

Fig. 12. *Raja (Okamejei) hollandi*. A, B, holotype, FMNH 52101, adult female, 412 mm TL; C, HK 17, adult male, 350 mm TL; D, THUP 03616, young female, 258 mm TL.

Reeves' drawings as *R. kenojei*, because he referred to the picture of *R. kenojei* published in Müller and Henle (1841). However, the picture of "*R. kenojei*" that appeared in Reeves' (1828) drawings again might be *R. (O.) boesemani*, for it shows dark specks on the disc forming rosette-like patches here and there.

**Distribution.** Based on published data and the present material, this new species occurs from the East China Sea (cf. many authors), through the South China Sea (the present material) to the

north-eastern Indian Ocean (Gloerfelt-Tarp and Kailola, 1984: 33, *Raja* sp. 3) at depths from 20 to 90 m. It inhabits deeper waters towards the south of its distributional area.

**Etymology.** This species is named in honour of Dr. Marinus Boeseman, RMHN, who started his ichthyological work in Japan. Without his suggestions, the present author would not have been aware of some problems still existing in the systematics of the Japanese *Raja* species.

*Raja (Okamejei) hollandi* Jordan et  
Richardson, 1909

(New Japanese name: Kiten-kasube;  
new English name: Yellow-spotted skate)  
(Fig. 12)

*Raja hollandi* Jordan and Richardson, 1909: 163, pl. 64 (descr., a female; type locality: Takao (=Kaohsiung)).

*Raja hollandi*: Engelhardt, 1913: 102 (listed); Garman, 1913: 351 (copied from Jordan and Richardson, 1909).

*Raja hollandi*: Fowler, 1930: 501 (listed); Matsubara, 1935: 20 (in key); Matsubara, 1936: 25 (in part); Okada and Matsubara, 1938: 24 (in part); Fowler, 1941: 370 (compiled); Wang, 1958: 42 (in key); Lindberg and Legeza, 1959: 118, fig. 73 (in part).

*Raja olseni* (not of Bigelow and Schroeder, 1951): Chen and Chung, 1971: 23, fig. 17 (misident.); Shen 1984a; 74, fig. (in key).

*Raja tengu* (not of Jordan and Fowler, 1903): Shen, 1984b: 6, pl. 10-2 (misident.).

**Material examined.** Holotype, FMNH 52101, adult female, 412 mm TL, Kaohsiung, Taiwan, 1906, collected by Hans Sauter; 4 adult males: HK 7, 351 mm TL, South China Sea, 20°32'N, 112°45'E, 84.2 m depth, July, 1958, collected by R.L. Bolin; HK 9, 365.5 mm TL, South China Sea, 20°32'N, 112°31'E, 87.8 m depth, July 23, 1958, collected by R.L. Bolin; HK 17, 350 mm TL, collected with HK 7; HK 18, 332 mm TL, collected with HK 7; 6 adult females: HUMZ 33373, 392 mm TL, no data; HK 3, 392 mm TL, collected with HK 7; HK 4, 367.5 mm TL, collected with HK 9; HK 14, 417 mm TL, collected with HK 7; HK 15, 406.5 mm TL, South China Sea, 21°02'N, 113°32'E, 67.7 m depth, June 25, 1958; HK 16, 384.5 mm TL, South China Sea, 21°0'N, 113°32'E, 75 m depth, June 26, 1958, collected by E.D. Ommanney; 9 young males: NA 3, 225.5 mm TL, South China Sea, 11°52'-12°14'N, 109°19'-109°23'E, depth unknown, Feb. 2, 1961, collected by a South Vietnamese fisherman; NA 4, 291 mm TL, South China Sea, 15°40'N, 109°25'E, depth unknown, collected by R.L. Bolin; NA 6, 203 mm TL, collected with NA 4; HK 10, 298 mm TL, collected with HK 7; HK 19, 325.5 mm TL, collected with HK 9; HK 20, 314.5 mm TL, collected with HK 7; HK 21, 291 mm TL, collected with HK 7; HK 24, 306 mm TL, South China Sea, 19°38'N, 111°30'E, depth unknown, July 21, 1958, collected by R.L. Bolin; HK 26, 348.5 mm TL, collected with HK 24; 6 young females: THUP 03616, 258 mm TL, only a photograph examined, Tung Kong; NA 1, 224.5 mm TL, collected with NA 3; NA 2, 203 mm TL, collected with NA 3; NA 5, 226.5 mm TL, collected with NA 4; NA 7, 205.5 mm

TL, collected with NA 4; HK 25, 319 mm TL, collected with HK 24.

**Diagnosis.** A medium-sized *Raja (Okamejei)* species with a maximum total length of about 350 mm in males and 400 mm in females. Snout pointed, dorsal head length 4.09–5.71 times the interorbital width. Procaudal tail length 21.1–23.5% of TL and 41.4–49.0% of tail length. Postdorsal tail length 30.2–48.4% of dorsal head length and usually more than 1.5 times the  $D_2$  base length. Interdorsal distance usually more than  $D_1$  base length. 1–5 nuchal thorns. Dark specks evenly distributed on entire dorsal side of disc. Small yellowish spots present on almost entire dorsal side of disc. Ventral sensory pores absent on abdominal region and never forming V-shaped pattern at midlength of metapterygium. Dorsal lobe of clasper with pseudorhipidion and two clefts separated by terminal bridge, ventral lobe with rhipidion, shield, sentinel, spike, boss and funnel. Scapulocoracoid horizontally expanded, its height about a half of its length. Tooth rows in upper jaw 37–46. Vtr, 26–29; Vprd, 37–46.

**Description.** Meristic counts and morphometric measurements of the holotype and the new material are given in Table 7.

External features: Disc rhombic, its greatest width in posterior half, at 56.3–63.0% of disc length. Snout hard and pointed, dorsal head length 4.97–5.71 times the interorbital width; preorbital snout length 65.5–69.6% of dorsal head length; interorbital space nearly as large as orbit length. Tail stout, its length longer or shorter than precaudal body length; tail gradually tapering rearwards; procaudal tail length 21.1–23.5% of TL and 41.4–49.0% of tail length; both dorsals equal in size, separated by a distance of more than  $D_1$  base length usually; postdorsal tail length 6.5–9.9% of TL, 12.7–19.7% of tail length, 30.2–48.4% of dorsal head length and usually more than 1.5 times the  $D_2$  base length; caudal fin only developed dorsally, its height more than the maximum width of lateral tail folds; underside of tail tip with a keel, about half of caudal fin base length; lateral tail folds narrow, originating at or near root of tail. Mouth weakly arched with 37–46 parallel rows of pointed teeth in upper jaw in males and 30–46 rows of flattened teeth in quincunx in females; mouth width 45.4–58.3% of preoral length; internarial width 58.0–68.5% of

Table 7. Counts and measurements (mm) of *Raja (Okamejei) hollandi*.

	Holotype											% of TL
	♀ FMNH 52101	♂ HK-7	♂ HK-9	♂ HK-17	♂ HK-18	♂ HK-26	♀ HUMZ 33373	♀ HK-3	♀ HK-14	♀ HK-15	♀ HK-16	
Total length	412	351	365.5	350	332	348.5	392	392	417	406.5	384.5	—
Disc length	217	192	202	193	184.3	182	210	214	223	224	215	52.5–56.7
Disc width	262	231	236	222	212	216	249	253.5	277	264	255.5	62.0–68.7
Snout to maximum disc width	132	121	116	111	110	106	125	124.5	134	126	129	30.4–33.6
Dorsal head length	86.2	74	78.5	73	69.5	70	80.5	82	90	85.5	84.5	20.1–22.3
Preorbital snout length	58.2	48.8	52.2	47.9	48	47	56	57	60.5	59.5	57	13.5–15.5
Orbit length	15.2	16.1	14	15	13	14	14	14.8	15.9	15	15.5	3.6–4.6
Interorbital width	16.5	14.6	14.8	13.8	13.2	12.5	15.5	16.5	17.3	16.5	16	3.6–4.2
Spiracle length	10	10	10.5	9.5	10	8	10.5	10.5	11.2	12	12	2.3–3.2
Interspiracular width	38.2	22.5	22.3	22.5	21	20.8	24.5	25.3	27.5	25	24.1	6.0–6.9
Ant. orbit rim to spiracle end	21.3	21.8	26.5	21.4	18	20	20.5	21.5	24	22.5	22.6	5.2–7.3
Procaudal length	91.3	68.5	77	79.3	75	79	89.5	86.3	96.3	95.5	88.5	21.1–23.5
D <sub>1</sub> base length	17.6	17	17.8	16.2	15	14.5	15.5	17.6	19.3	17.2	16.5	4.0–4.9
D <sub>1</sub> vertical height	7.7	8	7.7	9.1	—	7.5	7.8	8.5	8	7.1	8	1.7–2.6
D <sub>2</sub> base length	18.6	17.7	17.7	17.5	16	15	16.7	20	18.7	18.1	18.5	4.3–5.7
D <sub>2</sub> vertical height	7.8	7.3	8.5	7.8	—	6.5	6	9.5	8.1	8.5	8.5	1.5–2.4
Interdorsal distance	21.4	18.7	18	16.5	16	14	18.5	18.8	18.5	24.1	19	3.7–5.9
Postdorsal length	33.5	—	23.7	29.1	28	32.5	39	31	40	34.6	31	6.5–9.9
Caudal fin vertical height	3.4	—	3.2	4.5	—	2.8	3.5	4.3	3.8	3.3	4.3	0.8–1.3
Lateral tail fold length	152	—	85.5	106	45	59.5	145	62.5	51.5	155	132.5	12.4–38.1
Precaudal body length	212	176	177	173.5	165	163	191	198	214	204	193	46.8–51.5
Tail length	197	174	186	177	170	182	198.5	196	203	195	188.5	47.8–52.2
Ventral head length	113.5	103	103.5	100	—	95.5	108.5	111.5	119	115.5	113.5	27.4–30.1
Preoral snout length	58.7	52	55	53.5	50.5	52	63	63	64.5	63.5	63.5	14.2–17.3
Mouth width	34	40	29	27.7	27.5	26.5	29.8	30.4	34	31.7	32.5	7.6–8.5
Prenarial snout length	48.2	40	42.1	40.3	39.5	39.3	47.5	48.5	51.4	50.1	50	11.3–13.2
Internarial width	30	26.5	26.5	24.3	—	25.2	29.8	31	31.5	31.3	29	6.9–7.9
Nasal curtain length	17	19.3	20.8	21	—	18.8	20	21.4	20.5	22.4	21	4.1–6.0
Over 1st gill slits (outer rims)	—	54.6	54.5	54.5	53.5	51.7	67	65.5	70	67	67.3	14.2–17.6
Ant. pelvic lobe length	49.2	38	37.5	39.5	—	33	45.3	43.6	46	43.3	42	9.5–11.9
Post. pelvic lobe length	61.8	47.4	48.5	56.3	—	49.3	45	53.9	57.5	52.7	52.5	11.0–15.0
Clasper length	—	79	79.8	77.9	—	—	—	—	—	—	—	21.8–22.3
Tooth rows in upper jaw	43	40	46	38	43	41	39	44	46	41	45	
Vtr	27	27	28	27	28	27	27	28	28	28	28	
Vprd	42	45	48	42	45	47	43	43	43	45	45	
Cranium length	92	—	—	—	—	—	84	—	—	—	—	
Rostral cartilage length	51	—	—	—	—	—	48	—	—	—	—	
Prefontanelle length	38.2	—	—	—	—	—	38	—	—	—	—	
Cranium width	46	—	—	—	—	—	45.5	—	—	—	—	
Interorbital width	15	—	—	—	—	—	13	—	—	—	—	
Ant. fontanelle length	21	—	—	—	—	—	15	—	—	—	—	
Post. fontanelle length	17	—	—	—	—	—	15	—	—	—	—	

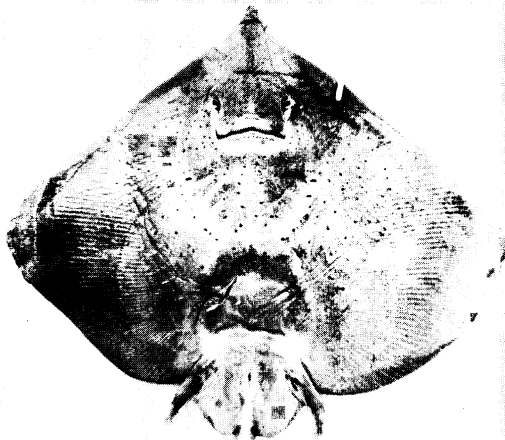


Fig. 13. Ventral side of *Raja (Okamejei) hollandi*, NA 2, showing ventral sensory pore patterns.

prenarial length; distance between first gill slits (outer rims) 69.4–83.2% of dorsal head length.

Squamation: Dorsal surface of disc with thorns and prickles; nuchal thorns 1–5, mostly 1–2; orbital thorns 4–14; interdorsal thorns 2–9; in young, one row of tail thorns in both sexes; in adults, 3 rows in males and 5 in females; alar and malar thorns well developed in adult males, both

thorn fields connected; prickles dorsally developed only on snout, anterior margin of disc and both dorsals; caudal fin sometimes prickly. Ventral side smooth, except for snout tip and lateral narrow areas aside nostrils.

Coloration: Dorsal ground color dark brown; snout translucent lighter; dark specks evenly distributed on entire dorsal side of disc, but never forming any patches; many small yellowish spots of varying sizes present on disc; tips of both dorsals and tail darkish; ventral side usually whitish (see Shen, 1984b: pl. 10-2).

Ventral sensory pores: Rather sparsely distributed on about anterior half of disc; absent on abdominal region and pelvic lobes; series of posteriormost pores undulated and W-shaped (Fig. 13).

Clasper: Slender with pointed tip, its length 42.9–44.0% of tail length; dorsal lobe with pseudorhipidion and two clefts separated by terminal bridge; ventral lobe with bilobed rhipidion, shield, sentinel, spike, boss and funnel; tip of st crab-shaped; tip of sk pointed and close to tip of st (Fig. 14A).

Clasper skeleton: Consists of 3 dorsal terminal, 2 accessory terminal, terminal bridge, ventral ter-

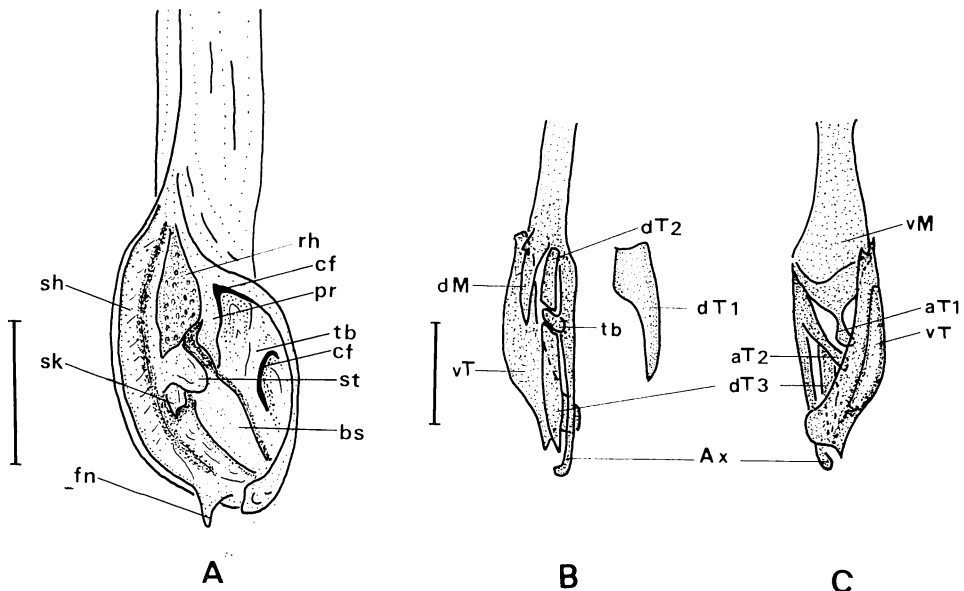


Fig. 14. Left clasper of *Raja (Okamejei) hollandi*, HK 7. A, clasper components (clasper glans opened); B, clasper skeleton in dorsal view; C, clasper skeleton in ventral view. aT1 and aT2, accessory terminals 1 and 2; Ax, axial cartilage; bs, boss; cf, cleft; dM, dorsal marginal; dT1–dT3, dorsal terminals 1 to 3; fn, funnel; pr, pseudorhipidion; rh, rhipidion; sh, shield; sk, spike; st, sentinel; tb, terminal bridge; vM, ventral marginal; vT, ventral terminal. Scales indicate 10 mm.

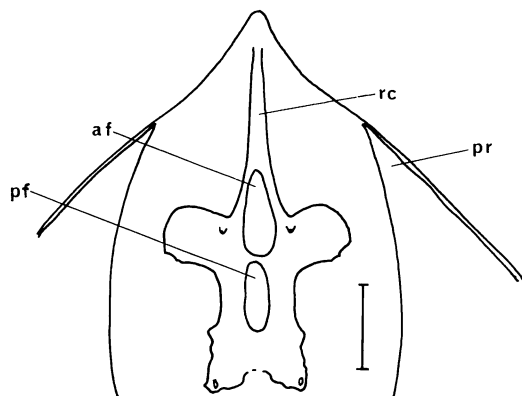


Fig. 15. Cranium of *Raja (Okamejei) hollandi*, holotype, FMNH 52101, 412 mm TL. af, anterior fontanelle; pf, posterior fontanelle; pr, pectoral radials; rc, rostral cartilage. Scale indicates 20 mm.

minal, 2 marginal and axial cartilages; dM with single distal tip, which forming pr externally; dT1 almost triangular, rotated onto ventral side and united with vT; dT2 boot-shaped, anteriorly united to dM at above tip of dM and posteriorly united with Ax by tb and with dT3; dT3 tapering distally, united with Ax at tip; tb apparent externally; tip of dM and tb forming proximal cf and tb and dT1 forming distal cf externally; vT J-shaped, lateral convex ridge running along entire length of cartilage and forming sh externally; medial ridge of vT twisted about 90 degrees through three-fourths length of cartilage, its tip pointed and forming fn externally; anterior notch of vT well developed; aT1 Y-shaped with two proximal arms and one distal arm; tip of distal arm blunt and forming st externally; aT2 inverse Y-shaped with two distal arms; lateral arm curved, its pointed tip forming sk externally; another distal arm of aT2 firmly connected to axial and forming bs externally; aT3 absent (Fig. 14B, C).

**Cranium:** Measurements are given in Table 7. Length of rostral cartilage 55.4–57.1% of cranium length; prefontanelle length 41.5–45.2%; cranium width 50.0–54.2%; interorbital width 15.5–16.3%; length of anterior fontanelle 17.9–22.8%; length of posterior fontanelle 17.9–18.5%. Anterior fontanelle oval with distinct anterior margin; posterior fontanelle gourd-shaped and almost equal to anterior fontanelle in length (Fig. 15).

**Scapulocoracoid:** Measurements are given in Table 8. Almost rectangular with anterior fenestra,

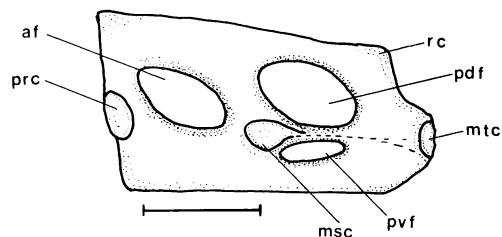


Fig. 16. Left scapulocoracoid of *Raja (Okamejei) hollandi*, HK 14, 417 mm TL. af, anterior fenestra; msc, mesocondyle; mtc, metacondyle; pdf, postdorsal foramen; prc, procondyle; pvf, postventral foramen; rc, rear corner. Scale indicates 10 mm.

Table 8. Measurements (mm) of the left scapulocoracoid of *Raja (Okamejei) hollandi*, HK 14.

Character		% of greatest length
Greatest length	37.5	100
Greatest height	20.0	53.3
Premesocondyle length	17.3	46.1
Postmesocondyle length	20.2	53.9
Anterior fenestra length	7.9	21.1
Anterior fenestra height	10.4	27.7
Postdorsal foramen length	12.4	33.1
Postdorsal foramen height	6.9	18.4
Postventral foramen length	8.9	23.7
Postventral foramen height	3.2	8.5
Height of rear corner	15.4	41.1

tra, postdorsal foramen and postventral foramen; scapulocoracoid greatly horizontally expanded, its height 53.3% of its length; anterior fenestra horizontally elliptical, as well as postdorsal and postventral foramina; length of postdorsal foramen 1.4 times the length of postventral foramen; posterodorsal margin well elevated and rather deeply concave (Fig. 16).

**Remarks.** In recent years, the present author became aware of the existence of a skate species (the new material), which agrees well with the description and figure of *R. hollandi* Jordan et Richardson, 1909, but not with those of "*R. hollandi*" by many subsequent authors who followed Ui (1929) and Matsubara (1936). The former clearly differs from the latter in the dorsal coloration patterns, viz., distributional patterns of dark specks, and presence or absence of small



Fig. 17. *Raja (Okamejei) kenojei*. Lectotype, RMNH D2499, immature female, 370 mm TL.

yellowish spots and dark rings. In 1986, Dr. Matthias Stehmann examined the holotype of *R. hollandi* and provided the author with a detailed description, measurements, photographs and a radiograph. Based on these data, the author came to the conclusion, that *R. hollandi* is not only valid, but also different from *R. hollandi* sensu many subsequent authors. After its original description *Raja (Okamejei) hollandi* has been confused with another species, *R. (O.) boesemani* sp. nov., described in this paper. Chen and Chung (1971) reported "*R. olseni*" from Tung Kong, Taiwan, although *R. olseni* Bigelow et Schroeder, 1951 was described from the western North Atlantic. Based on photograph of *R. olseni* sensu Chen and Chung (1971), the author considered the specimen, THUP 03616, as identical with *R. (O.) hollandi*. Also, "*R. tengu*" as identified by Shen (1984b) is in fact *R. (O.) hollandi*, judging by its color photograph (see Shen, 1984b: pl. 10-2).

*Raja (O.) hollandi* differs from *R. (O.) acutispina*, *R. (O.) kenojei*, *R. (O.) meerdervoortii* and *R. (O.)*

*schmidti* in the combination of the eight characters shared with *R. (O.) boesemani* sp. nov. (see the remarks on *R. (O.) boesemani*). Furthermore, *R. (O.) hollandi* differs from *R. (O.) boesemani* in the nine characters mentioned above (see also the remarks on *R. (O.) boesemani*).

**Distribution.** Based on the present material, this species occurs from Kaohsiung, Taiwan (type locality) to the South China Sea as far south as the Nansha Is. (the new material) at depths from about 67 to 87 m. It is uncertain whether or not this species is endemic to the South China Sea.

*Raja (Okamejei) kenojei* Müller et  
Henle, 1841

(Japanese name: Komon-kasube; new  
English name: Ocellate spot skate)  
(Figs. 17, 18)

*Raja kenojei* Müller and Henle, 1841: 149 (in part, descr. in German; type locality: Nagasaki, Japan, four dried specimens).

*Raja kenojei*: Temminck and Schlegel, 1850: 308 (comment); Bleeker, 1853: 22 (listed); Bleeker, 1858: 42 (in part); Bleeker, 1860: 65 (descr. in Latin; remarks); Duméril, 1865: 556 (descr. in French); Günther, 1870: 461 (descr.); Peters, 1880: 927 (listed); Nyström, 1887: 51 (descr. in Swedish); Jordan and Snyder, 1901a: 337 (descr.); Jordan and Snyder, 1901b: 42 (listed); Jordan and Fowler, 1903: 652 (descr.); Pietschmann, 1908: 10 (descr. in German); Jordan, Tanaka and Snyder, 1913: 27 (listed); Jordan and Hubbs, 1925: 113 (in key; remarks); Fowler, 1930: 501 (listed); Ebina, 1931: 20, fig. 20 (descr. in Japanese); Schmidt, 1931: 11 (listed, Fusan); Tanaka, 1933: 99, fig. (descr. in Japanese); Tang, 1934: 83 (descr., Amoy); Taranetz, 1935: 89 (in part); Tchang, 1940: 163 (notes); Fowler, 1941: 372 (compiled); Herre, 1945: 109 (listed, Tanghai); Boeseman, 1947: 22 (selection of the lectotype); Chen, 1948: 5, fig. 4 (descr., Keelung); Herre, 1953: 39 (listed, Philippine); Matsubara, 1955: pl. 7-24 (in key); Tomiyama et al., 1958: 289, fig. 859 (descr. in Japanese); Wang, 1958: 42 (in key); Lindberg and Legeza, 1959: 118 (in part); Chyung, 1961: 113, color pl. 7, pl. 23 (descr. in Korean); Chyung, 1977: 92, color pl. 5, pl. 17 (descr. in Korean); Boeseman, 1978: (abstract); Boeseman, 1979: 273, pls. 4, 5, 7 and 8 (remarks); Sato and Hasebe, 1982: 20, fig. 8 (descr. in Japanese, Kesenuma, Miyagi Pref.); Iwai, 1986: 40, pl. 38 top (descr. in Japanese).

*Raja kenojei*: Liu, 1932: 161, fig. 9 (descr.; in key).

*Raja (Okamejei) kenojei*: Ishihara and Ishiyama, 1986:



Fig. 18. Four specimens of *Raja (Okamejei) kenojei* showing color variation. A, FUMT P-10558, juvenile male, 101 mm TL, collected off Choshi, Chiba Pref.; B, HUMZ 93870, adult female, 390.5 mm TL, off southern Hokkaido; C, HUMZ 52819, immature female, 377 mm TL, off Sado I.; D, HUMZ 34839, adult male, 473.5 mm TL, off Shizugawa, Miyagi Pref.

278, fig. 8 (listed).  
*Raja porosa* Günther, 1874: 154 (descr. without illustr.;  
type locality: Chefoo (=Yentai), Shangtang Pen.,

syntypes).  
*Raja porosa*: Engelhardt, 1913: 102 (listed); Garman,  
1913: 350 (copied from Günther, 1874); Liu, 1932:

- 160 (in key).
- Raja porosa*: Fowler, 1930: 501 (listed); Fang and Wang, 1932: 266, fig. 23 (descr., no. 897); Koo, 1933: 18, pl. 7 (descr., Chefoo); Wang, 1933: 104 (descr., Chusan); Matsubara, 1936: 28, fig. 19 (in key; descr. in Japanese); Okada and Matsubara, 1938: 25 (in key); Tchang, 1940: 163 (notes); Fowler, 1941: 391 (compiled); Herre, 1945: 109 (listed, Tanghai); Chen, 1948: 4, fig. 3 (descr., Keelung); Kamohara, 1950: 16 (descr. in Japanese); Matsubara, 1955: 137 (in key); Zhang et al., 1955: 32, fig. 23 (descr., nos. 00088 and 00094); Wang, 1958: 32 (in key); Lindberg and Legeza, 1959: 120, fig. 26 (descr.); Zhu, 1960: 150, figs. 140–142 (in key; descr. in Chinese); Hiyama and Yasuda, 1961: 11, pl. 20 (descr.); Zhu et al., 1963: 60, fig. 46 (in key; descr. in Chinese); Cheng et al., 1964: 13, pl. 2 (descr.; biology; fisheries); Ueno, 1965: 406, fig. 3, B (in key); Chyung, 1977: 92 (descr. in Korean); ISJ, 1981: 460 (listed); Shiogaki, 1982: 5 (listed, Iwasaki, Aomori Pref.); Dolganov, 1983: 58, fig. 82 (in key); Shen, 1984a: 74, fig. (in key); Masuda et al., 1984: 13, pl. 14-E (descr.).
- Raja porosa porosa*: Teng, 1962: 212 (in key; descr. in Japanese); Chen and Chung, 1971: 25 (descr.; in key).
- Raja (Okamejei) porosa*: Ishiyama, 1967: 19, fig. 5, pls. 8–10 (descr.; range; remarks).
- Raja fusca* Garman, 1885: 42 (descr. without illustr.; type locality: Japan, no. 26542).
- Raja fusca*: Jordan and Fowler, 1903: 649 (copied from Garman, 1885); Pietschmann, 1908: 9 (descr. in German); Jordan et al., 1913: 27 (listed); Jordan and Hubbs, 1925: 110 (in key; remarks); Ui, 1929: 22 (descr. in Japanese); Fowler, 1930: 501 (listed); Matsubara, 1935: 19 (in key); Okada and Matsubara, 1938: 24 (in key); Fowler, 1941: 366 (compiled); Kamohara, 1950: 16 (descr. in Japanese); Ishiyama, 1951a: 112 (age determination); Ishiyama, 1952: 3, fig. 1 (neurocranium); Herre, 1953: 39 (listed, Philippine); Matsubara, 1955: 137 (in key); Lindberg and Legeza, 1959: 123, fig. 77 (compiled); Ueno, 1965: 406, fig. 4 (in key); Chen and Chung, 1971: 19 (in key; descr.); ISJ, 1981: 460 (listed); Shiogaki, 1982: 5 (listed, Aomori Pref.); Dolganov, 1983: 59, fig. 83 (in key); Shen, 1984a: 74, fig. (in key); Masuda et al., 1984: 13 (descr.).
- Raja fusca*: Engelhardt, 1913: 102 (listed); Garman, 1913: 349, pl. 24 (redescr.).
- Raja (Okamejei) fusca*: Ishiyama, 1958b: 371, fig. 80 (descr.; notes); Ishiyama, 1967: 22, fig. 6, pl. 11 (descr.; range; remarks); Ishihara and Ishiyama, 1986: 278, fig. 8 (listed).
- Raja japonica* Nyström, 1887: 52 (descr. in Swedish without illustr.; type locality: Nagasaki, Japan).
- Raja japonica*: Jordan and Snyder, 1901b: 42 (listed).
- Raja meerdervoorti* (not of Bleeker, 1860): Jordan and Snyder, 1901a: 337 (misident.); Jordan and Snyder, 1901b: 42 (listed); Jordan and Fowler, 1903: 650, fig. 7 (descr.); Pietschmann, 1908: 6 (descr. in German; remarks).
- Raja meerdervoortii* (not of Bleeker, 1860): Fowler, 1910: 471 (listed); Pavlenko, 1910: 11 (descr. in Russian); Jordan et al., 1913: 26, fig. 13 (listed); Ui, 1929: 22 (descr. in Japanese); FNU, 1973: 397, pls. 12 and 13 (remarks).
- Raja meerdervoortii meerdervoortii* (not of Bleeker, 1860): Ishiyama, 1950: 35 (egg-capsule).
- Raja (Okamejei) porosa meerdervoortii* (not of Bleeker, 1860): Ishiyama, 1958b: 365, fig. 77, pl. 2-Q (descr.; notes).
- Raja tobae* Tanaka, 1916: 313 (descr. in Japanese without illustr.; type locality: Toba, Mie Pref.).
- Raja tobae*: Tanaka, 1917: 453, pls. 124–127 (redescr., nos. 7443 and 7446); Jordan and Hubbs, 1925: 113 (in key; remarks); Fowler, 1930: 501 (listed); Fang and Wang, 1932: 264, fig. 22 (descr., Chefoo, no. 2176); Wang, 1933: 104 (descr., Chusan); Tang, 1934: 81, fig. 12 (descr., Amoy); Matsubara, 1935: 20 (in key); Tortonese, 1939: 210, fig. 3 (descr., Yokohama); Tchang, 1940: 163 (notes); Fowler, 1941: 379 (compiled).
- Raja (Okamejei) porosa tobae*: Ishiyama, 1958b: 368, fig. 78 (descr.; notes).
- Raja katsukii* Tanaka, 1927: 662, pl. 154 (descr.; type locality: west coast of Aomori Pref.).
- Raja katsukii*: Fowler, 1930: 510 (listed); Matsubara, 1935: 20 (in key); Matsubara, 1936: 26, fig. 17 (in key; descr. in Japanese); Okada and Matsubara, 1938: 24 (in key); Fowler, 1941: 371 (compiled); Zhang et al., 1955: 34, fig. 24 (descr., no. 52-0435); Wang, 1958: 42 (in key); Zhu, 1960: 153, fig. 143 (in key; descr. in Chinese).
- Raja* subsp. Q: Ishiyama, 1958a: 14 (egg-capsule).
- Raja* subsp. Q': Ishiyama, 1958a: 14 (egg-capsule).
- Raja chinensis* (not of Basilevsky, 1855): Zhu, 1960: 145, figs. 134–136 (descr. in Chinese, six specimens); Zhu et al., 1963: 59, fig. 45 (descr. in Chinese).
- Raja isotrachys* (not of Günther, 1877): FNU, 1973: 397, pl. 11 (misident.).
- Raja tengu* (not of Jordan and Fowler, 1903): Chyung, 1977: 93, color pl. 6, pl. 17 (misident.).

**Material examined.** Lectotype, RMNH D (dry) 2499, immature female, 370 mm TL, collected at the Nagasaki Fish Market by H. Bürger; 2 paralectotypes: RMNH D2500, adult female, 410 mm TL; RMNH 4234, young male, 293 mm TL, both collected with the lectotype; RMNH 7434, two specimens, a young male, 315 mm TL, collected by P. van Meerdervoort, and an adult female, 448 mm TL, in the Bleeker Collection, another female of smaller size mentioned



by Bleeker (1858) lost; BMNH 1874.1.16.60-61, syntypes of *R. porosa*, a pair of adult male and female, 442 mm TL and 390 mm TL, Chefoo (=Yentai), ca. 37°30'N, 121°25'E, collected by Swinhoe; ZMUU Type Coll. No. 278, holotype of *R. japonica*, young male, 213.5 mm TL, Nagasaki, collected by J.W. Petersen and J.C. Smitt; ZUMT 13755, holotype of *R. katsukii*, adult female, 403 mm TL, west coast of Aomori Pref., collected by Jutaro Katsuki.

110 specimens from around the Japanese Archipelago:

41 specimens from the Pacific coast of Japan: 9 adult males: 452.5-521 mm TL, FAKU 111509, FUMT P10523, HUMZ 34839, HUMZ 34840, HUMZ 34842, HUMZ 81305, MTUF 25178, MTUF 25180, MTUF 25182; 10 adult females: 432.5-509 mm TL, FAKU 111510, FUMT P10522, FUMT P10526, FUMT P10527, FUMT P10528, HUMZ 34897, MTUF 25181, MTUF 25183, MTUF 25184, MTUF 25930, 8 young males: 101-454.5 mm TL, FUMT P10518, FUMT P10558, MTUF 25177, MTUF 25923, MTUF 25924, MTUF 25926, MTUF 25928, MTUF 25931; 14 young females: 96-492 mm TL, FUMT P10519, FUMT P10525, FUMT P10532, HUMZ 48964, HUMZ 81304, MTUF 25179, MTUF 25185, MTUF 25922, MTUF 25925, MTUF 25927, MTUF 25929, MTUF 25933, MTUF 25934, MTUF 25948.

38 specimens from the Sea of Japan: 16 adult males: 347.5-467.5 mm TL, FAKU 111544, HUMZ 34903, HUMZ 34910, HUMZ 34926, HUMZ 34932, HUMZ 34957, HUMZ 34961, HUMZ 34995, HUMZ 60271, HUMZ 64780, MTUF 25064, MTUF 25218, MTUF 25936, MTUF 25937, MTUF 25939, MTUF 25940; 8 adult females: 390-493 mm TL, HUMZ 34865, HUMZ 34875, HUMZ 34889, HUMZ 34982, HUMZ 93870, MTUF 25932, MTUF 25935, MTUF 25938; 3 young males: 279-332 mm TL, FAKU 111546, HUMZ 34900, MTUF 111547; 11 young females: 320-377 mm TL, FAKU 111545, HUMZ 34883, HUMZ 34888, HUMZ 34908, HUMZ 34916, HUMZ 34921, HUMZ 34963, HUMZ 52818, HUMZ 52819, HUMZ 52820, MUTF 25227.

29 specimens from the East China Sea: 6 adult males: 389-478 mm TL, HUMZ 33149, HUMZ 33160, HUMZ 33161, MTUF 25215, MTUF 25216, MTUF 25062; 4 adult females: 413.5-502 mm TL, HUMZ 33167, MTUF 25220, MTUF 25223, MTUF 25224; 6 young males: 281-409 mm TL, HUMZ 33150, HUMZ 33151, HUMZ 33152, HUMZ 33153, HUMZ 33157, MTUF 25233; 13 young females: 226-443 mm TL, HUMZ 33142, HUMZ 33156, HUMZ 33158, HUMZ 33162, HUMZ 33163, HUMZ 33164, MTUF 25229, MTUF 25230, MTUF 25231, MTUF 25232, MTUF 25234, MTUF 25235, MTUF 25236.

2 specimens from the Bungo Strait: a young male, MTUF 25968, 240 mm TL; a young female, MTUF

25966, 235.5 mm TL.

**Diagnosis.** A medium to large-sized *Raja* (*Okamejei*) species with a maximum total length of about 350-500 mm in both sexes. Snout blunt to pointed, dorsal head length 3.60-4.89 times the interorbital width. Tail depressed, its length never exceeds precaudal body length. Procaudal tail length 14.9-19.5% of TL and 32.6-41.3% of tail length. Postdorsal tail length 12.6-20.2% of dorsal head length and usually less than 1.5 times the  $D_2$  base length. 2-16 nuchal thorns. Prickles present only on snout region of both sides of disc in both sexes; in some females, median area and posterior margin of dorsal side of disc also prickly. In young, a pair of dark rings always present at center of pectorals, which become light or dark markings with growth. Another pair of white markings present at posterior centers of pectorals. One or a few small dark spots present inside the posterior markings, and after formalin preservation these markings become dusky. In the northern forms, dark specks or dark reticulated patterns scattered over entire dorsal side of disc. Ventral sensory pores absent on abdominal region. Several sensory pores assembled to form V-shaped pattern at midlength of metapterygium. Dorsal lobe of clasper with pseudorhipidion, cleft and slit; ventral lobe with rhipidion, shield, sentinel, spike and funnel. Ventral terminal clasper cartilage consisting of two joint pieces. Scapulocoracoid rather vertically expanded, its height 87.3% of its length. Length of egg-capsule 45-55 mm, excluding horns. Tooth rows in upper jaw 43-55. Vtr, 25-29; Vprd, 35-46.

**Description.** Meristic counts and morphometric measurements of the lectotype, paralectotypes and the new material are given in Table 9.

External features: Disc rhombic, its greatest width in posterior half, at 50.4-61.1% of disc length. Snout hard, and blunt to pointed, dorsal head length 3.60-4.89 times the interorbital width; preorbital snout length 62.3-71.9% of dorsal head length; interorbital width as large as or longer than orbit length. Tail stout and depressed, its length never exceeds precaudal body length; procaudal tail length 14.9-19.5% of TL and 32.6-41.3% of tail length; both dorsals equal in size, separated by a distance of about one-third of  $D_1$  base length to slightly longer than  $D_1$  base length; postdorsal tail length 2.7-5.9% of TL, 5.8-12.4%

Table 9. Counts and measurements (mm) of *Raja (Okamejei) kenojei* including those of type specimens of *R. japonica*, *R. katsukii* and *R. porosa*.

	Lecto- type	Paralectotypes		Syntypes of <i>R. porosa</i>		Holotype of <i>R. japonica</i>	Holotype of <i>R. katsukii</i>		♀ RMNH 7434	♀ MTUF 25185	% of TL	
	♀ RMNH D2499	♀ RMNH D2500	♂ RMNH 4243	♂ BMNH 1874· 1·16·60	♀ BMNH 1874· 1·16·61	♂ UUZM Type Coll. No. 278	♀ ZUMT 13755	♂ RMNH 7433				♂ MTUF 25931
Total length	370	410	293	442	390	213.5	403	315	445	448	490.5	—
Disc length	200	215	160	237.5	222.5	119.5	225	170	260	250	285.5	52.4–58.5
Disc width	245	270	187	267	272	140.5	266	212	321	305	307	60.4–70.8
Snout to maximum disc width	115	126	96	131	120	68	132	80	142	126	150	28.1–34.5
Dorsal head length	80	90	65	89	78.5	45.5	82	67	95.5	95	96	19.6–22.0
Preorbital snout length	55.6	60.5	45.3	59	53	32.5	56.5	47	62.2	62.8	69	12.8–15.6
Orbit length	—	17.5	11	13.5	15.5	7.8	14.5	10	15.6	16	19.7	3.1–4.9
Interorbital width	18	18	13.8	21	20	9.1	19	14.8	22.6	21	26.7	4.3–5.4
Spiracle length	10.5	8.5	8.5	12	11	6	11.5	10	15	16.5	16	2.1–3.7
Interspiracular width	25.6	26.5	20	28.7	26	14.3	28.5	21	34.5	30	39.7	6.5–8.4
Ant. orbit rim to spiracle end	—	—	—	—	—	10.5	—	—	24.5	—	24.8	5.0–5.8
Procaudal length	59	75	51	86.3	70.5	43	74	48	69	75	79.8	14.9–19.5
D <sub>1</sub> base length	18.5	14.7	16.5	26.7	20	13	19	18	22.3	27	27.2	3.6–6.0
D <sub>1</sub> vertical height	6	8	10.5	11.7	10.7	3	9.7	5	12.1	16	14	1.2–3.6
D <sub>2</sub> base length	16.5	20.3	16.5	22	14.7	10.3	20.5	16	21.6	26.5	28.1	3.8–6.1
D <sub>2</sub> vertical height	5	5	6.5	11	7.2	3	8	4	10	6.5	12.6	1.2–3.5
Interdorsal distance	9	17.5	8.5	11.7	13.5	6.3	19	7.5	10.4	11.5	10.6	1.6–4.7
Postdorsal length	14.5	22.5	11	26	20	12	18	11.5	15	12	15.2	2.7–5.9
Caudal fin vertical height	1	—	2.5	3	1	1.5	1.3	—	3.8	2	3.8	0.3–0.9
Lateral tail fold length	145	—	110	170	140	82	155	115	155	170	152.5	31.3–39.2
Precaudal body length	200	220	146	233	213	105	210	164	239	245	274.5	52.1–56.4
Tail length	180	190	147	209	177	108.5	193	151	206	203	216	43.6–48.6
Ventral head length	105	122	—	—	—	61	—	—	128	130	147.5	27.9–30.1
Preoral snout length	53.5	60	46	60.5	51	33	58	48.5	62.5	60.5	67.5	13.1–15.6
Mouth width	29.8	35	23.5	38	31.3	17.8	35.5	13	42.8	35	43.5	7.8–9.8
Prenarial snout length	44	50	36.8	46.5	40.5	25.8	47.5	37.5	50	47	50.3	10.0–12.5
Internarial width	22.8	28	23	34	34	16	33	23.5	40	34	42.5	6.2–9.0
Nasal curtain length	15.8	16	13	18.8	15.5	10	20	—	22.1	19	24.4	3.9–6.8

Over 1st gill slits (outer rims)	69.8	73	—	75.7	76.3	40.5	76	58	92	87.8	104.8	17.1-21.9
Ant. pelvic lobe length	35.5	38.5	32.8	55	53.5	27.1	58	—	60.1	50.5	59	9.4-14.4
Post. pelvic lobe length	55.5	68.4	40.3	72.5	60.8	34.4	42.5	—	82.8	75.5	90.3	10.5-20.4
Clasper length	—	—	—	111.5	—	—	—	—	—	—	—	25.2-28.2
Tooth rows in upper jaw	45	45	47	53	55	44	48	52	52	46	54	—
Vtr	—	—	—	28	26	29	29	28	27	26	—	—
Vprd	46	43	43	36	38	43	35	46	43	40	—	—
Cranium length	77	87.3	62.5	93	82	—	—	—	—	97	—	—
Rostral cartilage length	41	46	33.5	46	41	—	—	—	—	47	—	—
Prefrontalle length	34	37.8	26.5	35	32	—	—	—	—	34	—	—
Cranium width	44.5	49.2	33	52	49	—	—	—	—	52.5	—	—
Interorbital width	18	13.8	13.8	21	17.5	—	—	—	—	20	—	—
Ant. fontanelle length	19.5	16.6	15.3	20	18	—	—	—	—	21.5	—	—
Post. fontanelle length	18	20.5	13	19	17	—	—	—	—	21	—	—

of tail length, 12.6-29.2% of dorsal head length; caudal fin well developed, its height more than width of lateral tail folds; ventral keel present or absent; lateral tail folds rather wide and originating near root of tail. Mouth weakly arched with 43-52 parallel rows of pointed teeth in upper jaw in males and 45-55 rows of flattened teeth in quincunx in females; mouth width 55.1-74.0% of preoral length; internarial width 51.8-84.5% of prenarial length; distance between first gill slits (outer rims) 81.1-109.2% of dorsal head length.

Squamation: Dorsal surface of disc with thorns and prickles; nuchal thorns 2-16; orbital thorns 6-16; interdorsal thorns 1-6; 3 rows of tail thorns in males and 3 or 5 in females; alar and malar thorns well developed in adult males, and both thorn fields connected; prickles developed dorsally on snout, anterior margin of disc and both dorsals; in some females, median area and posterior margin of dorsal side of disc also prickly; caudal fin sometimes with prickles. Ventral side of disc entirely smooth, or only prickly on snout.

Coloration: Dorsal ground color dark brown; snout translucent lighter; a pair of dark rings always present at center of pectorals in young; in adults, coloration patterns variable: a pair of light or dark oval markings, which modified from juvenile dark rings, present at center of pectorals; another pair of white oval markings present posterior to those at center of pectorals; one or a few small dark spots present inside the posterior markings, or after formalin preservation the posterior markings entirely dusky; in some specimens of northern forms, disc with numerous dark specks or disc mottled by dark reticulate patterns. Ventral side largely whitish; tip of snout and lateral margin of disc usually dark brown; interbranchial and abdominal regions with dusky blotches or entirely dusky (see Figs. 18, 19).

Ventral sensory pores: Rather densely distributed on anterior half of disc, but absent on abdominal region and pelvic lobes; series of posteriormost pores undulated and W-shaped; several pores apparent at midlength of metapterygium and forming V-shaped pattern (Fig. 19).

Clasper: Depressed with rather pointed tip, its length 53.3-58.8% of tail length; dorsal lobe with pseudorhipidion, cleft and slit (sl); ventral lobe with monolobed rhipidion, shield, sentinel, spike and funnel; tips of st and sk close together; fn with triangular tip (Fig. 20A).

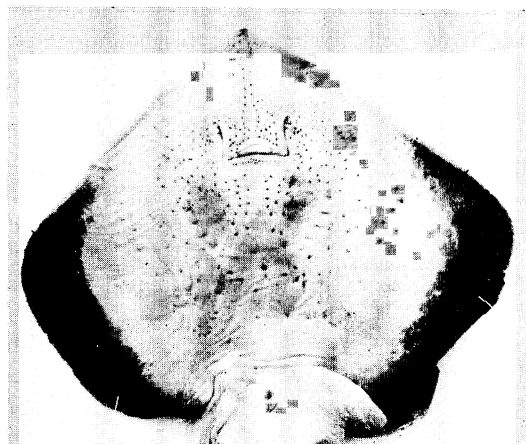


Fig. 19. Ventral side of *Raja (Okamejei) kenojei*, FUMT P-10532, showing ventral sensory pore patterns.

Clasper skeleton: Consists of 3 dorsal terminal, 2 accessory terminal, terminal bridge, ventral terminal, 2 marginal and axial cartilages: tip of dM bifurcated, lateral longer tip of which forming pr externally; median tip of dM only slightly produced; dT1 long crescent-shaped, rotated onto ventral side and united with vT; dT2 rod-like, rather expanded distally, anteriorly united with dM just above tip of dM, and posteriorly united with Ax by tb and with dT3; dT3 slender and long, as long as dT1 and 2.5 times

longer than dT2; dT3 united with Ax at tip; longer tip of dM and dT1 forming cf externally; tb obscure externally; vT J-shaped, divided into two subpieces at center; lateral convex ridge running along entire length of cartilage and forming sh externally; medial ridge of vT twisted about 90 degrees through its entire length, tip of which forming fn externally; anterior notch of vT well developed; aT1 Y-shaped with two proximal arms and one distal arm; distal arm of aT1 expanded to form st externally; aT2 inverse Y-shaped with two distal arms; lateral arm of aT2 curved and forming sk externally; the other arm of aT2 firmly connected to Ax distally; aT3 absent (Fig. 20B, C).

Cranium: Measurements are given in Table 9. Length of rostral cartilage 48.5–53.6% of cranium length; prefontanelle length 35.1–44.2%; cranium width 52.8–59.8%; interorbital width 15.8–23.4%; length of anterior fontanelle 19.0–25.3%; length of posterior fontanelle 20.4–23.5%. Anterior fontanelle oval, with distinct anterior margin and flat posterior margin; posterior fontanelle gourd-shaped; both fontanelles almost equal in length (Fig. 21).

Scapulocoracoid: Measurements are given in Table 10. Almost rectangular with one anterior fenestra, one postdorsal foramen and one post-ventral foramen; vertically expanded, its height 87.3% of its length; anterior fenestra vertically

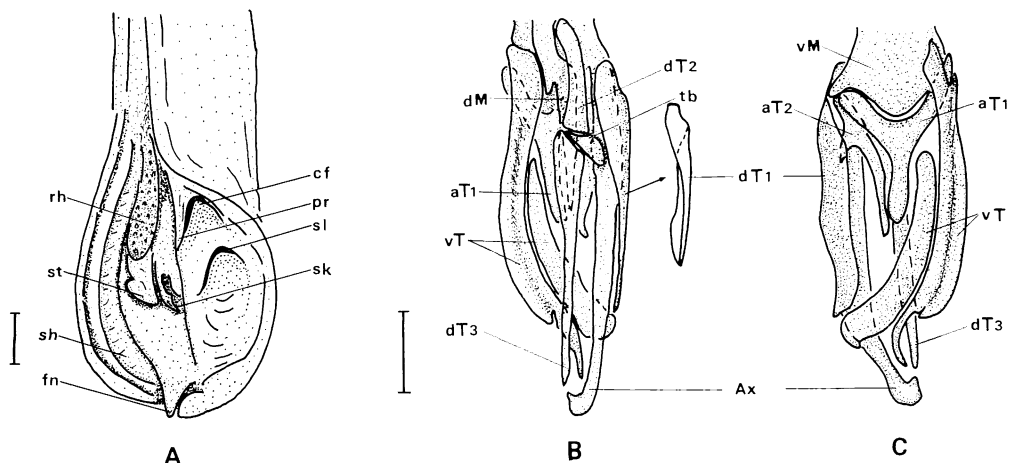


Fig. 20. Left clasper of *Raja (Okamejei) kenojei*, MTUF 25178. A, clasper components (clasper glans opened); B, clasper skeleton in dorsal view; C, clasper skeleton in ventral view. aT1 and aT2, accessory terminals 1 and 2; Ax, axial cartilage; cf, cleft; dM, dorsal marginal; dT1–dT3, dorsal terminals 1 to 3; fn, funnel; pr, pseudorhipidion; rh, rhipidion; sh, shield; sk, spike; sl, slit; st, sentinel; tb, terminal bridge; vM, ventral marginal; vT, ventral terminals. Scales indicate 10 mm.

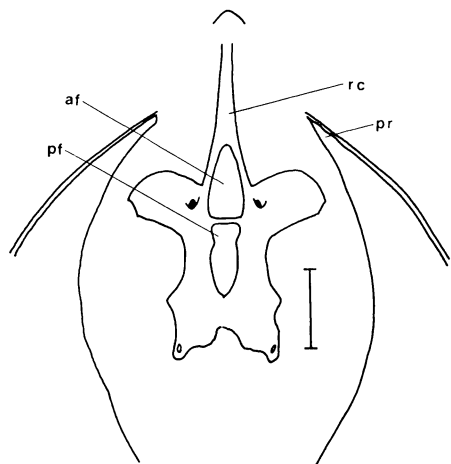


Fig. 21. Cranium of *Raja (Okamejei) kenojei*, syntype of *R. porosa*, BMNH 1874.1.16.60, adult male, 442 mm TL. af, anterior fontanelle; pf, posterior fontanelle; pr, pectoral radials; rc, rostral cartilage. Scale indicates 20 mm.

Table 10. Measurements (mm) of the left scapulocoracoid of *Raja (Okamejei) kenojei*, MTUF 25185.

Character	mm	% of greatest length
Greatest length	35.3	100
Greatest height	30.8	87.3
Premesocondyle length	15.2	43.1
Postmesocondyle length	20.1	56.9
Anterior fenestra length	8.5	24.1
Anterior fenestra height	12.9	36.5
Postdorsal foramen length	11.0	31.2
Postdorsal foramen height	8.4	23.8
Postventral foramen length	8.2	23.2
Postventral foramen height	4.8	13.6
Height of rear corner	20.6	58.4

elliptical; postdorsal and postventral foramina horizontally elliptical, and length of the latter about two-thirds the length of the former; posterodorsal margin highly elevated, never concave and angled at about 120 degrees (see Ishihara and Ishiyama, 1986: fig. 8-D).

**Egg-capsule:** Measurements are given in Table 11. Almost rectangular with horns at each corner; lateral edges almost straight; bases of horns stout; posterior horns curved inwards from midlength on and longer than anterior ones; lateral keel



Fig. 22. Egg-capsule of *Raja (Okamejei) kenojei*, collected off Choshi, Chiba Pref., 47.2 mm in length excluding horns.

Table 11. Measurements (mm) of the egg-capsule of *Raja (Okamejei) kenojei* collected off Choshi, Chiba Pref.

Character	mm
Length (without horns)	47.2
Width: maximum	29.0
minimum	20.2
Ant. horn length	14.3
Post. horn length	21.9
Ant. apron width	2.2
Post. apron width	9.4
Keel width	—

indistinct; anterior ends of lateral keels separated from main portion and forming fibroid tendrils; anterior apron poorly developed; posterior apron moderately developed, its rear margin extending to one-third the length of posterior horns; ground color of both sides orange-brown (Fig. 22).

**Remarks.** As a consequence of the suggestions

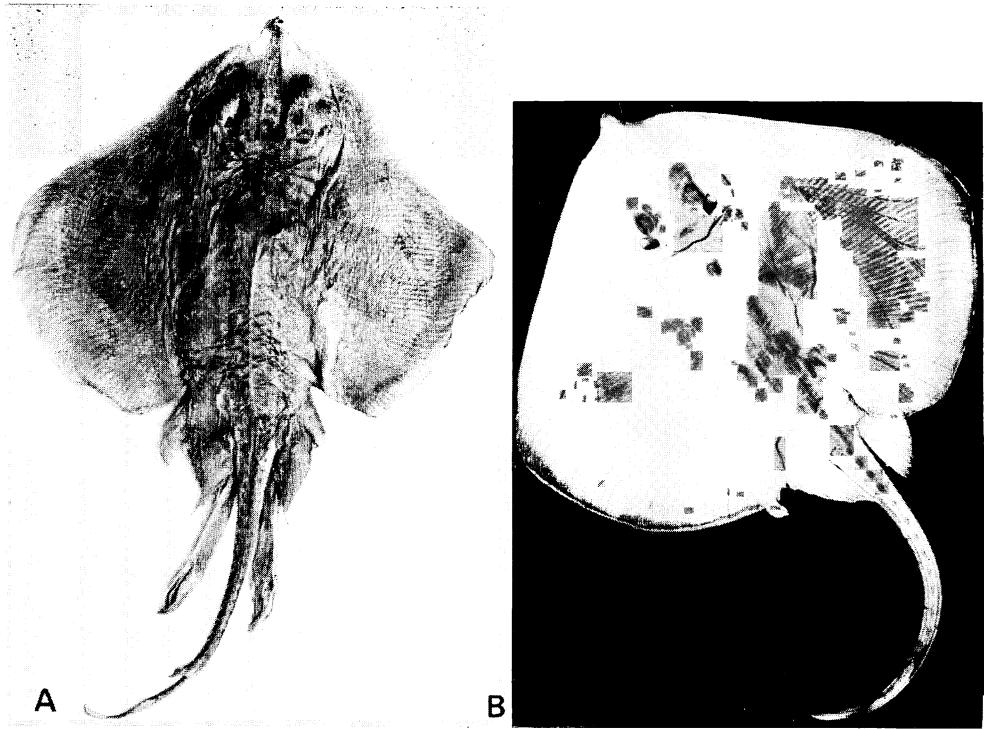


Fig. 23. A, syntype of *Raja porosa* Günther, BMNH 1874·1·16·60, adult male, 442 mm TL, Chefoo, China; B, holotype of *R. japonica* Nyström, ZMUU Type Collection No. 278, young male, 213.5 mm TL, Nagasaki, Japan.

on the systematics of the Japanese *Raja* species given by Boeseman (1978, 1979), the present author re-examined in 1985 the type specimens of *R. kenojei* Müller et Henle at the RMNH, the syntypes of *R. porosa* Günther at the BMNH, and the ZMUU holotype of *R. japonica* Nyström at the ISH (Fig. 23). Morphological comparison of these type specimens resulted in the conclusion that *R. porosa* and *R. japonica* are junior synonyms of *R. kenojei*. Boeseman (1947) designated the specimen RMNH D2499 as the lectotype of *R. kenojei* and other three, RMNH D2500, D2501 and 4243 as the paralectotypes based on the description of the species by Müller and Henle (1841). These four type specimens agree with the original description in having three to five rows of tail thorns. However, one of three paralectotypes, RMNH D2501, was identified as *R. acutispina* by the author in 1985, although Boeseman (1979) considered the specimen as identical with *R. meerdervoortii*. Bleeker (1860) and Boeseman (1947, 1979) noticed that the original picture of *R. kenojei*, which shows only one row of

tail thorns, does not correspond to both the original description and the four types of *R. kenojei* (see pl. 48 in Müller and Henle, 1841). The picture of *R. kenojei* published in Müller and Henle (1841) might well be identified as *R. boesemani* sp. nov. Thus the picture of *R. kenojei*, in Müller and Henle (1841), should not even be applicable to the "iconotype" of *R. kenojei* (see the remarks on *R. (O.) boesemani*).

Okada et al. (1935) misidentified their specimen of *R. (D.) kwangtungensis* as *R. kenojei*, and many subsequent authors followed this. For instance, Ishiyama (1958b, 1967), when revising the systematics of the Japanese *Raja* species, used the scientific name *R. porosa* for *R. kenojei* on the one hand and used the scientific name "*R. kenojei*" for *R. kwangtungensis* on the other. Although many subsequent authors followed Ishiyama's (1958b, 1967) scientific nomenclature of Japanese skates, his usage of the scientific names *R. kenojei* and *R. porosa* must be revised.

Garman (1885) described *R. fusca* on the basis of juvenile specimens collected from the Yedo

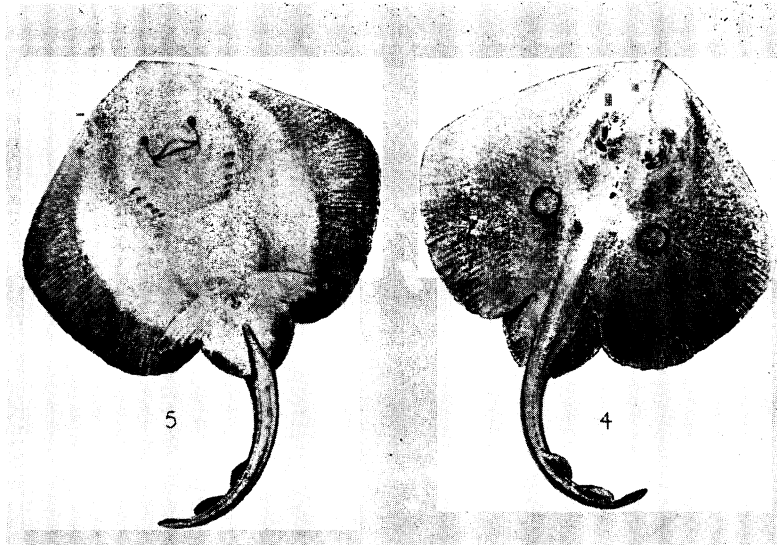


Fig. 24. Holotype of *Raja fusca* Garman after Garman (1913: pl. 24, figs. 4 and 5), USNM 26542, juvenile female, 109 mm TL, Tokyo Bay.

Bay (=Tokyo Bay) without having compared his specimen with *R. kenojei* Müller et Henle. Garman (1913) redescribed *R. fusca* with a fine figure. Jordan and Hubbs (1925) also considered *R. fusca* as a distinct species, different from *R. kenojei*. The present author examined juvenile specimens of *R. kenojei* collected from all around Japan and found that a pair of dark rings at center of pectorals was present in all of them. The holotype of *R. fusca*, USNM 26542, 109 mm TL, is now in bad condition and could not be examined (pers. comm., 1985, Susan Jewett, SOS). However, judging by the figure of the holotype in Garman (1913: pl. 24, figs. 4, 5), a pair of dark rings is present at center of pectorals (see Fig. 24). Consequently, *R. fusca* is here synonymized with *R. kenojei*.

Jordan and Snyder (1901a) and Jordan and Fowler (1903) misidentified their specimen of *R. kenojei* as *R. meerdervoortii*, because they did not compare it with the holotype of *R. meerdervoortii* (see Fig. 25 and the remarks on *R. meerdervoortii*). Although *R. tobae* Tanaka, 1916 and *R. katsukii* Tanaka, 1927 were already synonymized with *R. porosa* (= *R. kenojei*) by Ishiyama (1967), the author himself re-examined the original figure of *R. tobae* in Tanaka (1917: pl. 124) and the holotype of *R. katsukii*, ZUMT 13755 (see Fig. 26). Consequently, the author confirmed that Ishiyama

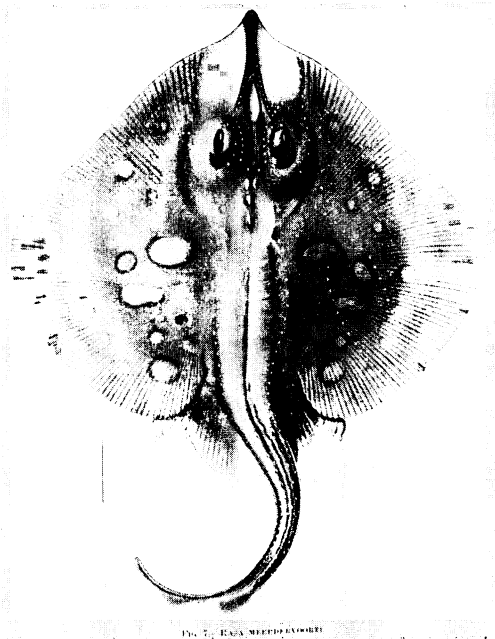


Fig. 25. *Raja meerdervoortii* sensu Jordan and Fowler (1903: fig. 7), female, about 30 mm TL, the specimen may be lost.

(1967) was correct in synonymizing *R. tobae* and *R. katsukii* with *R. porosa* (= *R. kenojei*).

The bipartite ventral terminal clasper cartilage existing in this species is a character not only