

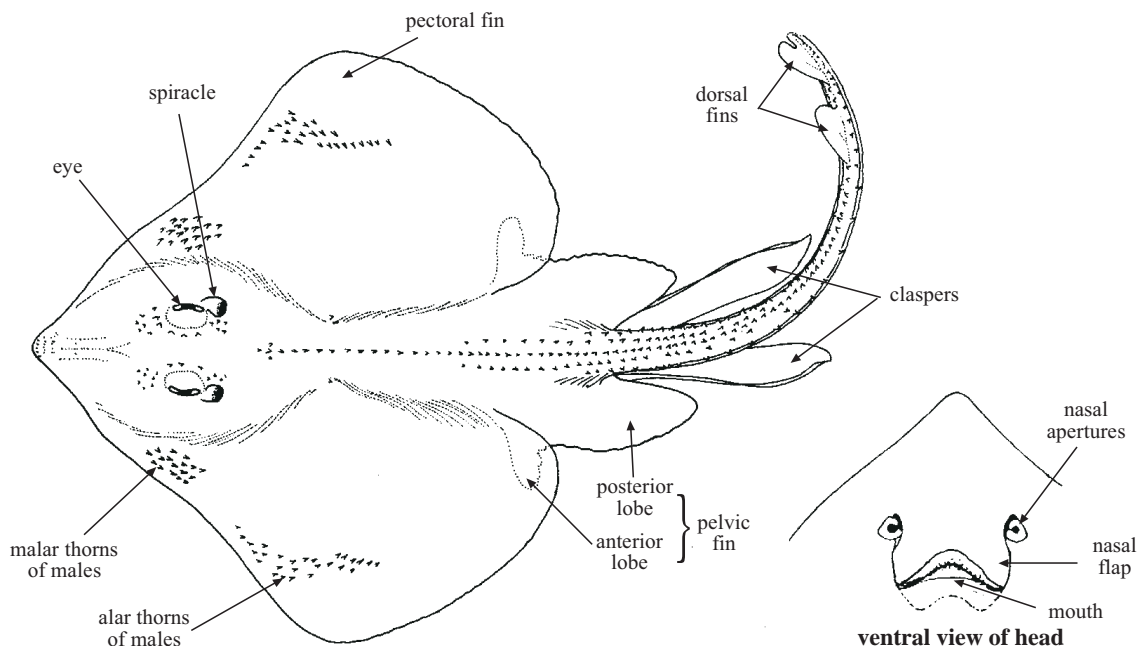
Order RAJIFORMES

RAJIDAE

Hardnose skates

by P.R. Last and L.J.V. Compagno

D **Diagnostic characters:** Small to large batoids (adults between 20 and 250 cm total length, disc width 12 to 180 cm), with **broad flat rhomboidal, rounded-angular, or heart-shaped pectoral discs**. **Tail narrow, slender**, and somewhat shorter to nearly twice as long as pectoral disc. Dorsal disc either smooth or covered with small dermal denticles or placoid scales; **more or less enlarged, sharp, hooked denticles or thorns present on dorsal surface**, usually on the midline of the tail and often along the midline of the disc, on the snout, orbits, and shoulders; adult males with rows of enlarged, hooked, retractile, claw-like spines or alar thorns on distal web of dorsal disc. **Trunk depressed and flattened, not shark-like**. Tail cylindrical or moderately depressed but not whip-like, with lateral ridges or folds on sides; abruptly narrower than trunk; **no barbed sting (stinger or stinging spine) on dorsal surface of tail**; paired electric organs present in tail. Head broad and depressed; **snout short to very long and bluntly to acutely angular**; **supported by a stout rostral cartilage** in most species in the area except *Gurgesiella sibogae* (more or less reduced and soft in many extralimital species); snout not formed into a rostral saw and without lateral saw teeth. **Five small gill openings** on underside of front half of pectoral-fin bases, not visible in lateral view; no gill sieves or rakers on internal gill slits. Eyes dorsolateral on head and just anterior to spiracles. Mouth transverse and straight to strongly arched, without prominent knobs and depressions. Nostrils just anterior to mouth and separated from it by less than 1/2 their own widths, connected by broad nasal grooves with mouth; **anterior nasal flaps elongated, posteriorly expanded and reaching mouth, but separate medially and not forming a nasal curtain**. **Oral teeth small, rounded-oval in shape** and with or without cusps on their crowns, not laterally expanded and plate-like, similar in shape and in 30 to 70 rows in either jaw. Pectoral fins large, originating in front of mouth and reaching snout tip or not, attached to sides of head and forming a large pectoral disc with free rear tips ending posterior to pelvic-fin origins; **disc not subdivided by a notch at eyes**. No large electric organs at bases of pectoral fins. Pelvic fins high, rounded-angular or angular, **subdivided into narrow anterior lobes and broad posterior lobes with a connecting web**. **Usually 2 small, subequal and close to widely separated dorsal fins present**, these of similar rounded or rounded angular shapes with margins more or less confluent, not falcate; a single dorsal fin or none in a few species. **First dorsal fin, when present, originates far behind anterior half of total length, base far behind rear tips of pelvic fins and junction between trunk and tail and behind midlength of tail**. **Caudal fin small to rudimentary**, more or less symmetrical, and with vertebral axis parallel to body axis; lower lobe absent. **Colour:** dorsal surface varying from whitish to dark brown or black, either plain or with light or dark spots, blotches, reticulations, or basal ocelli on pectoral fins; usually white below but often dark or blotched and with dark sensory pores.

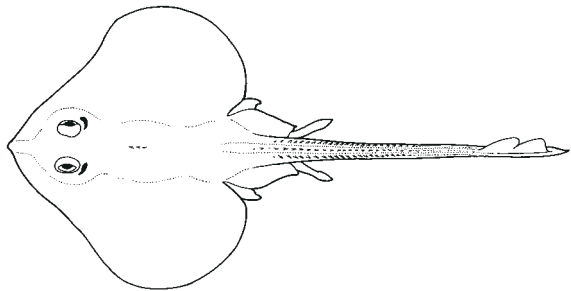


Habitat, biology, and fisheries: Hardnose skates are a very large, widely distributed group of inshore shelf to offshore, deep-slope batoids ranging from polar to tropical latitudes in all seas. Their greatest diversity is in cold, deep water on the continental slopes and on the temperate inshore and offshore continental shelves; some, however, penetrate well inshore as well as deepwater in tropical environments. They occur off sandy beaches, in muddy enclosed bays and estuaries, and offshore on soft sand and mud bottom at depths from the intertidal down to about 4 120 m; none are oceanic and a single estuarine species penetrates into fresh water. They are bottom-dwellers that are among the dominant benthic fishes in some areas. Skates feed on invertebrates including small to large crustaceans, cephalopods, worms, bivalves, sea pens, and both demersal and pelagic bony fish. All species are oviparous as far as is known, and deposit eggs in large, quadrangular egg cases with distal horns. Eggs may hatch out after several months. Utilization and fishing gear is not recorded for the Western Central Pacific at present, but usage of skates could increase as deep-water resources are increasingly exploited in the area. Skates are important in temperate fisheries elsewhere. They are inoffensive to people, but should be handled with care because of needle-sharp thorns and teeth, knife-like clasper parts, and powerful jaws in many species. Ichthyologists who regularly handle skates complain of injuries from the extremely sharp, retractable alar thorns of males that lie hidden within grooves in the skin.

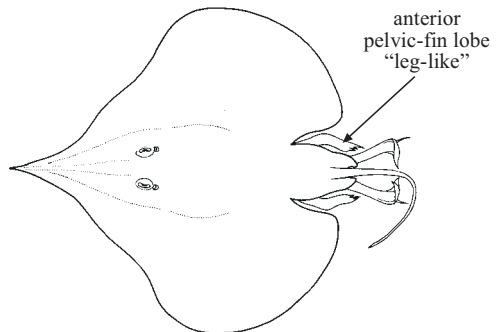
Similar families occurring in the area

Arhynchobatidae: very similar in external form and often regarded as a subfamily of the Rajidae. Species in the area usually have slender reduced rostral cartilages and flexible snouts (pronounced and firm in the Rajidae), and are usually less spinose. Additionally, most adult males have claspers with a glans that is not greatly expansible (extremely so in the Rajidae) and usually lack a spongy clasper rhipidion and a broad, flat, sharp-edged clasper shield (both present in the Rajidae).

Anacanthobatidae: also regarded as a subfamily of the Rajidae by many authors. Anterior lobes of pelvic fins separate from the posterior lobes and formed as slender "legs" with expanded distal "feet". Also, species in the area have naked discs, very slender tails with a low caudal fin but no dorsal fins, possibly no electric organs in the tail, no thorns except alar spines of males, and snouts usually with an anterior filament or leaf-like appendage.



Arhynchobatidae



Anacanthobatidae

No other batoids in the area combine the following characteristics: large flat angular or subangular pectoral discs; slender, non-whip-like tails with small posterior dorsal fins; rudimentary caudal fins, and no sting; alar spines in males; expanded, lobe-like anterior nasal flaps not fused medially as a nasal curtain; subdivided pelvic fins.

Key to the genera and subgenera of Rajidae occurring in the area

Note: the rajid skates of the area are in urgent need of revision. Many of the species are known from only a few specimens and museum holdings are frequently inadequate to resolve species level problems. Species are also difficult to identify at the generic level because the most useful characters are skeletal. The following key distinguishes supraspecific taxa represented in the area.

- 1a. Snout with very thin, flexible rostral cartilage *Gurgesiella*
 1b. Snout with well-defined, firm rostral cartilage (*Raja*) → 2
- 2a. Disc round or oval; snout short, broadly rounded anteriorly with small lobe at tip . . . *Raja* (*Rajella*)
 2b. Disc somewhat angular; snout medium to elongate, distinctly angular anteriorly → 3

- 3a.** Rostral cartilage long, mostly exceeding 60% dorsal head length; adult clasper lacking a projecting distal cartilage *Raja (Dipturus)*
- 3b.** Rostral cartilage moderate, mostly less than 60% dorsal head length; adult clasper with a projecting distal cartilage (funnel) *Raja (Okamejei)*

List of the species occurring in the area

The symbol ◆ is given when species accounts are included.

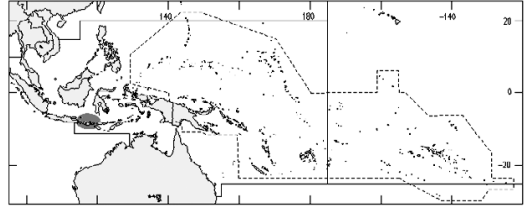
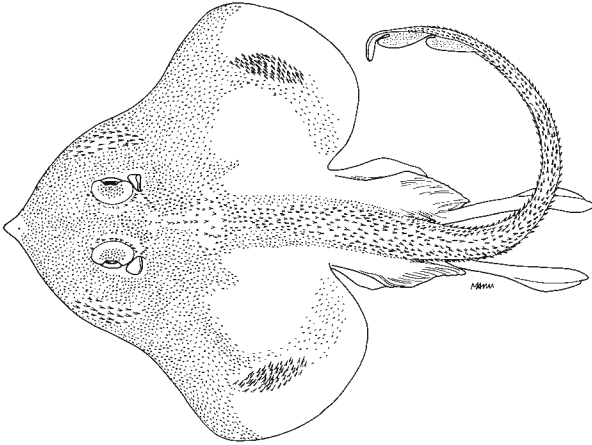
- ◆ *Gurgesiella sibogae* (Weber, 1913)
 - Raja (Dipturus) australis* Macleay, 1884
 - Raja (Dipturus) gigas* Ishiyama, 1958
 - Raja (Dipturus) polyommata* Ogilby, 1910
 - Raja (Dipturus) tengu* Jordan and Fowler, 1903
 - Raja (Dipturus)* sp. G [Last and Stevens, 1994]
 - Raja (Dipturus)* sp. H [Last and Stevens, 1994]
- ◆ *Raja (Dipturus)* sp. I [Last and Stevens, 1994]
- Raja (Dipturus)* sp. K [Last and Stevens, 1994]
- Raja (Dipturus)* sp. cf. *johannisdaviesi* Alcock, 1899 [Seret] (Indonesia)
- Raja (Dipturus)* sp. [Seret] (Indonesia)
- Raja (Dipturus)* sp. [Seret] (New Caledonia)
- Raja (Dipturus)* sp. [Seret] (Philippines)
- Raja (Okamejei) acutispina* Ishiyama, 1958
- ◆ *Raja (Okamejei) boesemani* Ishihara, 1987
- Raja (Okamejei) hollandi* Jordan and Richardson, 1909
- Raja (Okamejei) kenojei* Müller and Henle, 1841
- Raja (Okamejei)* sp. [Seret] (Indonesia)
- ◆ *Raja (Rajella) annandalei* Weber, 1913

References

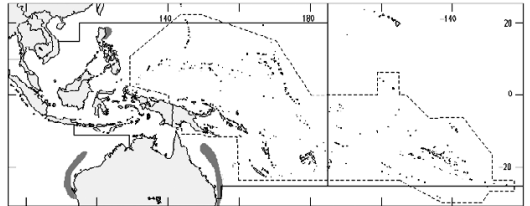
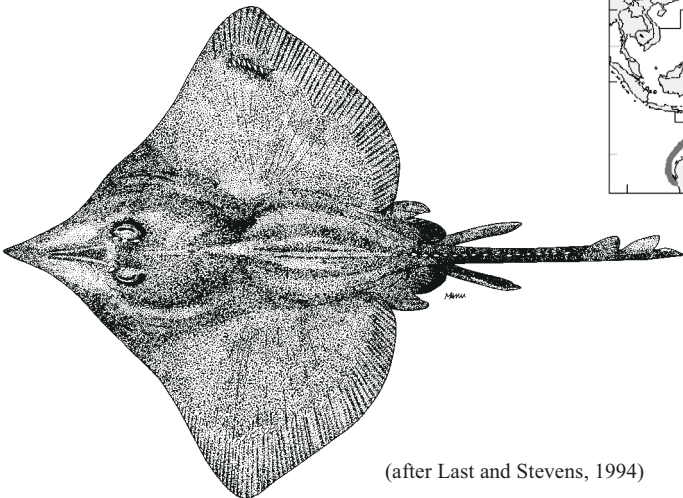
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- Stehmann, M. 1976. Revision der Rajoiden-Arten des nördlichen Indischen Ozean und Indopazifik (Elasmobranchii, Batoidea, Rajiformes). *Beaufortia*, 24:133-175.

Gurgesiella sibogae* (Weber, 1913)*En** - Siboga skate.

Maximum length at least 31 cm. A small deep-water skate, possibly confined to the tropical Indo-West Pacific, and known from only a few individuals. Biology little known. Not utilized for human consumption and unlikely to be of commercial value. Known to occur in the Bali Sea (Indonesia) on the continental slope at a depth of 290 m.

***Raja (Dipturus) sp. I*****En** - Weng's skate.

Maximum length at least 115 cm. A little-known and seldom caught skate, at present of limited commercial importance in the region. Possibly wide ranging in the Indo-Pacific. Known to occur on the continental slope off tropical and temperate Australia in depths of 400 to 1 030 m from eastern Australia between northern Queensland and Tasmania and off western Australia between Port Hedland and Geraldton. A similar form occurs along the continental slope off the northern Philippines (Luzon).

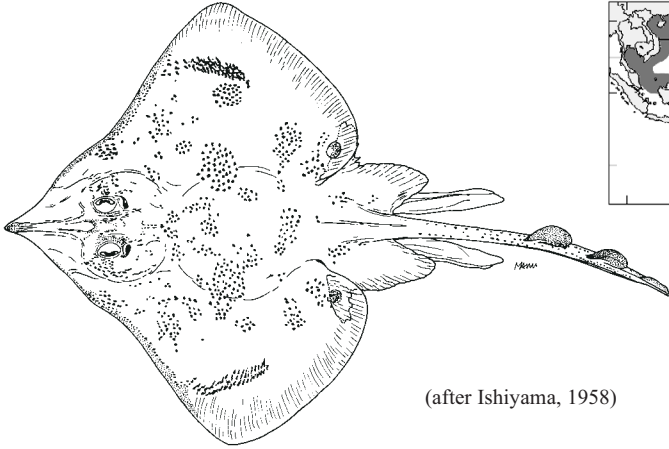


(after Last and Stevens, 1994)

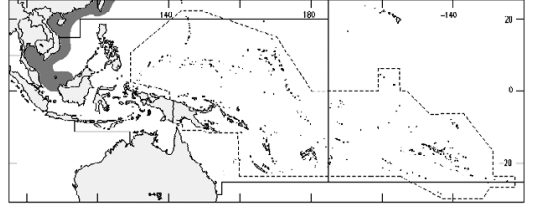
***Raja (Okamejei) boesemani* Ishihara, 1987**

En - Boeseman's skate.

Maximum length at least 55 cm. A little-known skate, with biology poorly known. Details of utilization sketchy. Possibly wide ranging in the Indo-Pacific. Known to occur on the continental shelf in the East and South China Seas from Shanghai (China) to Kuching (Sarawak), and possibly off eastern Indonesia (Java) in depths of 20 to 90 m.



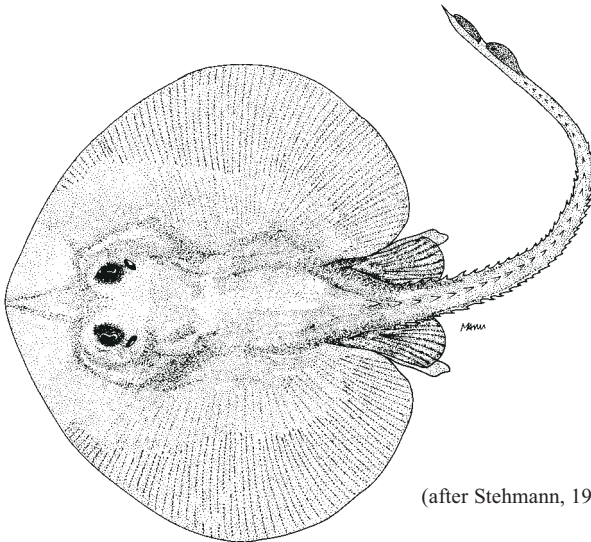
(after Ishiyama, 1958)



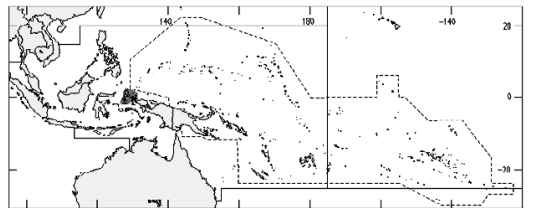
***Raja (Rajella) annandalei* Weber, 1913**

En - Annandale's skate.

Maximum length at least 33 cm. A small deep-water skate, possibly confined to the tropical eastern Indian Ocean, and known from only a few individuals. Biology little known. Not utilized for human consumption and unlikely to be of commercial value. Occurs on the continental slope off eastern Indonesia (Halmahera Sea) in depths of 400 to 830 m.



(after Stehmann, 1976)

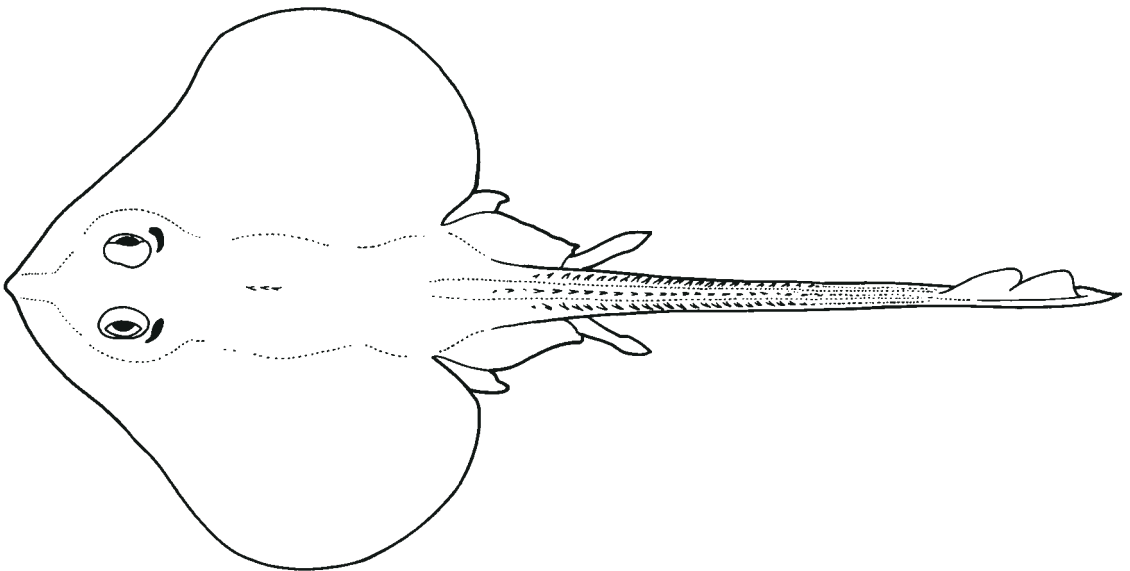


ARHYNCHOBATIDAE

Softnose skates

by P.R. Last and L.J.V. Compagno

Diagnostic characters: Small to moderate-sized batoids (adults between 30 and 175 cm total length, mostly less than 100 cm, disc width 16 to 125 cm) **with large, broad, flat rhomboidal to heart-shaped pectoral discs. Tail narrow and slender**, slightly shorter to nearly twice as long as pectoral disc. Dorsal disc either smooth or covered with small dermal denticles or placoid scales; **more or less enlarged, sharp, hooked denticles or thorns usually present on dorsal surface**, on the midline of the tail and often on the midline of the disc, on the snout, orbits, and shoulders; adult males always with rows of enlarged, often retractile and claw-like spines or alar thorns on distal web of dorsal disc. Trunk depressed and flattened, not shark-like. Tail cylindrical or moderately depressed but not whip-like, with lateral ridges or folds on sides; abruptly narrower than trunk; **no barbed sting (stinger or stinging spine) on dorsal surface of tail**; tail with paired electric organs present. Head broad and depressed; **snout short to long and bluntly to acutely angular; supported by a more or less reduced, soft, slender rostral cartilage** (stout and stiff in a few South American and Australian species); snout not formed into a rostral saw and without lateral saw teeth. **Five small gill openings** on underside of front half of pectoral-fin bases, not visible in lateral view; no gill sieves or rakers on internal gill slits. Eyes dorsolateral on head and just anterior to spiracles. Mouth transverse and straight to moderately arched, without prominent knobs and depressions. Nostrils just anterior to mouth and separated from it by less than 1/2 their own widths, connected by broad nasoral grooves with mouth; **anterior nasal flaps elongated, posteriorly expanded and reaching mouth, but separate medially and not forming a nasal curtain. Oral teeth small, rounded-oval in shape** and with or without cusps on their crowns, not laterally expanded and plate-like, similar in shape and in over 20 rows in either jaw. Pectoral fins large, originating in front of mouth and reaching snout tip or not, attached to sides of head and forming a large pectoral disc with free rear tips ending posterior to pelvic-fin origins; disc not subdivided by a notch at eyes. No electric organs at bases of pectoral fins. Pelvic fins high, rounded-angular or angular, **subdivided into narrow anterior lobes and broad posterior lobes with a connecting web. Usually 2 small, subequal, and close to widely separated dorsal fins present**, these of similar rounded or rounded angular shapes with margins more or less confluent, not falcate; a single dorsal fin or none in some species. **First dorsal fin, when present, originates far behind anterior half of total length, base far behind rear tips of pelvic fins and junction between trunk and tail and well behind midlength of tail. Caudal fin small to rudimentary**, more or less symmetrical, and vertebral axis parallel to body axis; lower lobe rudimentary or absent. **Colour:** dorsal surface varying from whitish to dark brown, bluish or black; plain or with light, dark or coloured spots, blotches, reticulations, occasionally with basal ocelli on pectoral fins; usually plain white, dusky or brownish below, but sometimes blotched.



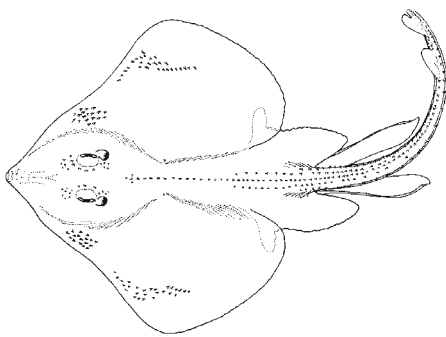
Habitat, biology, and fisheries: Softnose skates are a large, widely distributed group of inshore shelf to offshore, deep-slope batoids. Some species penetrate the tropics in deep water, but their greatest diversity is in higher latitudes, in cold-temperate to polar seas (both Arctic and Antarctic) on continental shelves, and in the deep, cold water of continental slopes. A few species occur off sandy beaches, and in muddy enclosed bays and estuaries, but most live offshore on soft sand and mud bottoms in depths of 24 to at least 2 906 m; none are oceanic and none penetrate into fresh water. Softnose skates are little-known bottom-dwellers that feed on invertebrates including small to large crustaceans, cephalopods, and demersal and pelagic bony fish. All species are oviparous as far as is known, and deposit eggs in large, quadrangular egg cases with distal horns. Eggs may hatch out after a year in large species. Catch information, which is not recorded for the area, is minimal as the species are small and uncommon and much of the continental slope area of the region is unexplored. They are inoffensive to people, although large specimens should be handled carefully because the tail thorns and alar spines (in males) are often sharp.

Remarks: Arhynchobatids, along with members of the family Anacanthobatidae, are considered to be subgroups of the Rajidae by many authors.

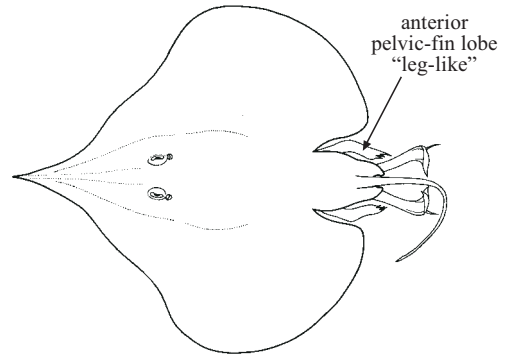
Similar families occurring in the area

Rajidae: species in the area with stout rostral cartilages and stiff snouts (rather than mostly slender and flexible), and usually more heavily spinose than arhynchobatids; specialized structures of the body skeleton and claspers also differ.

Anacanthobatidae: anterior lobes of pelvic fins separate from the posterior lobes and formed as slender “legs” with expanded distal “feet”; species in the area have naked discs and tails with no denticles or thorns except alar spines of males, very slender tails with a low caudal fin but no dorsal fins, possibly no electric organs in the tail, and small eyes and very long snouts usually with an anterior filament or leaf-like appendage.



Rajidae



Anacanthobatidae

No other batoids in the area combine the following characteristics: large flat angular or subangular pectoral discs; slender, non-whip-like tails usually with small posterior dorsal fins; rudimentary caudal fins, and no sting; alar spines in males; expanded, lobe-like anterior nasal flaps not fused medially as a nasal curtain; and subdivided pelvic fins.

Key to the species of Arhynchobatidae occurring in the area

Note: the following key is provisional as the species and genera in the area are poorly defined and require further investigation.

- 1a. No enlarged thorns on tail (although small bristle-like denticles may be present); undersurface of tail with fine denticles; both dorsal and ventral surfaces dark with flabby skin → 2
- 1b. Thorns present on tail; no denticles on undersurface of tail; ventral surface pale and skin not flabby (loose on the ventral surface of some species) → 3

- 2a. No dorsal fins or orbital thorns *Notoraja laxipella*
- 2b. Dorsal fins present; a single thorn before each eye *Notoraja subtilispinosa*

- 3a. Both dorsal and ventral surfaces uniformly pale to white; rostral cartilage firm near snout tip *Notoraja ochroderma*
- 3b. Colour not as above; rostral cartilage flexible near tip. → 4
- 4a. Upper surface of disc mostly uniform in colour (occasionally with a few large faint dusky blotches) *Pavoraja* sp. F
- 4b. Upper surface of disc with a distinctive pattern dominated by small spots and/or reticulations → 5
- 5a. Spots dark, irregular in shape and size, densely arranged over upper disc as a dark mosaic pattern; no nuchal thorns; preoral snout exceeding 13.5% of total length . . . *Pavoraja* sp. D
- 5b. Spots small, pale, regular in size and shape, not arranged into clusters or forming a dark mosaic pattern; nuchal thorns mostly present; preoral snout mostly less than 13.5% of total length *Pavoraja* sp. E

List of species occurring in the area

The symbol ♠ is given when species accounts are included.

- ♠ *Notoraja ochroderma* McEachran and Last, 1994
- ♠ *Notoraja (Insentiraja) laxipella* Yearsley and Last, 1992
- ♠ *Notoraja (Insentiraja) subtilispinosa* (Stehmann, 1985)
- ? *Notoraja (Insentiraja)* sp. [Seret] (New Caledonia)
- ♠ *Pavoraja (Pavoraja)* sp. D [Last and Stevens, 1994]
- ♠ *Pavoraja (Pavoraja)* sp. E [Last and Stevens, 1994]
- ♠ *Pavoraja (Pavoraja)* sp. F [Last and Stevens, 1994]

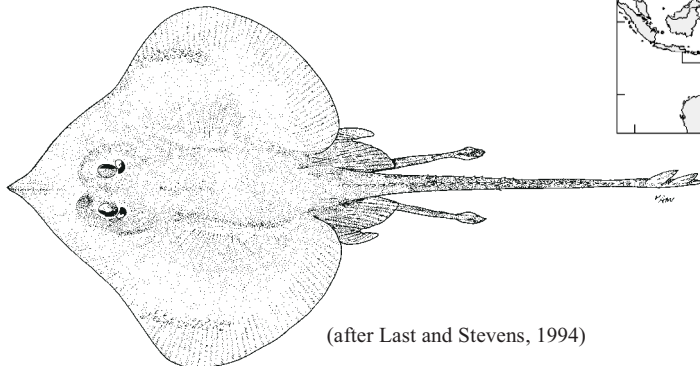
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- Stehmann, M. 1976. Revision der Rajoiden-Arten des nördlichen Indischen Ozean und Indopazifik (Elasmobranchii, Batoidea, Rajiformes). *Beaufortia*, (24):133-175.

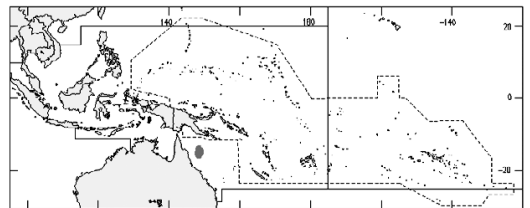
Notoraja ochroderma McEachran and Last, 1994

En - Pale skate.

Maximum total length at least 36 cm. A small deep-water skate, probably confined to the tropical western Pacific, and known from only a few individuals. Biology little known. Not utilized for human consumption and unlikely to be of commercial value. Occurs in the Coral Sea off Cairns (Australia) in depths of 400 to 465 m.



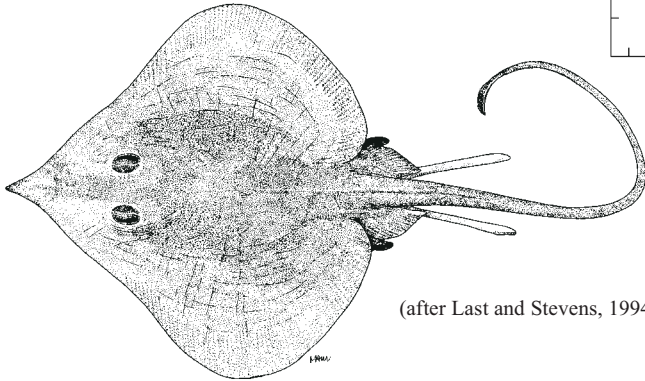
(after Last and Stevens, 1994)



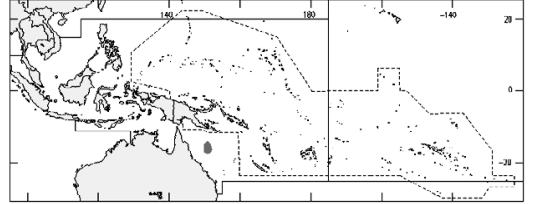
Notoraja (Insentiraja) laxipella Yearsley and Last, 1992

En - Eastern looseskin skate.

Maximum total length at least 57 cm. A small, highly distinctive, deep-water skate, probably confined to the mid continental slope off northeastern Australia, and known from only a few individuals. Biology little known. Not utilized for human consumption and unlikely to be of commercial value. Occurs in the Coral Sea off Cairns in depths of 800 to 880 m.



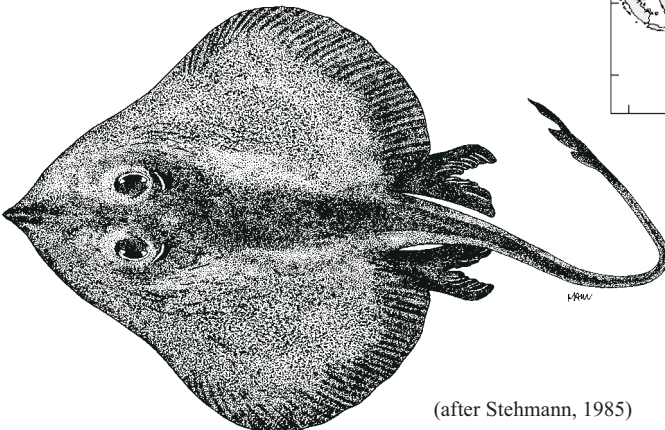
(after Last and Stevens, 1994)



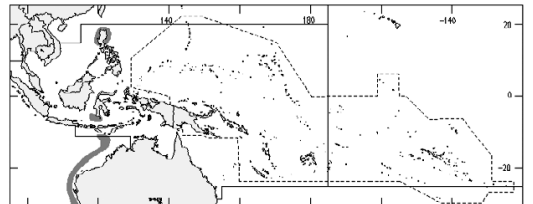
Notoraja (Insentiraja) subtilispinosa (Stehmann, 1985)

En - Western looseskin skate.

Maximum total length at least 54 cm. A small, moderately common, deep-water skate of the mid continental slope of the eastern Indian Ocean. Possibly the most abundant skate in depths of 900 to 1 100 m throughout its known range. Biology little known. Taken as bycatch by scampi trawlers but not utilized for human consumption; could be of minor commercial value. Inhabits soft substrates on mid-continental slopes in 600 to 1 200 m. Range not well defined, but known to occur off northwestern Australia, Indonesia, and the northern Philippines. Likely to be more widely distributed through the Indo-Malay Archipelago. Shape differences evident between populations across its range need further investigation.

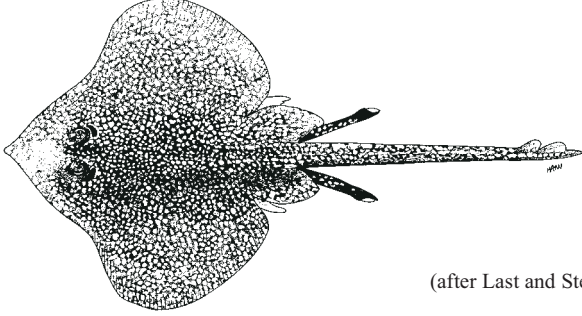


(after Stehmann, 1985)

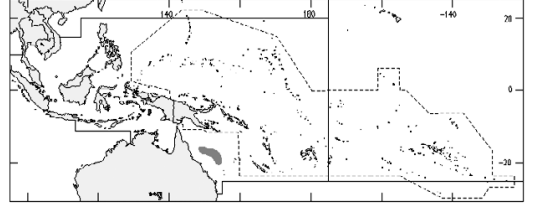


Pavoraja (Pavoraja) sp. D [Last and Stevens, 1994]**En** - Mosaic skate.

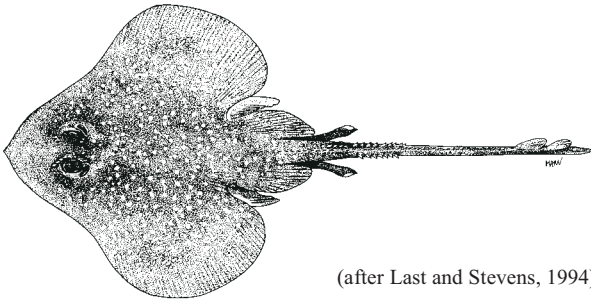
Maximum total length at least 30 cm. A small deep-water skate, confined to the tropical western Pacific, and known from only a few individuals. Biology little known. Not utilized for human consumption and unlikely to be of commercial value. Occurs in the Coral Sea on the upper continental slope between Ingham and Mackay (Australia) in depths of 300 to 400 m.



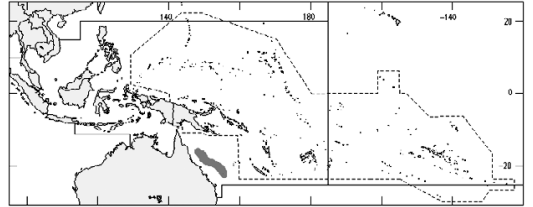
(after Last and Stevens, 1994)

***Pavoraja (Pavoraja) sp. E*** [Last and Stevens, 1994]**En** - False peacock skate.

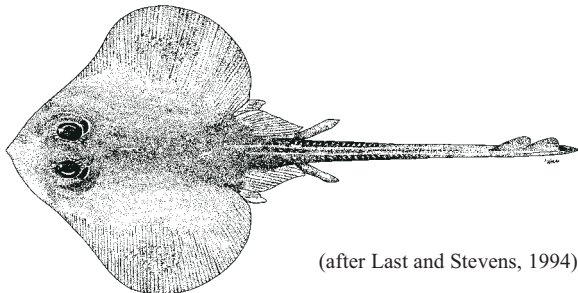
Maximum total length at least 37 cm. A small deep-water skate confined to the tropical Western Pacific. Possibly the most abundant skate throughout its known range. Biology little known. Not utilized for human consumption, but could be of minor commercial value. Occurs on the upper continental slope of northeastern Australia between Rockhampton and Cairns in depths of 210 to 500 m.



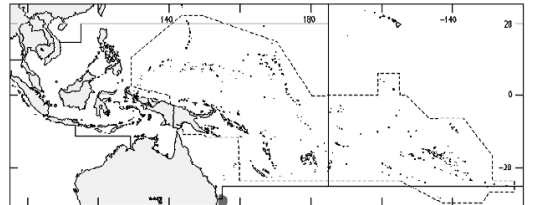
(after Last and Stevens, 1994)

***Pavoraja (Pavoraja) sp. F*** [Last and Stevens, 1994]**En** - Dusky skate.

Maximum total length at least 37 cm. A small deep-water skate, confined to the subtropical western Pacific, and known from only a few individuals. Biology little known. Not utilized for human consumption and unlikely to be of commercial value. Occurs off eastern Australia between Coffs Harbour and Moreton Island in depths of 360 to 730 m.



(after Last and Stevens, 1994)

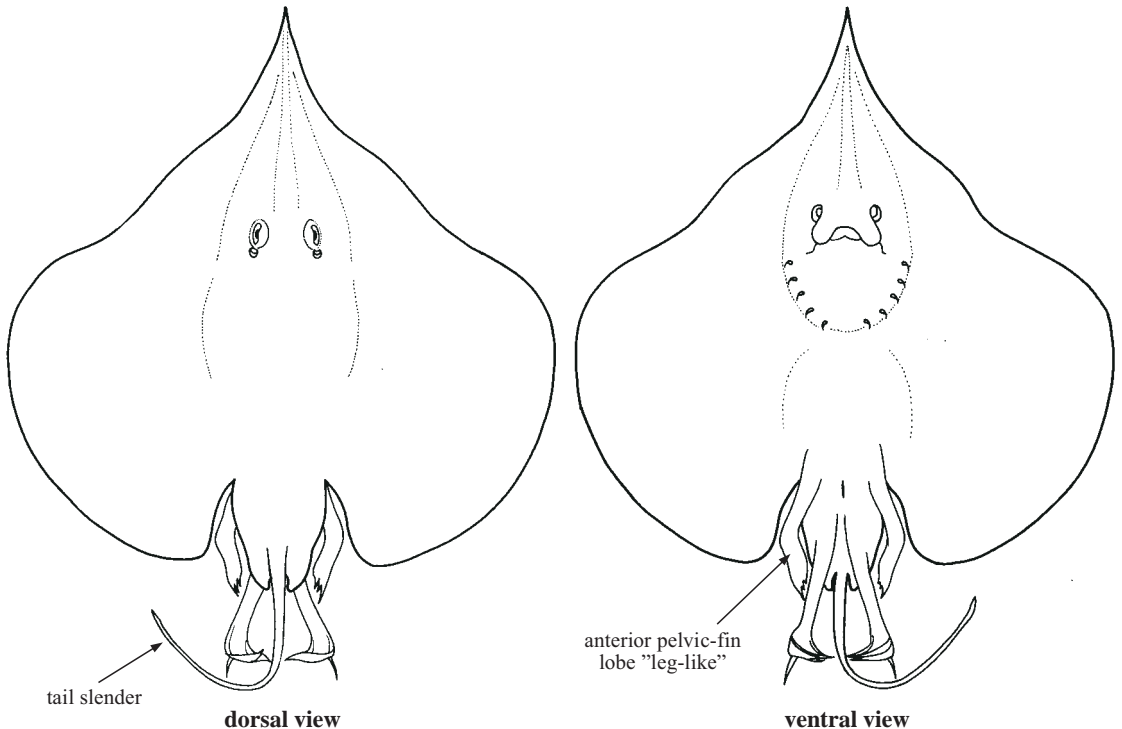


ANACANTHOBATIDAE

Legskates

by P.R. Last and L.J.V. Compagno

Diagnostic characters: Small to moderate-sized batoids (adults between 23 and 66 cm total length, disc width between 15 and 41 cm) with broad, flat, rounded to heart-shaped pectoral discs. Tail narrow to very slender, somewhat shorter to almost half again as long as pectoral disc. Dorsal disc either completely naked or with a few minute dermal denticles or placoid scales in species in the area (genus *Anacanthobatis*); enlarged, sharp thorns absent from the discs and tails of species in the area, but present on extralimital species (genus *Cruriraja*); adult males always with rows of enlarged, hooked, retractile, claw-like spines or alar thorns on distal web of dorsal disc. Trunk depressed and flattened, not shark-like. Precaudal tail slender, cylindrical, or moderately depressed but not whip-like, with or without lateral ridges or folds on sides; abruptly narrower than trunk, no barbed sting (stinger or stinging spine) on dorsal surface of tail, electric organs present or possibly absent in tail. Head broad and depressed; snout short to very long and bluntly to acutely angular, in some species with a distal filament or laterally expanded flap; supported by a stout, stiff or slender, flexible rostral cartilage; snout not formed into a rostral saw and without lateral saw teeth. Five small gill openings on underside of front half of pectoral-fin bases, not visible in lateral view; no gill sieves or rakers on internal gill slits. Eyes dorsolateral on head and just anterior to spiracles. Mouth transverse and straight to strongly arched, without prominent knobs and depressions. Nostrils just anterior to mouth and separated from it by less than 1/2 their own widths, connected by broad nasal grooves with mouth; anterior nasal flaps elongated, posteriorly expanded and reaching mouth, but separate medially and not forming a nasal curtain. Oral teeth small, rounded-oval in shape and with or without cusps on their crowns, not laterally expanded and plate-like, similar in shape and in 18 to 46 rows in either jaw. Pectoral fins large, originating in front of mouth and reaching snout tip or not, attached to sides of head and forming a large pectoral disc with free rear tips ending posterior to pelvic-fin origins; disc not subdivided by a notch at eyes. No electric organs at bases of pectoral fins. Pelvic fins long, rounded to angular, subdivided into narrow anterior lobes shaped like legs with a distinct distal foot, completely separate from the broad posterior lobes. No dorsal fins in species in the area (genus *Anacanthobatis*; 2 small, low, subequal rounded-angular, non-falcate dorsal fins present on the posterior 1/4 of the tail in some extralimital species of the genus *Cruriraja*). Caudal fin small, more or less symmetrical, and with vertebral axis parallel to body axis; lower caudal-fin lobe absent. **Colour:** dorsal surface varying from whitish, bluish grey, brownish or blackish, plain or mottled with small to large, darker spots and blotches but without basal ocelli on pectoral fins; whitish to dark brown below, often with blotches.



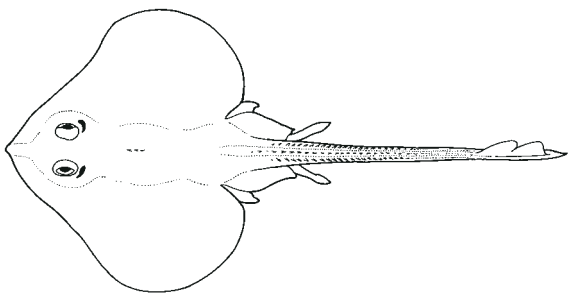
Habitat, biology, and fisheries: Legskates are a small group of offshore shelf to deep-slope batoids with a limited and sporadic distribution in warm temperate and tropical seas. Most species are found in the tropics and none occur at high latitudes. They occur in the western North Atlantic (Florida, Gulf of Mexico, and Caribbean), off southern Africa (Namibia, South Africa, and Mozambique) and Madagascar, the Andaman Sea, and the western Pacific from tropical Australia, Indonesia (including Borneo), the South and East China Seas off China, Taiwan Province of China, and Japan (Ryukyu Trough). They are found offshore on soft sand and mud bottom on the outer shelf and slopes at depths from 150 to 1 602 m. The peculiar pelvic “legs” of these skates are used to walk on the bottom. Legskates are rare to common bottom-dwellers that feed on invertebrates including small crustaceans, cephalopods, worms, and small demersal bony fish. All species are oviparous as far as is known, and deposit eggs in quadrangular egg cases with distal horns. Hatching time not recorded for egg cases. Utilization and fishing gear not recorded for the area, because these skates are small, uncommon, and occur in deep water; caught as a discarded bycatch of demersal trawl fisheries elsewhere. They are inoffensive to people.

Remarks: Anacanthobatids, along with the family Arhynchobatidae, are considered to be subgroups of the hardnose skates (Rajidae) by many authors.

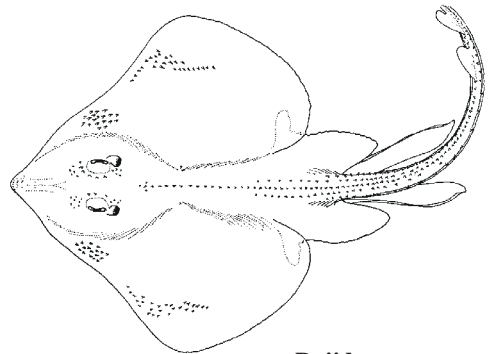
Similar families occurring in the area

Arhynchobatidae and Rajidae: anterior lobes of pelvic fins connected by webbing to posterior lobes, not formed as legs; disc usually with denticles and thorns; tails less slender; usually 2 dorsal fins (occasionally 1 or none); and snouts without a long, anterior filament or leaf-like appendage.

No other batoids in the area combine the following characteristics: large flat angular or subangular pectoral discs; slender, non-whip-like tails, without dorsal fins; rudimentary caudal fins; and no sting; alar spines in males; expanded anterior nasal flaps not fused medially as a nasal curtain; and subdivided pelvic fins.



Arhynchobatidae



Rajidae

Key to the species of Anacanthobatidae occurring in the area

- 1a. Ventral surface uniformly white, lacking pigment → 2
- 1b. Ventral surface brownish or with large pale and dark areas. → 3

- 2a. Tail with bulbous tip; more than 22 rows of teeth in upper jaw *Anacanthobatis* sp. A
- 2b. Tail filamentous, not bulbous near tip; fewer than 22 rows of teeth in upper jaw
 *Anacanthobatis* sp. B

- 3a. Dorsal surface of disc distinctly paler than ventral surface; anterior disc paler than posterior disc on ventral surface; adults smaller than 25 cm disc width *Anacanthobatis borneensis*
- 3b. Both dorsal and ventral surfaces of disc very dark (except where skin removed); large species, reaching maturity above 30 cm disc width → 4

- 4a. Dark brown above, usually black around eye and spiracles; interpelvic distance more than 2.5 times width of anterior pelvic-fin lobe at its base (Fig. 1a); interspiracular pores indistinct *Anacanthobatis melanosoma*
- 4b. Greyish blue above, not significantly darker around eye and spiracles; interpelvic distance less than 2.5 times width of anterior pelvic-fin lobe at its base (Fig. 1b); interspiracular pores obvious *Anacanthobatis* sp. C
(no confirmed records in the area)

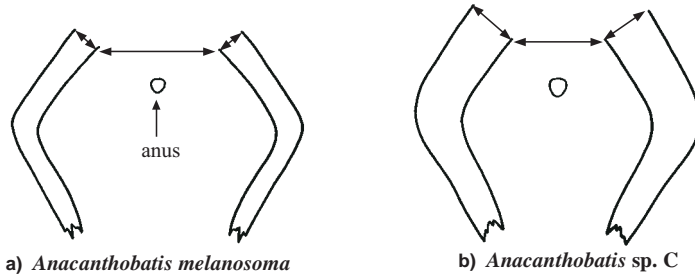


Fig. 1 anterior pelvic-fin lobes (ventral view)

List of species occurring in the area

The symbol ♠ is given when species accounts are included.

- ♠ *Anacanthobatis borneensis* Chan, 1965
- ♠ *Anacanthobatis melanosoma* (Chan, 1965)
- Anacanthobatis nanhaiensis* (Meng and Li, 1981)^{1/}
- Anacanthobatis stenosoma* (Li and Hu, 1982)^{1/}
- ♠ *Anacanthobatis* sp. A [Last and Stevens, 1994]
- ♠ *Anacanthobatis* sp. B [Last and Stevens, 1994]
- ? *Anacanthobatis* sp. C [Last] (Australia)^{2/}
- ? *Anacanthobatis* sp. [Seret] (Indonesia)

Reference

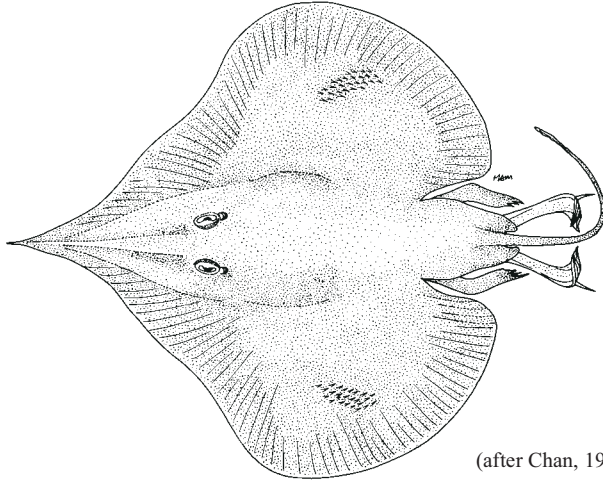
Hulley, P.A. 1973. Interrelationships within the Anacanthobatidae (Chondrichthyes, Rajoidea), with a description of the lectotype of *Anacanthobatis marmoratus* von Bonde and Swart, 1923. *Ann. S. Afr. Mus.*, 62(4):131-158.

^{1/} These species are likely to be synonyms of existing species.

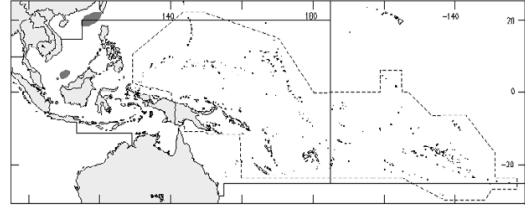
^{2/} Occurs on the continental slope off central Western Australia in 1 100 to 1 125 m and may occur in seas further north.

Anacanthobatis borneensis* Chan, 1965*En** - Borneo legskate.

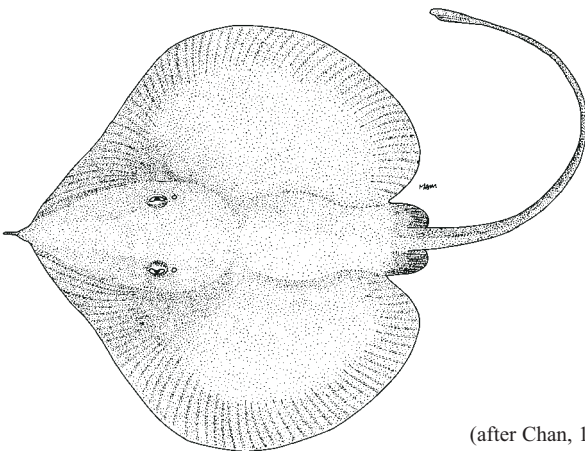
Maximum total length at least 32 cm, males maturing at about 26 cm; maximum width at least 21 cm. Little known ray recorded from the Indo-Chinese continental slope in depths of 475 to 835 m. Seldom caught so utilization for human consumption limited. Occurs in the South China Sea off eastern Malaysia (Sarawak) and Taiwan Province of China, but probably more broadly ranging within the area. Often confused with *Anacanthobatis melanosoma*.



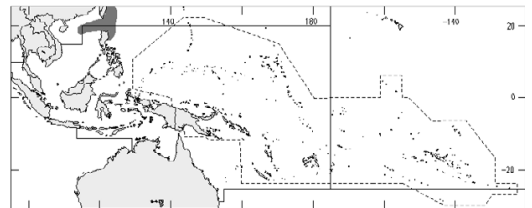
(after Chan, 1965)

***Anacanthobatis melanosoma* (Chan, 1965)****En** - Blackbodied legskate.

Maximum total length at least 59 cm; maximum width at least 38 cm. Poorly described legskate recorded from the Asian continental slope in depths of 900 to 1 100 m. Seldom caught, therefore utilization for human consumption limited. Occurs in the East and South China seas off Hong Kong, Philippines, Taiwan Province of China and southern Japan, but probably more broadly ranging within the area. Some authors consider this species to be conspecific with *Anacanthobatis borneensis*.



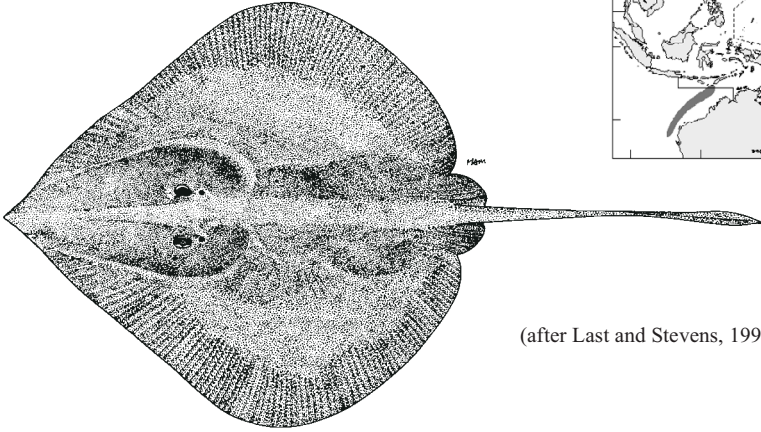
(after Chan, 1965)



***Anacanthobatis* sp. A** [Last and Stevens, 1994]

En - West Australian legskate.

Maximum total length at least 54 cm; maximum width to at least 35 cm. A distinctive legskate known from the upper continental slope off Western Australia down to 1 100 m but usually at shallower depths (420 to 800 m). May also occur along the Indonesian continental slope. Not utilized for human consumption and unlikely to be of commercial value.

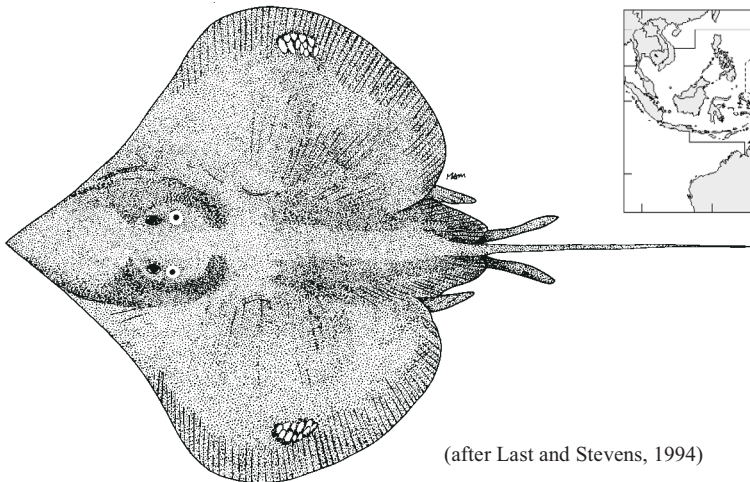


(after Last and Stevens, 1994)

***Anacanthobatis* sp. B** [Last and Stevens, 1994]

En - East Australian legskate.

Maximum total length at least 57 cm; maximum width to at least 36 cm. A little known legskate confined to the continental slope off eastern Australia in 680 to 880 m. May also occur on seamounts off New Caledonia. Not utilized for human consumption and unlikely to be of commercial value.



(after Last and Stevens, 1994)