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A New Species of Skate (Chondrichthyes : Rajidae), *Okamejei mengae* from the South China Sea

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A new species of the rajid genus *Okamejei* is described from a single specimen (295 mm TL) from off Shantou, Gwangdong in the South China Sea. The new species differs from all other congeners in the following combination of characters: snout pointed, dorsal head length 6.7 times interorbital width, tail moderately wide and long, its length 48.5% TL, interdorsal distance less than length of first dorsal fin base, postdorsal tail short as 5.8% TL, small evenly distributed dark brownish spots, without ocelli on dorsal surface of disc, pores of ampullae of Lorenzini on ventral surface distributed from snout tip to distal end of metapterygium, scapulocoracoid high, its height about 1.4 times rear corner height, trunk vertebrae 23, predorsal tail vertebrae 50 and pectoral fin radials 96.

Key words : New species, *Okamejei mengae*, Rajidae, South China Sea, Chondrichthyes

Introduction

The family Rajidae is cosmopolitan, encompassing about thirty genera and more than 230 nominal species, as well as about 50 undescribed species (McEachran and Miyake, 1990a, b; McEachran and Dunn, 1998). The Indo-Pacific rajid genus *Okamejei* was first described by Ishiyama (1958), as a subgenus of *Raja*, for seven species of Japanese rajids. At that time, *Okamejei* was characterized by having a relatively short snout, long tail, numerous rows of tail thorns, relatively few abdominal vertebrae, poorly or moderately developed electric organ and a specialized clasper structure. McEachran and Fechhelm (1982) subsequently considered subgenus *Okamejei* to be distinguished from subgenus *Dipturus* by body size and condition of the anterior margin of the neurocranial fontanelle. *Okamejei* was later elevated to generic rank by McEachran and Dunn (1998). To date, genus *Okamejei* comprised nine species, three distributed in the Indian Ocean (Stehmann, 1976; Fricke and Al-Hassan, 1995) and six in the western North Pacific (reviewed by Ishihara, 1987). Although a single species of *Okamejei* has been reported by Last and Stevens (1994) and Last and Yearsley (2002) from Australian waters, it was treated simply as "*Okamejei* sp. N".

Recently an unusual rajid was found in the collection of the Laboratory of Fishes, Shanghai Fisheries University, China, collected some decades earlier from the South China Sea. A female specimen, included in the genus *Okamejei*, due to its having characters recognized for the latter by Ishiyama (1958), Ishihara (1987), McEachran and Miyake (1986) and McEachran and Dunn (1998),

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but it differed uniquely from all other species in the genus. It is herein described as a new species of *Okamejei*. A revised description of *Okamejei* and a key to western North Pacific species in the genus are given here.

Materials and Methods

The holotype of the new species is collected by the late Professor Yuang-Ting Chu (formerly Shanghai Fisheries University) from the South China Sea off Shantou, Gwangdong Province, China in February 1956. Type specimen and comparative materials are listed on the below.

Methods for counts and measurements followed Hubbs and Ishiyama (1968) and McEachran and Stehmann (1984). Terminology and measurements of the neurocranium and scapulocoracoid followed Hubbs and Ishiyama (1968) and McEachran and Compagno (1979), and terminology of the pelvic girdle and ampullary system, Hulley (1972) and Chu and Meng (1979), respectively. Skeletal characters were observed on radiographs, the anterior and posterior fontanelles of the neurocranium, and left scapulocoracoid also being examined by dissection. Actual and proportional morphometrics of the body, neurocranium and scapulocoracoid are given in Tables 1, 2 and 3.

Comparative materials. Institutional abbreviations as follows; FAKU, Faculty of Agriculture, Kyoto University, Japan; FSIU, Laboratory of Fisheries, Department of Oceanography, College of Natural Science, Inha University, Korea; FSC, Laboratory of Fishes, Shanghai Fisheries University, China; HK, Hong Kong subexpedition of the Stanford University Naga expedition; HUMZ, Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University, Japan; IOCAS, Institute of Oceanology, Chinese Academy of Science, China; MTUF, Museum of Tokyo University of Fisheries, Japan; NA, The southern South China Sea subexpedition of the Stanford University Naga expedition. *Okamejei acutispina* (Ishiyama, 1958): Holotype, FAKU 111488*. 3 paratypes-FAKU 111489*, MTUF 24644, 25158. 44 specimens- FAKU 58249*, 111540-111543; FSIU 141-148*, 149-160; HUMZ 33695, 33776, 34872; MTUF 20710, 24131, 25160, 25061, 25192, 25196, 25197, 25200, 25202-25204, 25209, 25213, 25214, 25237, 25915. *O. boesemani* (Ishihara, 1987) : 13 paratypes-HK 5* ,6*, 8, 11*, 12*, 13*, 22, 23, 30, 32, 33; HUMZ 15855, 33375, 37603, 37633; MTUF 24644, 24648, 25988. 14 specimens-FSIU 305; HK 15; MTUF 24131, 24135, 24139, 24140, 24636, 24637, 24640, 24641, 24643, 24647, 24649; NA 8. *O. hollandi* (Jordan et Richardson, 1909) : 13 specimens-FAKU 71541, 78496; HK 7*, 10*, 14*, 17*, 18*, 19*, 20*, 21*, 24*, 25*, 26*. *O. kenojei* (Müller et Henle, 1841): 165 specimens-FAKU 63258-63261*, 63262, 63735-63757, 64180 -64182*, 64183-64185, 111510; FSIU 1-20, 22-27, 29-33, 39, 44-46, 58, 60-63, 66, 89-119, 228-230, 233-243, 245-246; HUMZ 33149, 33153, 33157, 33160, 33161, 33163, 33164, 33167*, 34839, 34840, 34842, 34879, 34963, 81305; IOCAS-62-0052, 40496; MTUF 24633, 24634, 25065, 25175, 25177-25179, 25181, 25186, 25187, 25219, 25221, 25222, 25234-25238, 25240, 25241, 25923, 25926, 25927, 25932, 25934, 25938*. *O. meerdervoortii* (Bleeker, 1860): MTUF 25150* (holotype of *Raja* (*Okamejei*) *macrophthalma sensu* Ishiyama, 1958); 7 paratypes of *R. (O.) macrophthalma*-MTUF 25051*, 25053, 25149-25152, 25155, 25880. 30 specimens-FSIU 121-140, HUMZ 34914, 34917, 34964, 34965, 34967, 34972, 48310; MTUF 25986, 25987, 25989. *O. schmidti* (Ishiyama, 1958): 7 specimens- FAKU 63162, 63263*, 63265, 63267, 63520*, 63543*, 63597. *soft X-rays examined.

Okamejei mengae sp. nov.

(Figs. 1～2, Tables 1～4)

Material. Holotype, SFC (Laboratory of Fishes, Shanghai Fisheries University, Shanghai, China) S04105, female, 295.0 mm TL, Shantou, Gwangdong, China, coll. Y.-T. Chu, February 1956.

Diagnosis. Dorsal surface with numerous small, evenly-distributed dark brownish spots. Rostral shaft of neurocranium long. Posterior fontanelle longer than anterior fontanelle. Pores of ampullae of Lorenzini on ventral surface of disc tiny, sparsely distributed from snout tip to distal end of metapterygium. Trunk vertebrae 23; predorsal tail vertebrae 50. Pectoral radials 96 on each side. Upper tooth rows 42. Scapulocoracoid with high suprascapular cartilage, without anterior bridge; anterior fenestra of scapulocoracoid large, vertically elliptical; postdorsal fenestra very large.

Description. Disc rhombic (Fig. 1), about 1.1 times wider than long (Table 1); anterior margin concave; convex at level of anterior section of pectoral propterygium; concave at level of spira-

Fig. 1. *Okamejei mengae* sp. nov., holotype, SFC S04105. A: Dorsal view; B: Ventral view.

Table 1. Actual and proportional measurements (as percentages of total length) of *Okamejei mengae* sp. nov., SFC S04105, female

Characters	(mm)	(%)	Characters	(mm)	(%)
Total length	295.0	–	Tail height at axil of pelvic fins	6.8	2.3
Disc width	187.5	63.6	Tail height at pelvic tips	5.3	1.8
Disc length	164.3	55.7	Tail height at midlength	3.6	1.2
Snout to maximum width	97.0	32.9	Tail height at first dorsal origin	3.4	1.2
Dorsal head length	78.0	24.7	Tail height at 2nd dorsal origin	2.7	0.9
Preorbital snout length	51.9	17.6	Tail height at caudal fin origin	1.5	0.5
Orbit diameter	12.7	4.3	Precaudal body length	152.0	51.5
Interorbital width	11.7	4.0	Tail length	143.0	48.5
Spiracle length	9.0	3.1	Preoral snout length	53.2	18.0
Interspiracular width	19.0	6.4	Ventral head length	90.3	30.6
Ant. orbit rim to spiracle end	16.4	5.6	Mouth width	23.0	7.8
Procaudal length (D1-tail tip)	53.4	18.1	Prenarial snout length	44.0	14.9
First dorsal fin, base length	14.0	4.7	Internarial width	22.5	7.6
First dorsal fin, vertical height	8.5	2.9	Nasal curtain, length	15.0	5.1
D2, base length	14.0	4.7	Nasal curtain, width each lobe	4.7	1.6
D2, vertical height	8.7	2.9	Between nasal fimbriae	13.5	4.6
Interdorsal distance	8.5	2.9	Nare to mouth	16.5	5.6
Postdorsal length	17.0	5.8	Over 1st gill slits (outer rims)	51.5	17.5
Caudal fin base length	13.0	4.4	Distance between first gill slits	41.5	14.1
Caudal fin vertical height	2.5	0.8	Distance between fifth gill slits	25.0	8.5
Lateral tail fold length	111.3	37.7	Width of first gill slit	4.8	1.6
Lateral tail fold width	1.0	0.3	Width of third gill slit	5.0	1.7
Behind lateral fold	7.5	2.5	Width of fifth gill slit	2.2	0.7
Tail width at axil of pelvic fins	16.0	5.4	Cloaca to pelvic fin tip	30.5	10.3
Tail width at pelvic tips	10.7	3.6	Ant. pelvic lobe length	41.8	14.2
Tail width at midlength	6.2	2.1	Post. pelvic lobe length	49.5	16.8
Tail width at first dorsal origin	6.0	2.0	Distance-cloaca to D1 origin	89.5	30.3
Tail width at 2nd dorsal origin	4.3	1.5	-cloaca to D2 origin	112.5	38.1
Tail width at caudal fin origin	2.6	0.9	-cloaca to caudal fin origin	129.0	43.7
			Angle of snout (°)	86°	

cles; posterior margin convex. Pectoral propterygia and radials well separated from rostral node. Snout relatively long, acute, maximum angle from anterior of spiracle to tip 86°. Interorbital space concave. Spiracles smaller than orbit. Ventral head length 1.2 times dorsal head length. Nares well separated from mouth; internarial width almost equal to mouth width. Nasal curtain well developed, length about one third prenarial snout length, directed posteriorly and extending slightly past margin of upper lip, rear margins fringed. Mouth small, weakly arched, with 42 cuspidate tooth rows on upper jaw in quincunx arrangement. Five pairs of gill slits; fifth smallest. Distance between fifth gill slits 60.2% of that between first gill slits. Tail shorter than precaudal body length, thin, slightly depressed, gradually tapering posteriorly. Pelvic fin deeply notched, anterior lobe thin, shorter than posterior lobe, posterior lobe tip moderately pointed. First dorsal fin base about 1.6 times fin height, same length as second dorsal fin base; second dorsal fin base about 1.6 times fin height; first and second dorsal fins separated by interspace equal to 60.7% of first dorsal fin base length. Caudal fin base long, slightly shorter than first dorsal fin base, height 2.5 times maximum width of lateral tail folds; confluent with end of second dorsal fin base. Lateral tail folds moderately developed, 77.8% of tail length. Pectoral

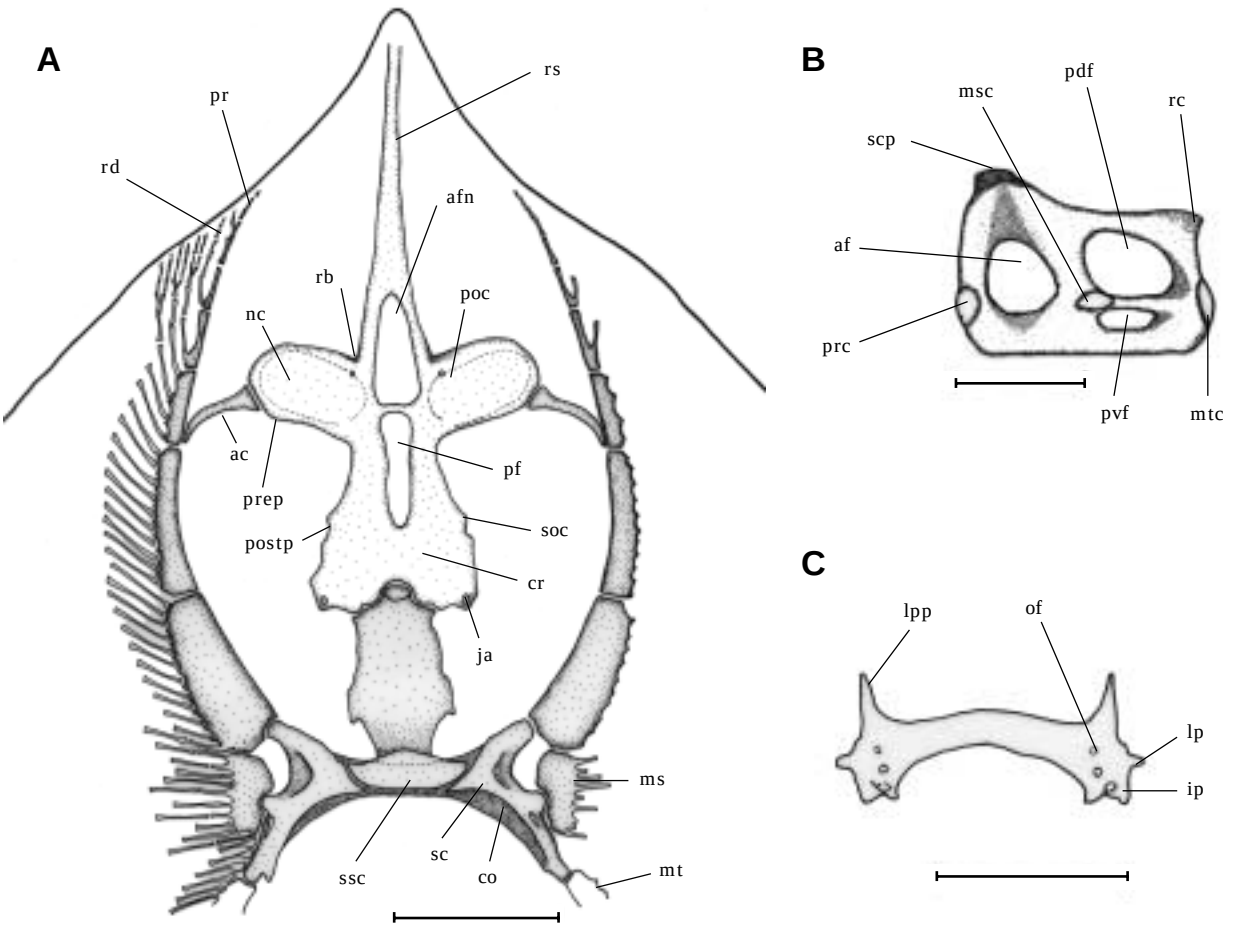

Fig. 2. *Okamejei mengae* sp. nov., holotype, SFC S04105, 295 mm TL. A: Dorsal view of neurocranium and pterygia (Bar=3 cm); B: Lateral view of scapulocoracoid (Bar=1 cm); C: Dorsal view of pelvic girdle (Bar=1 cm). ac-antorbital cartilage, af-anterior fenestra, afn-anterior fontanelle, co-coracoid, cr-neurocranium, ip-iliac process, ja-jugal arch, lp-lateral process, lpp-lateral prepelvic process, ms-mesopterygium, msc-mesocondyle, mt-metapterygium, mtc-metacondyle, nc-nasal capsule, of-obturator foramen, pdf-postdorsal fenestra, pf-posterior fontanelle, poc-preorbital canal foramen, postp-postorbital process, pr-propterygium, prc-procondyle, prep-preorbital process, pvf-postventral fenestra, rb-rostral base, rc-rear corner, rd-radials, rs-rostral shaft, sc-scapular, scp-scapular process, soc-supraorbital crest, ssc-suprascapular cartilage.

Table 2. Actual and proportional neurocranium measurements (as percentages of nasobasal length) of *Okamejei mengae* sp. nov., SFC S04105

Characters	(mm)	(%)
Nasobasal length	30.0	–
Cranium length	72.0	240.0
Rostral cartilage length	42.4	141.3
Prefontanelle length	33.5	111.7
Cranium width	34.5	115.0
Interorbital width	10.0	33.3
Rostral base	10.5	35.0
Anterior fontanelle length	13.8	46.0
Anterior fontanelle width	6.3	21.0
Posterior fontanelle length	14.3	47.7
Posterior fontanelle width	3.9	13.0
Least width of rostral cartilage	1.7	5.7
Width of rostral shaft	4.6	15.3
Width across otic capsules	17.5	58.3
Least width of basal plate	8.3	27.7
Greatest width of nasal aperture	12.8	42.7
Least width of nasal capsule	9.4	31.3
Internasal width	7.6	25.3

Table 3. Actual and proportional scapulocoracoid measurements (as percentages of greatest length) of *Okamejei mengae* sp. nov., SFC S04105

Characters	(mm)	(%)
Greatest length	19.2	–
Greatest height	13.4	69.8
Premesocondyle	9.4	49.0
Postmesocondyle	9.8	51.0
Postdorsal fenestra length	7.0	36.5
Postdorsal fenestra height	5.2	27.1
Anterior fenestra length	5.6	29.2
Anterior fenestra height	6.0	31.3
Base length	15.9	82.8
Anterior corner height	12.2	63.5
Posterior corner height	8.8	45.8
Postventral fenestra length	4.6	24.0
Postventral fenestra height	1.6	8.3

girdle propterygium with 10 segments on each side (Fig. 2A). Vertebrae 23 (trunk)+50 (predorsal tail). Pectoral radials 96 on each side.

Squamation-Disc entirely smooth dorsally, rostral, scapular, nuchal and lumbar thorns absent. Three rows of tail thorns and two interdorsal thorns (Fig. 1A). Ventral surface entirely smooth. Alar and malar thorns absent.

Ampullary system-Pores of ampullae of Lorenzini on ventral surface of disc small, sparsely distributed from snout tip to distal end of metapterygium (Fig. 1B), more densely distributed on head, larger in abdominal region. Mandibular ampullary pores in 2-3 irregular rows along lower jaw. Ampullae of Lorenzini sparsely distributed on dorsal surface of disc.

Neurocranium-Rostral shaft long, moderately slender; length about 58.9% of cranium length (Fig. 2A; Table 2). Nasal capsule rhombic, narrow; set at about 30° to transverse axis of neurocranium; preorbital canal foramen proximal to leading edge of nasal capsule. Preorbital and postorbital processes moderately developed. Anterior fontanelle elongated, preceded by slight rostral groove. Posterior fontanelle elongated, longer than anterior fontanelle, slightly constricted posteriorly. Jugal arch moderately slender.

Scapulocoracoid-Lateral face subrectangular, elongated posteriorly, greatest length 1.4 times greatest height (height about 1.4 times rear corner height) (Fig. 2B; Table 3). Distance between procondyle and mesocondyle slightly less than between mesocondyle and metacondyle. Anterior margin straight, slightly diagonal. Anterior corner broadly rounded, indistinct; rear corner well developed, elevated, extending to base of metacondyle. Dorsal margin gently sloping, concave above postdorsal fenestra. Coracoid base straight. Procondyle and metacondyle elliptic; mesocondyle expanded, depressed. Anterior fenestra large, slightly vertically elliptical, lacking anterior bridge; postdorsal fenestra very large, expanded diagonally; postventral fenestra expanded anteroposterioly. Suprascapular cartilage high, elevated above anterodorsal margin. Antorbital cartilages articulating proximally on posterolateral face of nasal capsule, with third segments of pectoral girdle propterygia.

Pelvic girdle-Puboischiadic bar moderately anteriorly arched (Fig. 2C). Iliac region relatively large, with 2 obturator foramina on each side, iliac process short, inwardly curved. Lateral prepelvic processes short, inner side convex.

Color in formalin. Dorsal surface of disc and tail light brown; very tiny spots scattered over entire dorsal surface (Fig. 1A). Ventral surface of disc and tail uniformly light brown. Nostrils, gill slits and cloaca pale brown. Pores of ampullae of Lorenzini darkly pigmented (Fig. 1B). Abdominal region of specimen dyed blue.

Distribution. Known from Shantou, eastern part of Gwangdong Province, South China Sea.

Etymology. The specific name “mengae” is in honor of Qing-Wen Meng for her great contributions to elasmobranch studies in China.

Table 4. Comparisons of characters of *Okamejei* species from the Western North Pacific

Characters	*O. mengae* sp. nov.	*O. acutispina*	*O. boesemani*	*O. hollandi*	*O. kenojei*	*O. meerdervoortii*	*O. schmidti*
Trunk vertebrae	23	26～29[a]	26～30[b]	27～28[b]	26～29 b	25～26[b]	27～29[a]
Predorsal tail vtr.	50	40～42[a]	37～47[b]	42～48[b]	35～46 b	37～41[b]	42～44[a]
Pectoral fin radials	96	78～79	76～80	78～84	76～78	74	80～82
Upper tooth rows	42	41～55	39～53	38～46	45～55	36～41	41～55
DHL/IOW (ratio)	6.7	5.5～6.0	4.8～5.9	5.0～5.7	3.6～5.0	5.3～6.4	4.0～4.5
IDD/D1BL (ratio)	under 1.5 (0.6)	over 1.5	over 1.5	over 1.5	under 1.5	under 1.5	under 1.5
PDTL/D2BL (ratio)	under 1.5 (1.2)	over 1.5	over 1.5	over 1.5	under 1.5	under 1.5	under 1.5
Pectoral ocellus	absent	present	present	absent	present	present	present
AmL, ventrally	tiny, sparse	large, dense	tiny, sparse	tiny, sparse	tiny, sparse	tiny, sparse	large, dense
AmL V-shaped at MT	absent	absent	absent	absent	present	present	absent
AmL at ABR	absent	present	absent	absent	absent	absent	present
Nuchal thorns	1	1～3	0～4	1～5	2～16	1～3	1～2

BR-abdominal region; AmL-ampullae of Lorenzini; D1BL-first dorsal fin base length; D2BL-second dorsal fin base length; DHL-dorsal head length; IDD-Interdorsal distance; IOW-Interorbital width; MT-metapterygium; PDTL-postdorsal tail length.

[a]Ishiyama (1958)'s data included; [b]Ishihara (1987)'s data included.

Discussion

Okamejei mengae closely resembles *O. boesemani* and *O. hollandi* in general body shape, pointed snout, the number of upper tooth rows (42 vs. 39～53 in *O. boesemani* and 38～46 in *O. hollandi*) and dorsal side of disc with dark spots. But, *Okamejei mengae* differs from *O. boesemani* and *O. hollandi* in having long dorsal head length (6.7 times of interorbital width vs. 4.8～5.9 times in *O. boesemani* and 5.0～5.7 times in *O. hollandi*), relatively short precaudal length (18.1% of total length vs. more than 21% in *O. boesemani* and *O. hollandi*), narrow interdorsal distance (0.6 times of first dorsal fin base length vs. more than 1.5 times in *O. boesemani* and *O. hollandi*), fewer trunk vertebrae (23 vs. 26～30 in *O. boesemani* and 27～28 in *O. hollandi*), many predorsal tail vertebrae (50 vs. 37～47 in *O. boesemani* and 42～48 in *O. hollandi*), a greater number of pectoral fin radials (96 vs. 76～80 in *O. boesemani* and 78～84 in *O. hollandi*) and higher scapulocoracoid (69.8% of its length vs. less than 60% in *O. boesemani* and *O. hollandi*) (Tables 1, 3, 4).

Okamejei mengae differs from other four western North Pacific representatives of the genus, *O. acutispina, O. kenojei, O. meerdervoortii and O. schmidti*, in having a greater number of pectoral fin radials (96 vs. 74～84 in the other four species), fewer trunk vertebrae (23 vs. 25～ 29), many predorsal tail vertebrae (50 vs. 35～46) and a somewhat pointed snout (head length 6.7 times interorbital width vs. 3.6～6.4 times) (Table 4).

Numerous pectoral fin radials, few trunk vertebrae and many predorsal tail vertebrae of *O. mengae* seems to be an unusual condition among the species of genus *Okamejei*. The counts of vertebrae show variations among the rajid conspecific specimens, such as the data shown by Ishiyama (1958) and Ishihara (1987), but the counts of trunk and predorsal tail vertebrae of *O. mengae* are not included in those of conspecific variants of any species of *Okamejei* from the Western North Pacific (Table 4).

Okamejei mengae also differs from three Indian Ocean species, *O. powelli, O. heemstrai* and *O. pita*, in having more pectoral fin radials (96 vs. 77～80) (Table 5). Three small to medium-sized Australian skates, *Okamejei australis*, *O. cerva* and *O. lemprieri* (*sensu* McEachran and Miyake, 1990b; McEachran and Konstantinou, 1996; McEachran and Dunn, 1998; Compagno, 1999), recognized as species of *Dipturus* by Last and Yearsley (2002) on the basis of clasper anatomy, obviously also differed from the *O. mengae*, the latter lacking ventral sensory pores on the abdominal region, the pores never reaching to the pelvic girdle (ventral sensory pores distributed on the abdominal region and reaching to just anterior to the pelvic girdle in *D. australis* and *D. cerva*). Finally, *O. mengae* differs from *D. lemprieri* in having 50 precaudal tail vertebrae (vs. 45 in *D. lemprieri*), 96 pectoral fin radials (vs. 76～79) and a pointed snout, 4.1 times the preorbital snout length/orbit length (vs. 2.8～3.4 times) (Table 5).

Genus *Okamejei* Ishiyama, 1958

Rostral cartilage relatively short, its length

Table 5. Comparisons of characters of the Indo-Western South Pacific *Okamejei* species and related species

Characters	Indian Ocean			Australian waters			
	O. heemstrai[a]	*O. powelli*[a]	*O. pita*[b]	*D. australis*[c]	*D. cerva*[c]	*D. lemprieri*[c]	*O.* sp. N[c]
Trunk vertebrae	29～30	30～31	22	?	?	?	?
Predorsal tail vtr.	47～53	49～55	58	?	?	45	?
Pectoral fin radials	78～80	77～78	77	?	?	76～79	?
Upper tooth rows	31～35	72～75	46	?	?	3～33 (lower)	
POSL/OL (ratio)	4.0～4.6	4.3～4.5	3.6	3.3～3.8	3.4～3.6	2.8～3.4	4.0～5.1
IDD/D1BL (ratio)	?	?	?	(dorsals close or connected)	(dorsals close or connected)	(dorsals close or connected)	(dorsals very widely separated)
PDTL/D2BL (ratio)	?	?	?	(very short)	(moderate)	(very short)	(long precaudal length)
AmL, ventrally	?	?	tiny, sparse	tiny, sparse	tiny, sparse	tiny, sparse	tiny, sparse
AmL V-shaped at MT	?	?	absent	absent	absent	absent	?
AmL at ABR	absent?	absent	absent	present	present	absent	absent?
Nuchal thorns	1～2	3	(numerous)	0～1	1～3	(lumbar thorns)	absent

ABR-abdominal region; AmL-ampullae of Lorenzini; D1BL-first dorsal fin base length; D2BL-second dorsal fin base length; IDD-Interdorsal distance; MT-metapterygium; OL-orbit length; PDTL-postdorsal tail length; POSL-preorbital snout length.
[a]McEachran and Fechhelm (1982); [b]Fricke and Al-Hassan (1995); [c]Last and Stevens (1994). Missing data shown as "?"

less than 60% of dorsal head length; three rows of tail thorns in males, three to five in females; tail always gradually tapering posteriorly; prickles on ventral surface developed only on snout region; ventral surface of disc generally whitish; trunk vertebrae 22～30; predorsal tail vertebrae 29～58; pectoral fin radials 74～96; anterior fontanelle of neurocranium with distinct anterior margin; distal tip of medial ridge of ventral terminal clasper cartilage well developed, forming a funnel; length of egg-capsule, excluding horns, less than 65 mm; total adult length less than about 60 cm (at least 58 cm).

Key to species of *Okamejei* in the western North Pacific

1a. Ventral sensory pores rather large, densely distributed on entire ventral surface of disc except for posterior margins 2
1b. Ventral sensory pores tiny, sparsely distributed on ventral surface of disc except for abdominal region 3
2a. Snout sharply pointed, dorsal head length 5.5～6.0 times interorbital width; dark dots densely distributed on dorsal surface of disc, usually in a reticulated pattern; ventral sensory pores distributed rearwards beyond pelvic girdle to areas lateral to cloaca ..... *O. acutispina*
2b. Snout bluntly pointed, dorsal head length 4.0～4.5 times interorbital width; dark dots rather sparsely distributed; ventral sensory pores absent on pelvic girdle ..... *O. schmidti*
3a. Postdorsal tail length usually more than 1.5 times length of second-dorsal fin base 5
3b. Postdorsal tail length usually less than 1.5 times length of second-dorsal fin base 4
4a. ventral sensory pores not forming V-shaped pattern at level of metapterygium; dorsal head length 6.7 times interorbital width; pectoral fin radials 96 ..... *O. mengae* sp. nov.
4b. ventral sensory pores forming V-shaped pattern at level of metapterygium; dorsal head length less than 6.0 times interorbital width; pectoral fin radials 74～78 6
5a. Interdorsal distance usually shorter than length of first-dorsal fin base; small dark dots forming symmetrical patches on both sides of dorsal disc; a pair of dark orbit-sized ocelli usually distinct on pectoral axil ..... *O. boesemani*
5b. Interdorsal distance usually greater than length of first-dorsal fin base; small dark dots evenly distributed on dorsal surface of disc; no dark ocelli on pectoral axil or pectoral center ..... *O. hollandi*
6a. Snout rather bluntly pointed; dorsal head length 3.6～4.9 times interorbital width; 2～16 nuchal thorns; a pair of dark and/or light ocelli at middle of pectorals with a few inner small dark spots behind large ocelli on pectoral fin; adults reach 58 cm TL ..... *O. kenojei*
6b. Snout sharply pointed; dorsal head length 5.3～6.4 times interorbital width; 1～3 nuchal thorns, in females in triangular pattern; no dark or white ocelli on pectorals; many small

yellowish and/or light spots on dorsal surface of disc; adults reach 37 cm TL ..... *O. meerdervoortii*

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남중국해산 홍어과(연골어강, 홍어과) 어류 신종, *Okamejei mengae* sp. nov.

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중국 상해수산대학에 소장된 어류 표본 중에 남중국해에서 채집된 1개체의 표본(295 mm TL)을 근거로 하여 홍어속(*Okamejei*) 어류의 신종을 기재하였다. 홍어속 어류는 북서태평양에 6종, 인도양에 3종이 서식하여 전세계에 9종이 유효하다. 호주 해역에는 홍어속의 미기재종 1종과 근연종으로 살홍어속(*Dipturus*)으로 소속이 변경된 3종이 서식한다.

Okamejei mengae sp. nov.는 문연골 길이가 두장의 54.3%로 주둥이가 짧고, 꼬리부가 전장의 48.5%로 길고, 미극이 3열, 신경두개의 상생체공의 전단부가 명확하게 구별되는 점 등으로 홍어속에 포함된다. 이 종은 복추골이 23개로서 적고, 등지느러미 앞까지의 미추골이 50개로 많으며, 가슴지느러미의 복사연골이 96개로 많은 특징 등으로 동일속의 9종 및 근연종 등 13종과 명확히 구별된다. 또한 뾰족하게 돌출된 주둥이, 양안간격이 6.7배로 긴 두장, 넓은 꼬리, 좁은 제1등지느러미와 제2등지느러미의 거리, 짧은 제2등지느러미 뒤의 길이, 체반 등쪽에 작고 짙은 갈색 반점이 전체적으로 분포하지만 큰 반점은 없고, 배쪽의 로렌치니 병상 기관은 가슴지느러미의 후담기연골(metapterygium)의 뒤까지 분포하며, 견갑오훼연골이 높은 특징을 가지고 있다.

신종과 전 세계 홍어속 및 근연종 등 13종과의 특징 비교표를 작성하였으며, 북서태평양에 서식하는 7종에 대한 새로운 분류 검색표를 제시하였다.