



Bathyraja chapmani n. sp., a new deep-sea skate (Rajiformes: Arhynchobatidae) from the Southeast Pacific Ocean

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Abstract

A new species of softnose skate, *Bathyraja chapmani* n. sp., is described from two female specimens collected in deepwater off Lima, Peru (-11.933° , -78.15°), in the southeastern Pacific, at 1714 m deep, in a fishery for Patagonian toothfish. The new species is separated from other southeastern Pacific *Bathyraja* species by having the same color and same irregular spotted pattern on both the dorsal and ventral surfaces, as well as the form and arrangement of thorns and denticles and several meristic characters. *Bathyraja chapmani* n. sp. has a uniform black-to-chocolate or dark-plum-brown background coloration with an irregular pattern of whitish to dark-colored scattered spots. Its closest congener, *Bathyraja aguja*, also from Peru, has two symmetrically arranged, large, white spots on the dorsal surface at the pectoral-fin bases, symmetrically arranged white spots along the disc margins, and a ventral surface lacking any spots or patterning. The new species is the fourth *Bathyraja* species known to occur in Peruvian waters.

Key words: taxonomy, fishes, ichthyology, Chondrichthyes, elasmobranch, softnose skate, Peru, new species.

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Introduction

The softnose skate genus *Bathyraja* Ishiyama, 1958 (Rajiformes: Arhynchobatidae) was first described as a subgenus of *Breviraja* Bigelow & Schroeder, 1948, but Ishiyama & Hubbs (1968) later elevated it to full generic status. This is the largest elasmobranch genus with 55 known species, most occurring in the North Pacific Ocean (14 species) and the southeastern Pacific Ocean (14 species) (Ebert & Winton 2010, Ebert 2016, Last et al. 2016). Geographically, most southeastern Pacific species occur at much higher latitudes, from south of Valparaíso (33°S) to the Straits of Magellan (53°S) and into southern Patagonia (56°S) (Ebert & Winton 2010, Ebert 2016). Of the 5 species occurring at lower latitudes, three species are known to occur in Peruvian waters, including *Bathyraja aguja* (Kendall & Radcliffe, 1912), *Bathyraja longicauda* (de Buen, 1959), and *Bathyraja peruana* McEachran & Miyake, 1984. Two species, *Bathyraja abyssicola* (Gilbert, 1896) and *Bathyraja spinosissima* (Beebe & Tee-Van, 1941) are found in Ecuadorian waters, including the Galapagos Islands, and north to the Bering Sea (Ebert 2016, Cerutti-Pereyra et al. 2018).

A fishery for Patagonian toothfish (*Dissostichus eleginoides*) has been ongoing in Peruvian waters since 1996 (Bustamante 1997, IMARPE 2018), using deep-sea longlines as the primary fishing gear (Aramayo 2016). The artisanal fleet targeting Patagonian toothfish consists of 7 vessels with the entire catch being exported (IMARPE 2018). Several chondrichthyan species that were caught incidentally, as non-targeted bycatch, were retained for examination and identification (Alfaro-Shigueto et al., in press). Upon examination of the chondrichthyans species were two large softnose skates of the genus *Bathyraja* that we determined represented an undescribed species. Here we describe this new species as part of a series documenting, describing, and revising chondrichthyan taxa from the southeastern Pacific Ocean.

Materials and Methods

Morphometric measurements and terminology generally follow Last et al. (2008) and measurements were taken for the holotype and paratype. Meristics including vertebral, pectoral, and pelvic fin radial counts from radiographs and tooth counts are presented for both specimens. The holotype and paratype are deposited into the fish collection at Museo de Historia Natural Vera Alleman H. (MVAH), Universidad Ricardo Palma, Santiago de Surco, Peru. Comparative material was examined from the California Academy of Sciences (CAS), Harvard Museum of Comparative Zoology (MCZ), Oregon State University (OSU), and the United States National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM). Institutional abbreviations follow Sabaj (2020).

Genus *Bathyraja* Ishiyama, 1958

Bathyraja (subgenus of *Breviraja*) Ishiyama, 1958: 325

Type species. *Raja isotrachys* Günther, 1877, by original designation

Bathyraja chapmani, n. sp.

Chapman's Skate

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Figures 1–4, Table 1



Figure 1. *Bathyraja chapmani* n. sp., fresh holotype, MVAH 00453, female, 1126 mm TL, dorsal view.

Holotype. MVAH 00453, female, 1126 mm TL, off Lima, Peru, -11.933° , -78.15° , 1714 m, 5 October 2020, longline.

Paratype. MVAH 00454, female, 1085 mm TL, taken with holotype.

Diagnosis. A large *Bathyraja* species (to at least 1126 mm TL) with a rhombic disc, distinguished from other Peruvian species (as well as all other southeast Pacific congeners) by a uniform black-to-chocolate or dark-plum-brown coloration, notably the same on both dorsal and ventral surfaces vs. dorsal and ventral surfaces different colors (except *B. aguja*); and an irregular spotted pattern on both dorsal and ventral surfaces vs. no spotting or, in *B. aguja*, two symmetrically arranged, large, white spots on dorsal surface at pectoral-fin bases and symmetrically arranged white spots along disc margins; additionally separated from Peruvian congeners by more precaudal vertebrae 79–81 vs. 62–71; and fewer pectoral-fin radials 69–70 vs. 72–83.

Description. (data for holotype (paratype)) Disc rhombic, rather broad (Figs. 1 & 2), width 1.25 (1.20) times length; maximum angle in front of spiracles 88.8° (94.3°), greatest width 65.5% (67.9%) disc length, anterior margin nearly straight before becoming weakly concave at about level with first gill openings. Pectoral-fin tips broadly rounded, posterior margin relatively straight, posterior corner rounded with inner margin nearly straight near insertion of pectoral fin. Head moderately elongate, dorsal length 26.0% (27.7)% TL; pre-orbital length 3.86 (4.54) times orbit length, 1.96 (2.41) times interorbit; pre-upper-jaw length 1.76 (1.78) times internarial distance. Snout tip slightly produced, short, flabby, very pliable, and soft, no fleshy process at apex (Fig. 3). Orbits small, diameter 0.51 (0.53) times interorbital width; slightly elevated above head; interorbital space concave. Spiracle suboval, opening oblique, length 1.09 (1.35) in orbit diameter, anterior margin opening extending forward, nearly to posterior margin of eye. Nasal curtain well developed, relatively broad and short, lateral margin strongly notched beside lateral nasal flap, notched near its midlength, then expanded posteriorly, posterior margin fringed; internarial distance 2.23 (2.48) in distance between first gill slits, 1.39 (1.84) in distance between fifth gill slits (Fig. 3). Mouth transverse, nearly straight; upper jaw weakly arched; lower jaw weakly convex. Teeth with oval crown, acutely unicuspid, arranged in rows, not quincunx; 30 (30) rows in upper jaw, 32 (30) rows in lower jaw.

Pelvic fins deeply notched between anterior and posterior lobes, with lobes connected by membranes and two or three smaller fleshy radials in notch; anterior lobe relatively short, convex in lateral view, tapering towards narrowly rounded tip; posterior pelvic-fin lobe convex, broadly rounded, inner margin short, nearly straight, length 14.2% (15.7)% TL, 1.57 (1.56) times length of anterior lobe.

Tail moderately long and slender, length about equal to disc length, narrow at base, slightly depressed over length, dorsally convex, ventrally flattened, and tapering gradually posteriorly towards very slender tip; tail length from anterior vent to tail tip 0.77 (0.85) times distance from snout tip to anterior vent; tail width at insertions of pelvic fins 2.09 (2.53) times width at first-dorsal-fin origin, and 1.47 (1.39) times height at insertion of pelvic fins; tail width at first-dorsal-fin-origin 1.91 (2.07) times height at first-dorsal-fin-origin. Lateral tail skin folds well developed, originating posterior to pelvic axils, narrower than tail width, extending to distal end of tail and merging with caudal fin.

Dorsal fins similar in shape and size, slightly tilted rearward (Fig. 4); anterior margins relatively straight, becoming broadly rounded at apex, posterior margins convex, inner margin moderately long, free rear tip bluntly rounded; fin heights similar, base lengths similar, with first-dorsal-fin base 0.94 (1.07) times in second-dorsal-fin base; interdorsal space long, 11.6% (6.0)% TL, not connected near bases. Epichordal caudal-fin lobe developed, length short and height low, separated by narrow interspace from second dorsal fin; hypochordal caudal lobe minute, length less than first-dorsal-fin height.

Dorsal surface of disc without thorns; dorsal surface of tail with a single, median, continuous row of 22 (22), irregularly spaced, posteriorly angled thorns, first thorn just posterior to pelvic-fin notch, and row ending just anterior to first-dorsal-fin origin, no interdorsal thorns. Dermal denticles dense, uniformly covering dorsal disc surface, becoming denser at tail origin and extending length of dorsal tail surface, denticles coarsely textured making a rough-to-the-touch feel, denticles densely covering dorsal fins. Ventral disc surface and tail smooth, lacking any prickles, thorns, or thornlets.

Vertebral counts: trunk centra 28 (28); predorsal tail vertebrae 79 (81); total predorsal centra 107 (109); monospondylous centra 38 (38); predorsal diplospondylous centra 69 (71); postdorsal vertebrae 19 (18); total



Figure 2. *Bathyraja chapmani* n. sp., fresh holotype, MVAH 00453, female, 1126 mm TL, ventral view.



Figure 3. *Bathyraja chapmani* n. sp., fresh holotype, MVAH 00453, female, 1126 mm TL, upper: dorsal view with snout, orbit, and spiracle region; lower: ventral view with oronasal and tooth band region.

centra 126 (127). Tooth rows in upper jaw 30 (30); tooth series in upper jaw 5; tooth rows in lower jaw 32 (30); tooth series in lower jaw 5. Pectoral propterygial radials 32 (34); mesopterygial radials 9 (7); metapterygial radials 29 (28); total radials 70 (69); pelvic-fin radials 1+16 (1+17).

Color. (Figs. 1–3) When fresh, dorsal surface with uniform black-to-chocolate or dark-plum-brown background coloration, with an irregular pattern of whitish to dark-colored scattered spots that are not solid colored, but rather broken with a darker central blotch; tail dorsal surface uniformly dark, without spots. Ventral surface similarly colored to dorsal surface, with scattered spots mostly concentrated over gill region and possibly abdomen (although abdomen was opened by fishers who caught the type specimens such that no further detailed color description is possible for this region); pectoral and pelvic fins with a few scattered whitish to dark-colored dots; area around mouth white and edges of gills white; anterior pelvic-fin lobes lighter colored towards tips; tail darker anteriorly becoming lighter posteriorly towards tail tip.

TABLE 1

Proportional measurements of type specimens of *Bathyraja chapmani* n. sp.
as percentages of total length

	holotype	paratype		holotype	paratype
Total length (mm)	1126	1085	Gill slit length 3rd	2.6	2.3
Disc width (%)	65.5	67.9	Gill slit length 5th	1.8	1.5
Disc length	52.6	56.8	Interspace first gill slits	17.2	19.9
Snout tip to maximum disc width	43.5	48.8	Interspace fifth gill slits	10.7	14.7
Snout to preorbital	12.7	14.7	Pelvic-fin length anterior lobe	9.1	10
Snout to spiracle (direct)	16.2	18.2	Pelvic-fin length posterior lobe	14.3	15.7
Snout to spiracle (straight)	17.7	18.5	Anterior vent to 1st dorsal fin	46.8	45.8
Snout base width at spiracles	34.6	39.9	Anterior vent to 2nd dorsal fin	50.8	49.1
Head length dorsal	26	27.7	Anterior vent to tail tip	56.5	54
Orbit, horizontal diameter	3.3	3.2	Tail post-dorsal length	2.8	2.2
Eyeball, horizontal diameter	2	1.9	Tail height at pelvic fin base end	2.8	2.9
Interorbital width	6.5	6.1	Tail width at pelvic fin base end	4.2	4
Spiracle length	3	2.4	Tail height at pelvic tips	2.4	2.4
Interspiracle width	7.7	7.9	Tail width at pelvic tips	3.1	3.8
Orbit + spiracle length	5.3	5.3	Tail height at first dorsal fin origin	8	8.2
Prenasal length	10.2	11.6	Tail width at first dorsal fin origin	8.7	10
Snout to preoral length	13.6	14.3	Tail lateral fold length	40.4	34.2
Snout tip to anterior-vent length	43.5	46	First dorsal fin, height	1.2	1.5
Snout tip to 1st hemal spine	52.4	54.8	First dorsal fin, base length	2.9	2.8
Head length ventral	27.5	29.6	Second dorsal fin, height	2	1.6
Internarial width	7.7	8	Second dorsal fin, base length	3.1	2.6
Nasal curtain length	3.7	3.2	Caudal fin base length	2.3	1.3
Nasal curtain total width (distance from outer of each lobe)	8.8	7.7	Caudal fin height hypochordal lobe	--	5.5
Nasal curtain space between lobes (minimum between lobes)	5.3	5.5	Caudal fin length hypochordal lobe	20.1	14.6
Gill slit length 1st	1.7	1.7			



Figure 4. *Bathyraja chapmani* n. sp., fresh holotype, MVAH 00453, female, 1126 mm TL, lateral view dorsal and caudal fins.

Size. Type specimens were both females and measured 1085 and 1126 mm TL; sexual maturity could not be determined since specimens were gutted.

Distribution. Known only from the type location at -11.933° , -78.15° , about 100 km off Lima, Peru at depth of 1714 m.

Etymology. The new species is named for Demian Chapman in recognition of his contributions to shark and ray conservation and research. The proposed English common name is Chapman's Skate.

Comparisons. *Bathyraja chapmani* is the fourth species in the genus *Bathyraja* to be found in Peruvian waters, the other three being *B. aguja*, *B. longicauda*, and *B. peruana*. The systematics of Peruvian softnose skates has been confusing since Kendall & Radcliffe (1912) described *B. aguja*. Their original description, which included a holotype (USNM 65641) and paratype (MCZ S-1364), was actually based on two different species. McEachran & Miyake (1984) subsequently re-examined the types of *B. aguja* and determined that they were two different species, and described the paratype as a new species, *B. peruana*.

Bathyraja longicauda was first reported from Peruvian waters by McEachran & Miyake (1984) based on three small juvenile specimens that, at the time, were the first records of the species after the holotype, which was collected off Valparaíso, Chile. Further compounding uncertainty in the taxonomic status of Peruvian skates is the limited number of known specimens of each species. As a result, variation and ontogenetic changes are poorly documented, if at all, for these species (McEachran & Miyake 1984, Ebert 2016, Last et al. 2016).

The three previously known *Bathyraja* species from Peruvian waters can be separated from *B. chapmani* by a combination of external characteristics and meristics. *B. longicauda* and *B. peruana* are uniformly colored on their dorsal and ventral surfaces and lack any blotches, spots, or other distinctive patterns (consistent at all sizes from young to adult) vs. a strongly spotted pattern on both dorsal and ventral surfaces in the new species (McEachran & Miyake 1984, Ebert 2016, Last et al. 2016).

The new species is further distinguished from *B. longicauda* by having a nearly straight anterior disc margin vs. distinctly undulating; pectoral-fin apices broadly rounded vs. narrowly or abruptly rounded; preorbital length times orbital length 3.86–4.54 vs. 2.00–2.68; preorbital length times interorbital length 1.96–2.41 vs. 1.02–1.30; interorbital space times orbit length 1.89–1.97 vs. 1.20–1.50; orbital length times spiracle length 1.09–1.35 vs. 2.00–2.53; lack of thorns on the disc vs. a median row of thorns originating from the posterior half of the disc; a lower number of median thorns 22 vs. 26–30; a lack of interdorsal thorns vs. 1 or 2; the dorsal disc surface and tail densely covered with coarsely textured denticles vs. finely textured denticles on adults confined to a narrow median band originating just posterior to mid-disc and extending along the tail; teeth arranged in rows, not quincunx vs. arranged in quincunx; more predorsal tail vertebrae 79–81 vs. 62; more total predorsal vertebrae 107–109 vs. 93; a lower pectoral-fin radial count of 69–70 vs. 72; and a longer known maximum length, reaching 1126 mm TL vs. 800 mm TL.

The new species is further distinguished from *B. peruana* by having the pectoral fin apices broadly rounded vs. narrowly or abruptly rounded; the preorbital length times orbital length 3.86–4.54 vs. 2.41–3.40; preorbital length times interorbital length 1.96–2.41 vs. 1.02–1.17; interorbital space times orbit length 1.89–1.97 vs. 1.02–1.26; orbital length times spiracle length 1.09–1.35 vs. 1.16–1.78; pre-oral length times internarial length 1.76–1.78 vs 1.24–1.34 (in large *B. peruana* over 970 mm TL); irregularly spaced tail thorns vs. evenly spaced tail thorns; dorsal disc surface and tail densely covered with coarsely textured denticles vs. finely textured denticles; teeth arranged in rows, not quincunx vs. arranged in quincunx; more predorsal tail vertebrae 79–81 vs. 64–71; and a lower pectoral-fin radial count of 69–70 vs. 77–82.

The closest congener to *Bathyraja chapmani* is *B. aguja* (Fig. 5), which differs in having two symmetrically arranged, large, white spots on the dorsal surface at the pectoral-fin bases and symmetrically arranged white spots along the disc margins (Ebert 2016, Last et al. 2016); this pattern is consistent at all sizes from small to at least 760 mm TL in adult males. In contrast, *B. chapmani* has an irregular pattern of whitish to dark-colored scattered spots on the dorsal surface. In addition, *B. aguja* has a uniformly colored ventral surface without spots or patterning vs. numerous scattered spots. The new species is further distinguished from *B. aguja* by having a nearly straight anterior disc margin vs. distinctly undulating; preorbital length times orbital length 3.86–4.54 vs. 3.70; preorbital length times interorbital length 1.96–2.41 vs. 2.81; interorbital space times orbit length 1.89–1.97 vs. 1.30; orbital length times spiracle length 1.09–1.35 vs. 1.65; pre-oral length times internarial length 1.76–1.78 vs. 2.12; thorns absent on the dorsal disc surface vs. a median row of thorns originating from behind shoulder girdle on disc; thorns irregularly arranged vs. regularly arranged; fewer median thorns 22 vs. 30–33; no interdorsal thorns vs. 1 or 2; the dermal denticles on the dorsal disc surface coarsely textured vs. mostly smooth except for small patches of widely spaced dermal denticles on snout, between orbits, and tail; teeth arranged in rows, not quincunx vs. arranged in quincunx; more predorsal tail vertebrae 79–81 vs. 62–66; a lower pectoral-fin radial count of 69–70 vs. 80–83; and a longer known maximum length, reaching 1126 mm TL vs. 760 mm TL.

Aspects of maturity and gender differences are unknown since both specimens are female and had been gutted. The length of 1120 mm TL suggests it is a moderately large skate species. Female *B. peruana* mature at about 970 mm TL and grow to at least 1100 mm TL indicating it is also a moderately large skate. At present, *B. aguja* and *B. longicauda* are known to reach only 800 mm (mature female) and 760 mm (mature male) TL, respectively. Whether these species grow larger or show population differences is unknown. Differences in size at maturity and maximum length are known to occur between different populations of some *Bathyraja* species in the North Pacific (Ainsley et al. 2011, 2014, Winton et al. 2014, Haas et al. 2016).

Bathyraja chapmani occurs at a greater known depth than the other three Peruvian species: at least 1714 m vs. at least 650–980 m for *B. aguja*, 400–735 m for *B. longicauda*, and 243–1207 m for *B. peruana* (Ebert 2016, Last et al. 2016, Weigmann 2016).

An additional 9 *Bathyraja* species are found farther south and two species farther north than the 4 Peruvian species discussed above. The new species can be separated by having the same color on the dorsal and ventral surfaces as well as a spotted pattern on both surfaces. Of the 11 additional species, 5 can be distinguished by having a uniformly colored dorsal disc surface without any blotches, spots or other patterning (*B. abyssicola*; *Bathyraja griseocauda* (Norman, 1937); *Bathyraja meridionalis* Stehmann, 1987; *Bathyraja schroederi* (Kreff, 1968); and *B. spinosissima*) (Ebert 2016, Last et al. 2016). In addition, *B. griseocauda*, *B. meridionalis*, and *B. schroederi* have a dorsal surface coloration that is distinctly different from their ventral surface color (Ebert 2016, Last et al. 2016). The remaining 6 species have no patterning on their ventral surface, which is mostly white to yellowish, with some species having darker margins along the disc: *Bathyraja albomaculata* (Norman, 1937); *Bathyraja brachyurops* (Fowler, 1910); *Bathyraja cousseauae* Díaz de Astarloa & Mabrugaña, 2004; *Bathyraja macloviana* (Norman, 1937); *Bathyraja magellanica* (Philippi, 1902); and *Bathyraja multispinis* (Norman, 1937) (Ebert 2016, Last et al. 2016).

The conservation status of *B. aguja*, *B. longicauda*, and *B. peruana* have all been assessed by the International Union for the Conservation of Nature (IUCN) as Least Concern due to their deepsea habitat, which is beyond most fisheries except for the Peruvian Patagonian toothfish fishery (Concha et al. 2020, Concha & Ebert 2020, Ebert & Concha 2020). The depth at which these species occurs likely provides them with considerable refuge outside most fishing grounds. It is possible that the larger *B. peruana* are taken as bycatch in the Patagonian toothfish and Chilean Yellownose Skate (*Dipturus chilensis*) fisheries, but the overlap between fishing activities and the species range is considered to be minimal (Concha et al. 2020). However, the bycatch and opportunistic discovery of two large skate specimens from very deep water (1714 m), here described as *B. chapmani*, highlights how much remains to be discovered in the deepsea. Furthermore, as deepsea fisheries expand throughout the world, it will be critically important to know what chondrichthyans are being taken in order to improve conservation and management policy for these little known species.

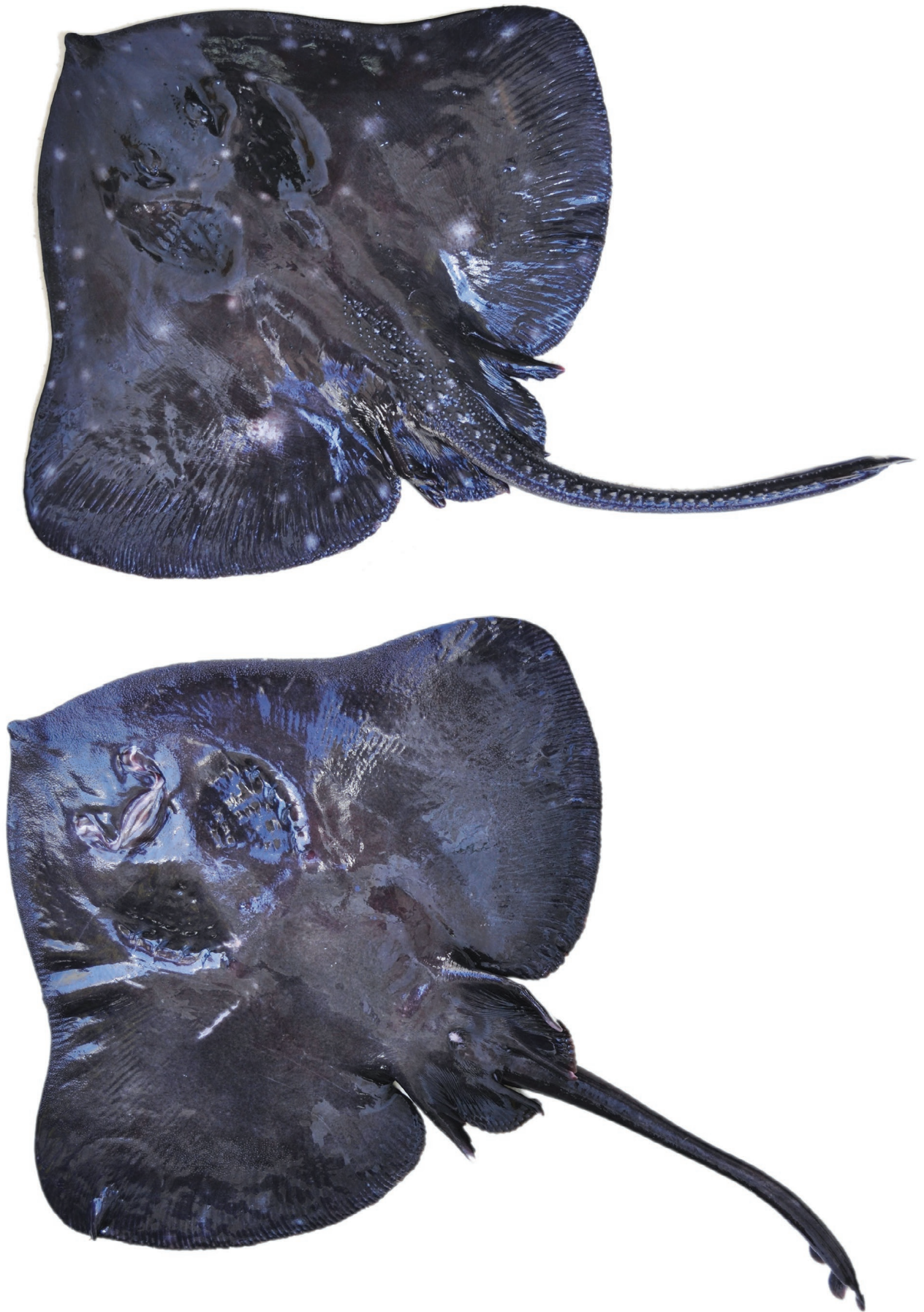


Figure 5. *Bathyraja aguja*, fresh male, USNM 423203, Nicaragua: upper: dorsal view; lower: ventral view, courtesy D. Ross Robertson (STRI).

Key to the Southeast Pacific Ocean *Bathyraja* species

(modified from Ebert (2016))

- 1a. Dorsal surface uniformly colored, without blotches or spots 2
- 1b. Dorsal surface with blotches or spots 8

- 2a. Ventral surface color lighter than dorsal surface, usually white to yellowish (southern Chile, south of Valparaíso to the Strait of Magellan) *B. griseocauda*
- 2b. Ventral surface color similar to or darker than dorsal surface 3

- 3a. Nuchal thorns present 4
- 3b. Nuchal thorns absent 5

- 4a. No median row of disc thorns (Galapagos Islands, Ecuador, and north Pacific from Japan to Gulf of California) ...
..... *B. abyssicola*
- 4b. Median row of 5–10 disc thorns (southern Chile, south of Valparaíso to the Strait of Magellan) ... *B. meridionalis*

- 5a. Disc dorsal surface with median tail thorn row (northern Peru to central Chile) *B. longicauda*
- 5b. Disc dorsal surface without median tail thorn row 6

- 6a. Dorsal and ventral disc surfaces densely covered with numerous dermal denticles making it rough to the touch (Ecuador, including Galapagos Islands, to Cocos Islands, Costa Rica) *B. spinosissima*
- 6b. Dorsal disc surface with dermal denticles on head, disc margins and mid-disc, otherwise smooth; ventral disc surface smooth 7

- 7a. Median row of tail thorns evenly spaced to first dorsal fin (Ecuador and Peru to southern Chile) *B. peruana*
- 7b. Median short row of small tail thorns ending well before first dorsal fin (southern Chile, south of Valparaíso to the Strait of Magellan) *B. schroederi*

- 8a. Ventral surface mostly white to yellowish, occasionally with darker margins 9
- 8b. Ventral surface mostly black to chocolate or dark plum brown 14

- 9a. Dorsal surface mostly smooth, with patches of minute, fine dermal denticles 10
- 9b. Dorsal surface rough textured, with numerous prickles, denser along disc edges and midback 12

- 10a. A single scapular thorn on each shoulder (southern Chile, south of Valparaíso to the Strait of Magellan) .. *B. multispinis*
- 10b. Scapular thorns absent 11
- 11a. Tail length about equal to, or slightly longer than disc length from tip of snout to margin of cloaca; a median row of 17–23 midback and tail thorns; dorsal surface with numerous prominent scattered white spots; spots on tail not forming a banded appearance (central to southern Chile) *B. albomaculata*
- 11b. Tail length slightly shorter than disc length from tip of snout to margin of cloaca; a median row of 16–20 midback and tail thorns; dorsal surface with symmetrically paired white spots of varying sizes; spots on tail forming a banded appearance (southern Chile, south of Valdivia to the Strait of Magellan) *B. brachyurops*
- 12a. Orbital and scapular thorns absent (southern Chile, south of Valparaíso to the Strait of Magellan) *B. cousseauae*
- 12b. Orbital (usually 2) and scapular thorns present 13
- 13a. One scapular thorn on each shoulder; dorsal coloration brownish with indistinct scattered white spots and a pair of larger, distinct, white spots with a brownish margin on pectoral-fin bases (southern Chile, south of Valparaíso to the Strait of Magellan) *B. macloviana*
- 13b. Usually two scapular thorns on each shoulder; dorsal coloration ash-gray with black spots and a few paired white spots encircled by a rosette pattern of darker spots (southern Chile, south of Valparaíso to the Strait of Magellan) *B. magellanica*
- 14a. Dorsal surface with two symmetrically arranged, large, white spots at pectoral-fin bases and white spots along disc margins and pelvic fins; ventral surface without spots; midback and interdorsal thorns present; dorsal surface with small patches of widely spaced, stellate, dermal denticles, mostly on snout, between orbits, and tail (Nicaragua to Valparaíso, Chile) *B. aguja*
- 14b. Dorsal surface with irregularly scattered small spots, no large spot at pectoral-fin bases; ventral surface with scattered spots mostly concentrated on gill and possibly abdomen region; midback and interdorsal thorns absent; dorsal disc surface coarsely textured giving it a rough-to-the-touch feel, with dermal denticles becoming denser at tail origin and extending length of dorsal tail surface (Peru) *B. chapmani*, n. sp.

Other material examined:

Bathyraja abyssicola (14 specimens): PSRC Baby 062612-1, 544 mm TL, female, R/V *Ms. Julie*, haul 171, San Diego, California, USA, 32.599, -118.6079°, 1119 m, 13 July 2011; PSRC Baby 062812-1, 1087 mm TL, mature male, R/V *Raven*, haul 181, Tijuana, Mexico, 32.0922°, -118.6863°, 968 m, 15 October 2011; PSRC Baby 020513-1, 498 mm TL, female, R/V *Ms. Julie*, haul 15, Flattery Rocks National Wildlife Refuge, Washington, USA, 47.6071°, -125.5860°, 1212 m, 25 May 2012; PSRC Baby 022813-1, 897 mm TL, female, Monterey, California, USA; PSRC Baby 022813-2, 1241 mm TL, female, Monterey, California, USA; PSRC Baby 022813-3, 1340 mm TL, female, Monterey, California, USA; PSRC Baby 110813-1, 1125 mm TL, female, R/V *Noah's Ark*, haul 333, Pismo Beach, California, USA, 35.1597°, -121.6669°, 1139 m, 29 September 2012; PSRC Baby 121016-1, 1079 mm TL, mature male, haul 129, Monterey, California, USA, 36.6412°, -122.1480°, 30 June 2016; PSRC Baby 121016-2, 1386 mm TL, mature female, R/V *Noah's Ark*, haul 89, King Range National Conservation Area, California, USA, 40.1358°, -125.0489, 1204 m 18 September 2015; PSRC Baby 121016-3, 1331 mm TL, mature female, R/V *Excalibur*, haul 137, Morro Bay, California, USA, 35.3861°, -121.6700°, 1229 m, 14 July 2015; PSRC Baby 121816-1, 1013 mm TL, female, haul 129, Cambria, California, USA, 35.8077°, 121.6700°, 1229 m, 14 July 2015.

-121.9700°, 30 September 2016; PSRC Baby 121816-2, 930 mm TL, immature male, F/V *Last Straw*, haul 112, Elk, California, USA, 39.1278°, -124.2041°, 1160 m, 24 June 2015; PSRC Baby 121816-3, 1038 mm TL, mature male, F/V *Last Straw*, haul 179, San Diego, California, USA, 32.4692°, -118.5450°, 1073 m, 17 July 2015; PSRC Baby 121816-4, 1056 mm TL, mature male, F/V *Last Straw*, haul 179, San Diego, California, USA, 32.4692°, -118.5450°, 1073 m, 17 July 2015.

Bathyraja aguja: Holotype: USNM 65641, off Aguja Point, Peru, 5.7833°, -87.4°, 980 m, 11 December 1904.

Bathyraja peruana: Holotype: MCZ Ich S-1364, off Aguja Point, Peru, 5.7833°, -87.4°, 980 m, 11 December 1904.

Bathyraja spinosissima (4 specimens): Holotype: CAS 25617, 164 mm TL, immature male, Arcturus, Station 72, Cocos Island, 4.8333°, -87.00°, 1399 m, 3 June 1925; OSU 1863 017, 1492 mm TL, female, Cannon Beach, Oregon, USA, 45.8483°, -125.575°, 2121 m, 7 June 1969; OSU 1885, 984 mm TL, female, Pacific City, Oregon, USA, 45.28°, -125.8533°, 2605 m, 19 March 1970; OSU 1893 030, 935 mm TL, female, Lincoln City, Oregon, USA, 44.9533°, -125.5917°, 2700 m, 6 July 1969.

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