. of specimens	<i>G. kotakamaru</i>	<i>G. australis</i>	<i>G. nazca</i>	<i>G. elongatus</i>	<i>G. melanomanus</i>	<i>G. mildredae</i>	<i>G. polli</i>	<i>G. struhshakeri</i>
SL (mm)	45–125	148–191	101–126	87–103	166–195	42–70	64–134	73–118
Dorsal-fin rays	12–13	11–12	11	10–12	10–11	13	12–14	12–14
Anal-fin rays	11–13	10–11	10–11	13–14	11–12	13	14	12–13
Pectoral-fin rays	21–23	23*–24	20–22	18–21	23–24	23	19–22	23–25
Pelvic-fin rays	13–14	13–14	13–14	11–12	12–13	12–13	12–13	13–15
Gill-rakers on 1st arch	37–40	35–39	34–37	30–36	36–38	—	32–36	—
Branchiostegal rays	5	5	5	5	5	5	—	5
Vertebrae	49–50	50	50–51	49–50	50–51	49–51	—	50–52
Lateral-line scales	ca. 50	—	50	—	—	—	48–50	51–54
Teeth on lower jaw	partly (2–4)	partly (2–4)	entirely (12–15)	entirely	partly	entirely (ca. 10)	entirely (10–20)	entirely (15–20)
Teeth on tongue	1–3	0–2	0–1	0	0	0	0	0
Depth ranges (m)	150–300	140–330	180–330	322–365	150–302	75–174	150–200	180–300
References	9	8, 9	6	8	8	4	2, 3	5

  

No. of specimens	<i>G. leioglossus</i>	<i>G. semifasciatus</i>	<i>G. danieli</i>	<i>G. lineatus</i>	<i>G. pseudolineatus</i>	<i>G. pygmaeus</i>
SL (mm)	51–111	94–206	86–112	91–99	72–80	53–99
Dorsal-fin rays	13–14	11–13	11–12	12–13	10–11	10–12
Anal-fin rays	11–13	11–13	12–14	13–15	10	11–13
Pectoral-fin rays	20–22	18–22	18–22	18–21	18–19	12–14
Pelvic-fin rays	12	10–12	12–13	10–12 (13)	11	10–12
Gill-rakers on 1st arch	36	35–40	32–34	27–29	24–26	31–35
Branchiostegal rays	5	5	4	4	4	5
Vertebrae	49	46–49	55–57	55	43–44	43
Lateral-line scales	—	50–53	56–57	56	—	43–46
Teeth on lower jaw	partly (2–8)	partly (0–10)	partly (17–30)	entirely (15)	entirely	absent
Teeth on tongue	2–3	2–6	0	0	2–3	2–6
Depth ranges (m)	80–360	70–240	310–420	145–230	150–156	90–460
References	2	2, 9	6	1, 2, 7, 9	8	2, 3

Table 2. Proportional measurements and counts of *Glossanodon kotakamaru* and *G. australis*. Asterisk indicates data from the original description.

	<i>G. kotakamaru</i>				<i>G. australis</i>	
	Holotype	Paratypes			Holotype	Paratypes*
	NSMT-P 95588	AMS I. 44880-001	BSKU 99830	8 smaller paratypes	AMS I. 27585-003	5 specimens
Standard length (mm)	125	101	105	57–64	157.5	148–191
As % of standard length						
Predorsal length	49.3	48.0	49.4	49.8–52.1	46.6	45.1–48.1
Preanal length	85.4	85.4	84.8	82.7–84.9	83.4	81.0–85.4
Prepectoral length	29.3	29.6	28.7	30.8–32.9	27.9	25.2–27.4
Prepelvic length	55.4	54.9	56.1	53.0–56.0	53.3	52.1–55.2
Postanal length	17.5	16.2	16.7	16.1–17.2	16.1	15.4–17.7
Postdorsal length	52.0	51.8	52.4	49.6–50.6	52.3	52.2–55.1
Snout to adipose fin origin	87.5	86.4	88.0	87.9–90.2	87.0	–
Dorsal to adipose fin origins	38.7	39.6	39.9	37.0–39.8	39.4	39.1–41.2
Pectoral to pelvic fin origins	26.0	26.5	28.1	23.3–24.9	26.0	25.5–29.1
Pelvic to anal fin origins	30.1	31.0	31.2	28.6–30.3	32.0	30.4–32.5
Anus to anal fin origin	2.2	–	–	2.2–2.5	2.3	2.6–3.6
Body depth at pectoral fin base	11.3	10.8	11.3	11.4–12.7	10.5	10.5–12.1
Body width at pectoral fin base	11.9	10.5	11.0	9.9–12.1	11.6	11.4–12.2
Body depth at dorsal fin base	12.3	11.3	12.3	9.9–10.6	11.6	11.7–13.9
Caudal peduncle depth	5.9	5.5	5.8	5.9–6.1	4.6	4.9–5.2
Caudal peduncle length	9.7	8.5	9.3	9.3–9.9	8.9	9.2–9.9
Length of dorsal fin base	9.3	8.4	8.2	7.2–8.3	8.2	8.0–8.9
Length of anal fin base	7.0	7.6	7.1	6.8–7.6	7.1	6.0–7.2
Head length	29.9	29.9	29.4	31.1–33.3	28.2	26.6–28.0
As % of head length						
Eye diameter	33.4	31.5	31.6	31.3–33.3	29.7	29.0–31.2
Pupil diameter	16.0	14.1	15.5	13.2–15.6	14.9	12.6–15.8
Snout length	33.4	32.6	32.6	32.3–34.4	34.7	34.3–35.8
Interorbital width	21.1	19.5	20.4	16.5–17.9	20.5	19.1–21.3
Snout to maxillary end	25.9	25.5	26.6	24.0–26.3	25.7	25.3–29.2
Maxillary depth	12.3	12.4	12.2	8.3–10.0	8.6	9.5–11.2
Lower jaw length	38.2	38.6	37.8	36.6–39.2	40.3	36.5–40.3
Counts						
Dorsal fin rays	12	13	12	12	11	11–12
Anal fin rays	11	11	11	11–13	11	10–11
Pectoral fin rays	22	22	22	21–23	24	24
Pelvic fin rays	13	13	14	13–14	14	13–14
Vertebrae	34+15=49	35+15=50	35+14=49	49–50	36+14=50	50
Gill rakers on 1st arch	10+1+26 =37	12+1+26 =39	12+1+25 =38	39–40	12+1+25 =38	35–39

blotches located on upper and lower parts of opercle: upper one distinct, more densely pigmented than lower, connecting dorsally to a lateral stripe on body. Opercle partly translucent. The longitudinal stripe running dorsal to lateral line dark brown to blackish, heavily pigmented, its anterior-most part somewhat curved dorsally. A stripe running ventral to lateral line pale, sparsely pigmented, obscure in some specimens. Seven

blotches on the stripe above lateral line dark brown to blackish, densely pigmented, 4th and 5th or 5th and 6th connecting each other [5th and 6th]; almost faded in large specimens, distinct in small ones. Six faint black bars across lateral stripes on body present only in 2 smallest specimens of 45 mm SL. Dorsal midline of body blackish, heavily pigmented. Jugular region densely pigmented, no melanophores on thorax



Fig. 2. Juglar region of *Glossanodon kotakamaru*, ventral view of holotype, NSMT-P 95588, 125 mm SL. Photographed by H. Endo.

between pectoral fin bases (Fig. 2). Dorsal-fin rays moderately pigmented, its fin membrane unpigmented. Caudal fin lobes densely pigmented along dorsal and ventral sides of long branched rays. Pectoral fin unpigmented without one-third of lower rays. All fin bases pigmented: densely on anal fin base; 2 dark blotches present on upper and lower caudal fin base, connecting posteriorly to dark bands on both lobes of caudal fin. Peritoneum blackish to dark brown, densely pigmented lacking silvery layer: internal pigmentation on midline from abdomen to anus visible externally through thin muscle layer and short transparent region immediately before anus (its length same as pupil diameter in holotype), remarkable in smaller specimens having translucent abdominal wall. Stomach unpigmented.

*Color when fresh in young specimens* (Figs. 1, 4). Head and body whitish and silvery. The blotch on upper opercle and the lateral stripe on body iridescent purplish blue with silvery and blackish background when very fresh, but fading rapidly. Longitudinal black stripe above lateral line faint posteriorly in NSMT-P 95588. The lateral stripe below lateral line silvery, sparsely pigmented. Seven black blotches on the stripe above lateral line distinct in NSMT-P 95588, relatively unclear in BSKU 78520.

**Distribution.** *Glossanodon kotakamaru* has been recorded from muddy and sandy bottoms of central Tosa Bay, off Kochi, in depths of about 150–300 m, and off Amami Island, Kagoshima. In Tosa Bay, the depth range of young specimens collected by R/V *Kotaka-maru* is 146–234 m.

Further, the Mimase's offshore trawlers usually fish around 200–300 m (maximum depth is ca. 420 m). For 1 specimen (KSHS 15067) from Amami Oshima Island, its detailed catch data are unknown.

**Etymology.** Named for the research vessel of the National Research Institute of Fisheries Science, *Kotaka-maru*, from which the paratypes and many other scientific specimens from Tosa Bay were collected.

**Remarks.** The new species clearly belongs to the genus *Glossanodon* in having the medial ends of maxillaries in contact or separated by a narrow space less than one-fourth the width of the narrow, underlying mesethmoid, and dentition with small conical teeth on vomer, palatines, and tongue (Cohen, 1958: 143). Further, *G. kotakamaru* belongs to the subgenus *Glossanodon* by having the anus located immediately anterior to the anal-fin origin [vs. well separated from the origin in *G. (Prosoarchus) pygmaeus*: Cohen, 1958] and more pectoral-fin rays (Table 1).

Among the subgenus, *G. kotakamaru* is clearly separated from 3 species of the “*lineatus*” group, *G. danieli*, *G. lineatus*, and *G. pseudolineatus*, by the counts of branchiostegal rays, vertebrae, and gill-rakers, and dentition on lower jaw (Table 1). Further, *G. kotakamaru* is easily distinguished from members of the “*leioglossus*” group by the counts of pelvic-fin rays and gill-rakers (for *G. leioglossus*), and a longitudinal lateral stripe (narrow black vs. wide silvery in *G. semifasciatus*) (Cohen, 1958; Table 1, Fig. 1).

Further, *G. kotakamaru* is clearly discriminated from 6 species of the “*polli*” group except *G. australis* (Table 1): *G. elongatus* by the counts of pectoral and pelvic-fin rays, and gill-rakers, and sparse dentition on lower jaw; *G. melanomanus* by dorsal-fin ray count, head length (29–30% SL vs. 33–34), body depth at dorsal-fin base (11–12% SL vs. 14–17), and dark spots on pectoral fin (absent vs. present) (Kobilyansky, 1998: fig. 2); *G. mildredae* and *G. struhsakeri* by dentition on lower jaw and tongue, and prepelvic length (55–56% SL vs. 51–55 and 50–55) (Cohen and Atsides, 1969; Cohen, 1970); *G. polli* by gill-



Fig. 3. *Glossanodon kotakamaru*, holotype, NSMT-P 95588, 37.4 mm HL, 125 mm SL (above) and *G. australis*, holotype, AMS I. 27585-003, 44.4 mm HL, 158 mm SL (below). Photographed by H. Endo.



Fig. 4. *Glossanodon kotakamaru*, paratypes, BSKU 97082, 58 mm SL (above) and BSKU 78520, 45 mm SL, in fresh condition (below). Photographed by H. Endo (above) and N. Nakayama (below).

raker count, and dentition on lower jaw and tongue; *G. nazca* by dorsal-fin ray count, dentition on lower jaw, predorsal length (48–49% SL vs. 45–46), prepectoral (29–30% SL vs. 28), prepelvic (55–56% SL vs. 52), interorbital (20–21% HL vs. 22–23), and melanophores on thorax to anus (absent vs. present) (Parin and Shcherbachev, 1982: fig. 3; Fig. 2).

*Glossanodon kotakamaru* is somewhat similar to *G. australis* by the counts, dentition on lower jaw (a few teeth centrally, lacking near symphysis and angle of gape), a dark longitudinal stripe

above lateral line, and pigmented juglar, but clearly differs from it in having longer prepectoral (29–30% SL vs. 25–27), deeper caudal peduncle (5.5–5.9% SL vs. 4.6–5.2), longer head (29–30% SL vs. 27–28), shorter snout (33% SL vs. 34–36), slightly larger eye (32–33% HL vs. 29–31), deeper maxillary (12% HL vs. 9–11), and higher position of anterior end of the dark stripe on body (vs. middle) (Tables 1, 2; Figs. 1, 3).

Compared with 3 large adults and 8 small young specimens of *G. kotakamaru*, the following proportions apparently change with growth: predorsal, prepectoral, postdorsal, distance from pectoral to pelvic fin origins, body depth at dorsal-fin base, head length, interorbital width, and maxillary depth (Table 2). For the young specimens, these characters do not fully represent the diagnosis of the species.

A dwarf species, *G. pygmaeus*, reaches sexual maturity around 80 mm SL; a female of 77.2 mm SL was recorded with ripe eggs, and a male of 86.6 mm SL had well-developed testes (Cohen, 1958). On the other hand, *G. semifasciatus* is probably the largest species, attaining 210 mm SL and maturing at 130 mm SL as a 2-year-old

(Yamada, 1986). Judging from the mature female holotype of *G. kotakamaru* (NSMT-P 95588, 125 mm SL) the new species is relatively large compared with other members of the genus. In addition, the two smallest specimens of *G. kotakamaru* (about 45 mm SL, BSKU 78520 and 97306 in Fig. 4) show 6 faint black bars across a longitudinal stripe, which is a juvenile character of the genus previously reported by others (e.g., Cohen, 1958; Kitagawa and Okiyama, 1997; Parin and Belyanina, 2007).

Kobilyansky (1998) noted that *G. australis* has no teeth on the tongue, but we found that one paratype examined (AMS I. 27585-004) has 2 small conical teeth (but there are no teeth in the holotype). This character shows variation and is not a useful character for distinguishing species.

Matsubara (1943) described *G. lineatus* based on two specimens collected from Kumano-nada, off Kii Peninsula, in January 1937 (holotype, FAKU 4247, 99.0 mm SL; paratype, FAKU 4245, 90.5 mm SL). Although Kitagawa and Okiyama (1997: 38) erroneously reported “three paratypes” of *G. lineatus* collected from Kumano-nada in October 1954 (FAKU 23980–23982, 77.1, 96.3 and 111.9 mm SL), Eschmeyer and Fricke (2010) mentioned that the types were apparently lost. The paratype was, however, recently found in the FAKU fish collection by Yoshiaki Kai; it is in very poor condition with a damaged snout and shrunken body (dried out once, which diminished its size: ca. 80+ mm SL). Matsubara (1943) noted that *G. lineatus* has 13 pelvic-fin rays, but Cohen (1958) reported it as 12 on the basis of re-examination of the paratype (CMK 4245: the acronym means “Collection of Dr. Kiyomatsu Matsubara”, same as FAKU 4245). Our count of the paratype is also 12. In addition, Kitagawa and Okiyama (1997) showed the range of the count as 10–12: 10 in 1 specimen, 11 in 6 specimens, and 12 in 5 specimens (22–112 mm SL, 9 in the specimen of 16.2 mm SL probably reaches to the range of 10–12 with growth). In addition, 4 specimens from Tosa Bay have 11 pelvic-fin rays. Hence, the range of

pelvic-fin rays in *G. lineatus* is probably 10–12.

**Comparative materials.** *Glossanodon australis* (2 specimens): AMS I. 27585-003 (holotype, 1 specimen, 158 mm SL), AMS I. 27585-004 (paratype, 1, 145), off eastern Australia. *Glossanodon lineatus* (5): BSKU 76922 (1, 79), BSKU 78770 (1, 89), BSKU 87940 (1, 62), KSHS 5427 (1, 112), Tosa Bay; FAKU 4245 (paratype, 1, ca. 80+), Kumano-nada. *Glossanodon semifasciatus* (3): BSKU 78403 (1, 142), BSKU 92322 (1, 104), BSKU 92324 (1, 94), Tosa Bay.

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