

TORPEDO RAYS

Family Torpedinidae

M.R. de Carvalho, P.R. Last & B. Séret

Torpedo rays are small to large batoids (to 1.8 m TL but mostly smaller than 1 m TL; 1 species matures at ~20 cm TL). The disc is rather depressed and variably subcircular, about as wide as long, with thick, fleshy margins. Snout is straight to slightly arched along its margin. Small or medium-sized eyes and spiracles are usually situated close together well forward on disc. There are 2 genera in the family, *Tetronarce* and *Torpedo*. Spiracles either smooth edged (*Tetronarce*) or with slender or knob-like papillae on posterior and lateral margins (*Torpedo*). Nostrils subcircular and relatively large, connected to mouth by deep nasoral grooves. Nasal curtain narrow to broad with a smooth posterior margin, sometimes with a small median lobe. Mouth strongly arched, with a wide gape. Teeth with a single cusp and numerous (in 25–70 rows in adults). Large, kidney-shaped electric organs are usually visible on both sides of the disc, but more visible in ventral view. Pelvic fins broad and rounded, each with a single lobe. Two rounded to angular dorsal fins, the first usually larger than second. The caudal fin is large and subtriangular, with upper and lower lobes of more or less equal size. Tail is stout and clearly demarcated from, but shorter than, the disc. A low lateral skin fold is present on either side of the tail. Skin very soft and smooth, without denticles. Dorsal surface is uniform brown, dark grey, purplish or blackish (*Tetronarce*), or with various light and dark markings (ocellated, spotted, mottled or vermiculated) on variable shades of brown or grey (*Torpedo*). The ventral surface is typically whitish, often with dark pectoral and pelvic-fin margins. Torpedo rays are found worldwide in temperate and tropical shallow coastal regions (*Torpedo*), and mainly in the pelagic realm or in deeper waters of the continental slope (*Tetronarce*). They are typically slow swimmers living on the bottom, although some spend time migrating in midwater. Their electric organs produce strong discharges used to stun prey as well as for defence. Prey items (mostly bony fishes but also benthic invertebrates) are grasped and ingested whole. All species are viviparous without placentae. Sometimes caught as bycatch and usually discarded at sea. The family is undergoing taxonomic revision, and while 18 species are treated here, at least another 7 undescribed *Torpedo* species have been discovered. Also, some species of *Tetronarce* in this book may be synonyms. Some species are very similar in appearance and individuals can be extremely variable within species, so identifying and defining species has proven difficult. Research is needed to define species and determine their true distributional ranges.

KEY TO TORPEDINID GENERA

Spiracle margins smooth and without any knobs or papillae (fig. 1); cosmopolitan *Tetronarce* (8 species; fig. 3, pp. 186–193)

Spiracle margins with few to many knobs or papillae (fig. 2); Atlantic and Indian Oceans *Torpedo* (10 species; fig. 4, pp. 194–203)

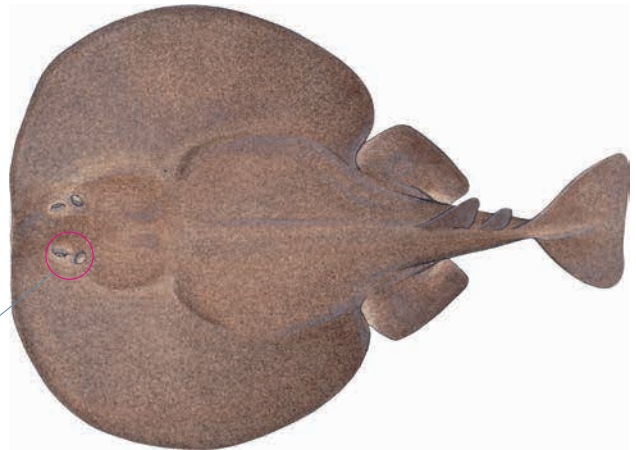
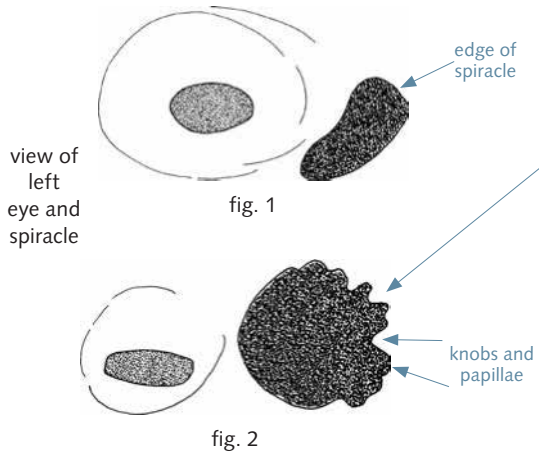


fig. 3



fig. 4

PACIFIC TORPEDO

18.1

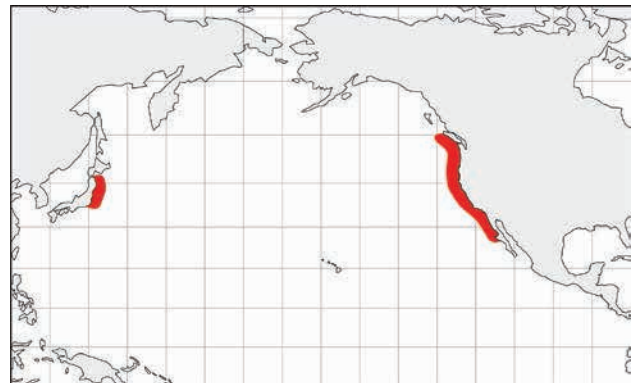
Tetronarce californica (Ayres, 1855)

LC

IDENTIFICATION. Very large torpedo ray usually with a dark-spotted bluish or greyish dorsal colour, and smooth spiracles devoid of papillae. Disc broadly circular, slightly wider than long, widest near its mid-length; anteriormost margin usually weakly convex and without median protuberance. Eyes small, slightly smaller than spiracles. Spiracles large, crescent shaped, rims not elevated. Mouth strongly arched; nostrils large, round and with well-developed nasal flaps. Teeth small and sharp. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins very broad, margins evenly rounded. Dorsal fins with broadly rounded to oval apices; second dorsal fin more slanted and much smaller than first; height of each ~1.5 times their length. First dorsal-fin insertion usually over pelvic-fin insertions or slightly forward; dorsal fins separated by about length of first dorsal base; distance between second dorsal and caudal fin equal to or greater than interdorsal distance. Tail short, shorter than disc length, tapering. Caudal peduncle rather slender with low skin folds. Caudal fin large, with both upper and lower lobes tall and broad; posterior margin straight to weakly concave.

COLOUR. Bluish, greyish or dark greyish brown above, usually with an irregular scattering of small black spots on body and fins. Undersurface creamy or white.

SIZE. To ~137 cm TL; males mature at ~65 cm TL, females at ~73 cm TL.



HABITAT AND BIOLOGY. North Pacific Ocean; off western USA and Japan. Demersal over continental and insular shelves, often in shallow coastal habitats, at depths of 5–275 m. Produces litters of up to 17 pups. Feeds exclusively on fishes that are usually ambushed from beneath sediment during the day or actively stalked in open water at night.

SIMILAR SPECIES. Very similar in appearance to other members of this genus, but distinctive in its dark-spotted dorsal colour. Black-spotted *Tetronarce* caught in the northern Indian Ocean are of uncertain identity.

SOUTH AFRICAN TORPEDO

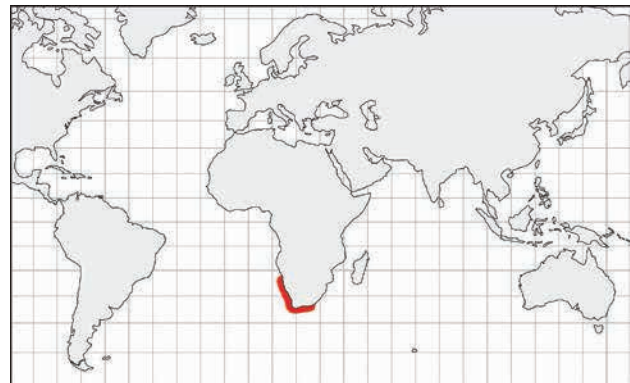
18.2

Tetronarce cowleyi Ebert, Haas & Carvalho, 2015

NE

IDENTIFICATION. Large torpedo ray with a greyish or black dorsal colour, without distinctive spots or dorsal markings, and smooth spiracles lacking papillae. Disc broadly rounded, clearly wider than long, width 65–70% TL, widest at its anterior third, thick at anterior margin; anterior margin with a small median protuberance. Eyes and spiracles small. Spiracles oval to round, slightly oblique in relation to eyes, flat. Nostrils large, round and with distinct flaps, their posterior margins with 2 confluent lobes, broad and angled medially; nasal curtain margins not fringed. Mouth strongly arched; teeth small and sharp, in 32 rows in largest males. Electric organs more clearly visible in ventral than dorsal view. Pelvic-fin outer margin broadly rounded, but fin not particularly broad. Claspers with small, distal integumental flap. Dorsal fins rounded to oval at apex; second dorsal fin more slanted and much smaller than first. First dorsal-fin origin slightly forward of pelvic-fin insertion; origin of second near tail mid-length; interdorsal distance subequal to distance between second dorsal and caudal fin. Tail stout and short, length slightly shorter than disc length, with ridge-like skin folds. Caudal fin large, with upper lobe slightly more angled than lower lobe, with oval apex; lower lobe more rounded; posterior margin of caudal fin straight to rounded.

COLOUR. Uniform shiny black or dark greyish above; ventral surface creamy white.



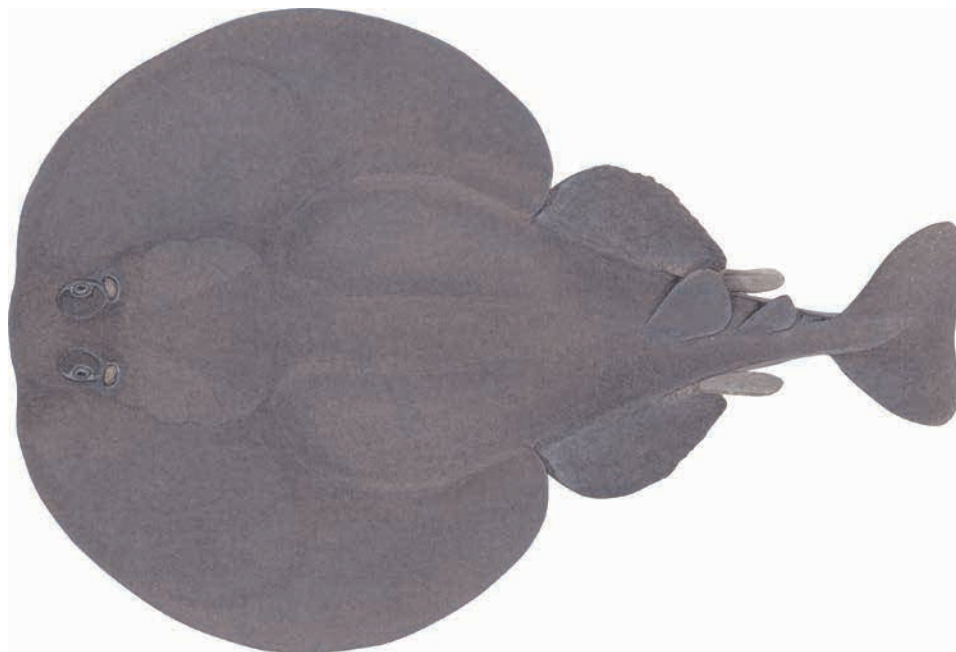
SIZE. Females reach 113 cm TL and males 68 cm TL; females mature at ~100 cm TL, males ~58 cm TL; born before 19 cm TL.

HABITAT AND BIOLOGY. South-East Atlantic and South-West Indian Ocean; Namibia to Algoa Bay (South Africa). Demersal on the outer continental shelf and upper slope at depths of 110–455 m. Feeds mainly on fishes.

SIMILAR SPECIES. This species is most similar to the Argentine Torpedo (18.6), and their separation is mostly based on subtle differences in body proportions.

TAIWANESE TORPEDO

18.3

Tetronarce formosa (Haas & Ebert, 2006)

DD

IDENTIFICATION. Medium-sized torpedo ray with a uniform purplish brown dorsal colour, first dorsal fin not extending beyond rear tip of pelvic fin, truncate or weakly concave caudal fin, and smooth spiracles lacking papillae. Disc broadly circular, considerably wider than long, widest near mid-length; anteriormost margin weakly convex to somewhat truncate; without median protuberance. Eyes smaller than spiracle. Spiracles moderately elongate, narrowly oval to slit-like, rims not elevated. Nostrils small, round, with distinct flaps. Mouth small, strongly arched; teeth small and sharp, in up to 23/27 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins not very broad, margins rounded to angular. First dorsal fin broad, subtriangular; second dorsal fin distinctly more slanted, much smaller than first, and with a more acute apex. First dorsal-fin insertion about over pelvic-fin insertions; dorsal fins separated by shorter than base length of first; distance between second dorsal and caudal fin usually larger than interdorsal distance. Tail moderately short, stout, tapering, smaller than disc length; caudal peduncle rather slender, with low ridge-like skin folds. Caudal fin large, lobes tall and broad, height usually exceeding its distance from first dorsal-fin origin; posterior margin straight to undulate, slightly more concave with more angular tips in large males.

COLOUR. Uniform purplish brown above, with darker hue around margins of disc and pelvic fins and on caudal fin;



lateral skin fold creamy. Undersurface creamy or white, usually narrowly and abruptly darker on posterior disc and pelvic-fin margins, claspers, and edges of tail.

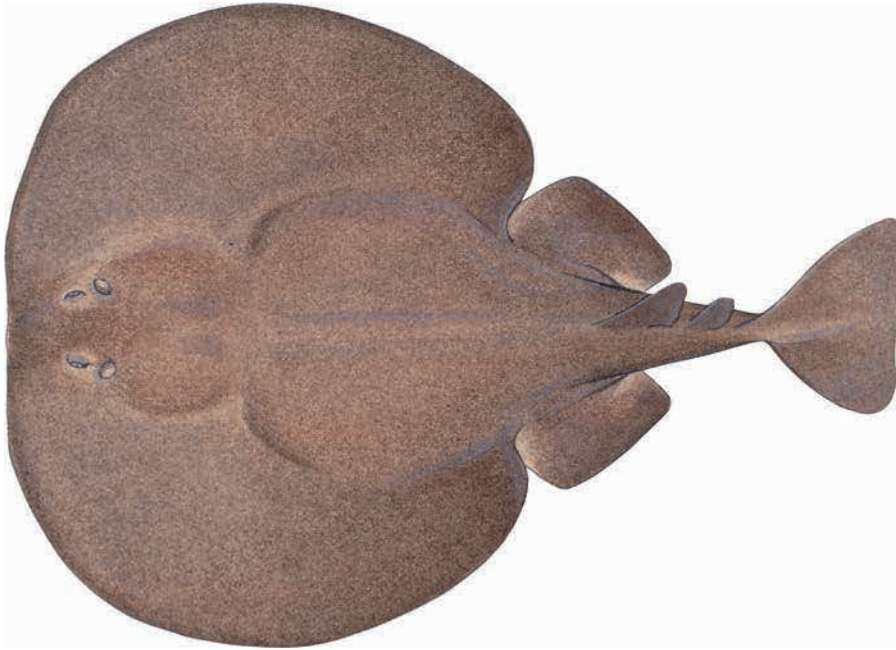
SIZE. To at least 62 cm TL; born at ~20–25 cm TL.

HABITAT AND BIOLOGY. North-West Pacific; Taiwan and possibly Philippines. Demersal, primarily offshore to depths of 300 m. Life history unknown.

SIMILAR SPECIES. Occurs with the Longtail Torpedo (18.7) off Taiwan. These forms differ in disc and caudal-fin shapes, and the relative length of tail. However, given the high level of variability within some members of this genus, they may turn out to be variations of the same species.

GREAT TORPEDO

18.4

Tetronarce nobiliana (Bonaparte, 1835)

DD

IDENTIFICATION. Very large torpedo ray, usually with a plain-coloured, dark brown to purplish brown dorsal surface, first dorsal fin usually extending posteriorly well beyond rear tip of pelvic fins, truncate or weakly concave caudal fin, and smooth spiracles lacking papillae. Disc broadly circular, considerably wider than long, width 58–71% TL, widest near its mid-length; anteriormost margin weakly convex to truncate. Eyes smaller than spiracle. Spiracles large, narrowly oval, rims barely elevated. Nostrils small, round, with distinct flaps. Mouth strongly arched; teeth small and sharp, in more than 50 rows in larger specimens. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins much broader than long, margins evenly rounded. Dorsal fins broad to narrowly rounded at apex; height of first ~1.2–1.3 times its base length, second much smaller. First dorsal-fin position variable, usually over pelvic fins; dorsal fins separated by about base length of first dorsal or less; distance between second dorsal and caudal fin usually larger than interdorsal distance. Tail shorter than disc length, tapering; caudal peduncle rather slender with low skin folds. Caudal fin large, both lobes tall and broad; posterior margin almost straight to weakly concave in adults.

COLOUR. Variably brownish or greyish above; often with bluish hues and light or dark flecks. Undersurface of disc white, occasionally with dark margins.



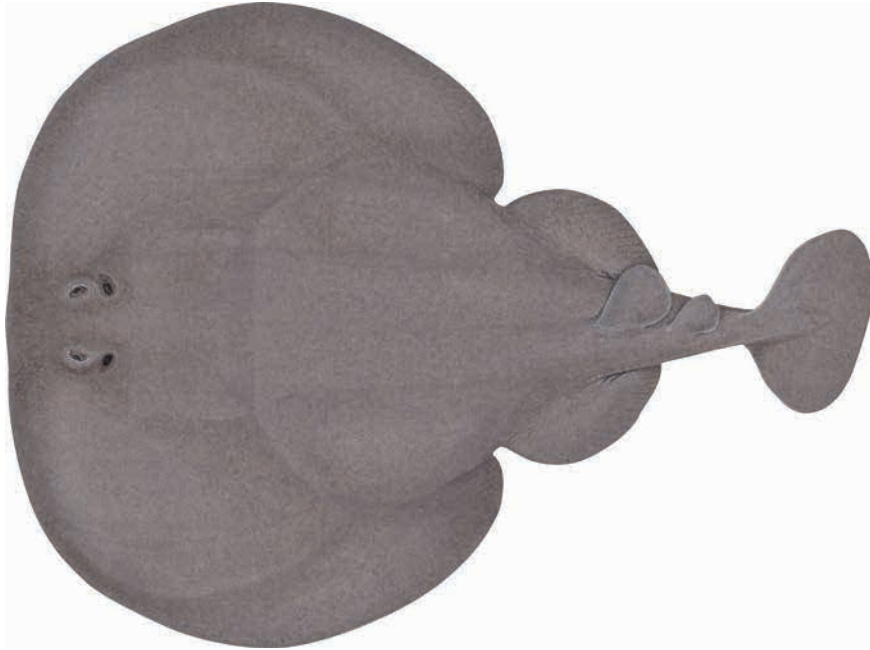
SIZE. To ~180 cm TL (Atlantic); males mature at ~60 cm TL (South Pacific).

HABITAT AND BIOLOGY. Indo-Pacific and Eastern Atlantic Ocean, including Mediterranean Sea; widespread, primarily in temperate latitudes. Demersal on continental and insular shelves and slopes to at least 925 m depth. Makes long pelagic migrations, often near the surface. Produces litters of up to 60 pups. Preys mainly on bony fishes.

SIMILAR SPECIES. Extremely variable in shape and colour; *T. fairchildi* (Hutton) and *T. macneilli* (Whitley) are synonyms. However, the Western Atlantic Torpedo (18.5), previously considered a synonym, is now recognised as a valid species based on molecular data.

WESTERN ATLANTIC TORPEDO

18.5

Tetronarce occidentalis (Storer, 1843)

NE

IDENTIFICATION. Very large torpedo ray usually with a plain brownish dorsal coloration lacking distinctive spots or markings, and smooth spiracles lacking papillae. Disc broadly circular, wider than long, widest slightly beyond its mid-length; anteriormost margin almost straight, lacking a small median protuberance. Eye much smaller than spiracle. Spiracles large, slit-like, with low but slightly elevated rims. Nostrils large, round to oval and with distinct flaps. Mouth strongly arched; teeth small and sharp, in 38–66/38–61 rows, increasing in number during growth. Electric organs more clearly visible in ventral than dorsal view. Pelvic-fin outer margin rounded, but not particularly broad. Dorsal fins narrowly rounded at apex; second dorsal fin more slanted and always much smaller than first. First dorsal-fin insertion about over pelvic-fin insertions; second dorsal usually centred slightly forward of tail mid-length; distance between second dorsal and caudal fin larger than interdorsal distance. Tail short and stout based, tapering rapidly, length ~42% TL; caudal peduncle slender with low and short skin folds. Caudal fin large, with upper lobe similarly angled to lower lobe; posterior margin of fin straight to weakly concave.

COLOUR. Uniform chocolate brown, purplish or blackish brown on dorsal surface. Undersurface generally white, sometimes edges of disc and pelvic fins brownish; tail may have dark markings.



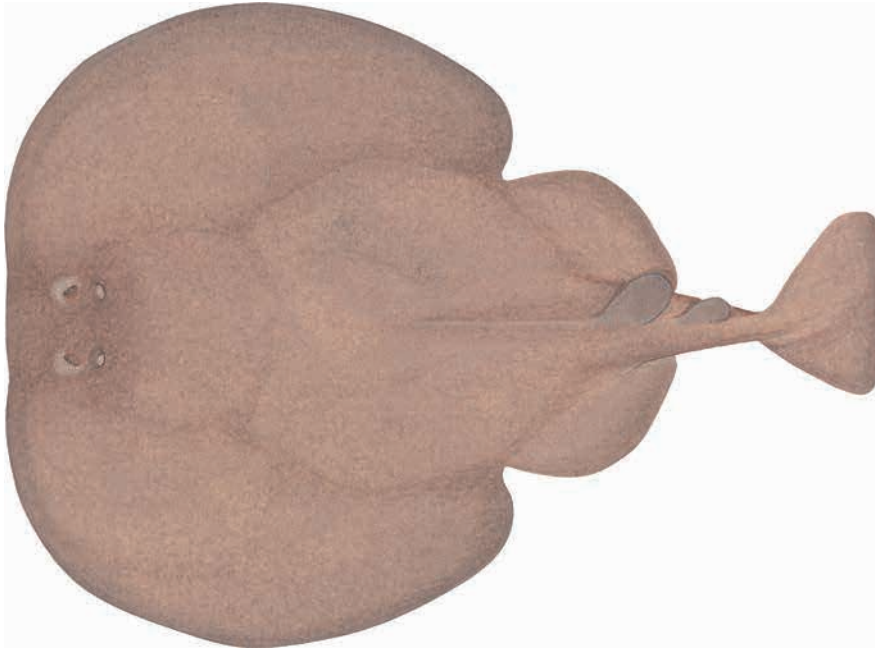
SIZE. Reaches at least 154 cm TL and at least 60 kg; males mature at 75–85 cm TL, females 125–135 cm TL.

HABITAT AND BIOLOGY. North-West Atlantic; mainly eastern USA, rarely south to Venezuela. Demersal, from shoreline to ~530 m depth. Life history largely unknown.

SIMILAR SPECIES. Previously thought to be identical to the Great Torpedo (18.4), but recognised as a distinct species based on new DNA analyses. However, these species have not been adequately distinguished on morphology and more research is needed. Its relationship with a south-western Atlantic species, the Argentine Torpedo (18.6), also needs further investigation.

ARGENTINE TORPEDO

18.6

Tetronarce puelcha (Lahille, 1926)

DD

IDENTIFICATION. Large torpedo ray with a distinctive brownish, greyish or blackish dorsal colour, without distinctive spots or dorsal markings, and smooth spiracles devoid of papillae. Disc broadly circular, slightly wider than long, width 65–73% TL, widest at its anterior third; anteriormost margin almost straight, sometimes with a median protuberance. Eyes slightly smaller than spiracles. Spiracles large and rounded to oval, with low but slightly elevated rims. Nostrils large, round and with distinct flaps. Mouth strongly arched; teeth small and sharp, in ~35–37 rows in adult males, slightly more in larger females. Electric organs more clearly visible in ventral than dorsal view. Pelvic-fin outer margin rounded, but not particularly broad. Dorsal fins rounded to oval at apex; second dorsal fin more slanted and much smaller than first. First dorsal situated almost entirely over posterior pelvic fins; second dorsal at tail mid-length; distance between second dorsal and caudal fin slightly larger than interdorsal distance. Tail rather short, length smaller than disc length; stout with a low lateral skin fold. Caudal fin large, with upper lobe slightly more angled than lower lobe; posterior margin of fin straight to rounded slightly.

COLOUR. Uniform greyish, dark brownish, black or even purplish brown on dorsal surfaces; creamy white ventrally.



Variation in dorsal colour is independent of preservation, as fresh specimens may vary from grey to brown or black.

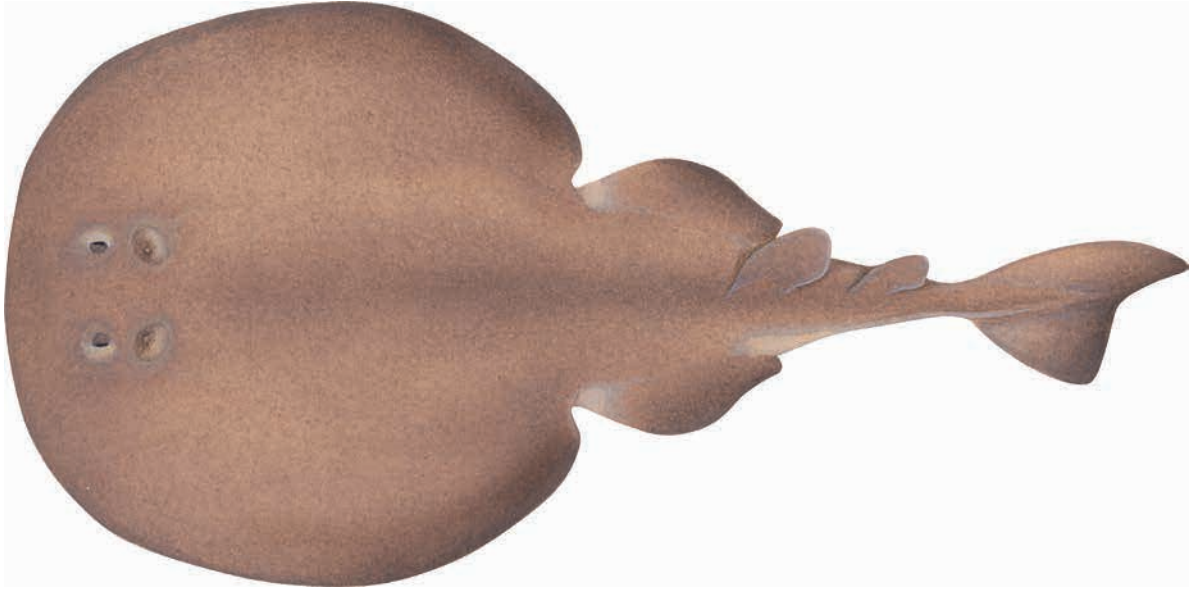
SIZE. Reaches 120 cm TL. Males mature at 62–67 cm TL; largest known specimens are females.

HABITAT AND BIOLOGY. South-West Atlantic; more common off southern Brazil than either Uruguay or Argentina. Feeds primarily on fishes. Little else known of its biology.

SIMILAR SPECIES. Resembles the larger Great Torpedo (18.4) in colour and overall appearance, but largely differs in tooth row counts and aspects of body proportions.

LONGTAIL TORPEDO

18.7

Tetronarce tokionis (Tanaka, 1908)

DD

IDENTIFICATION. Medium-sized to large torpedo ray with a dark dorsal surface, posterior margin of first dorsal fin behind pelvic-fin tip, strongly emarginate caudal fin in adults, and smooth spiracles devoid of papillae. Disc almost circular and thick, width about equal to length; anteriormost margin usually convex, without median protuberance. Orbits largely concealed, eyes small, about half of spiracle length. Spiracles moderately elongate, suboval, rims not elevated. Nostrils small, round, with distinct flaps. Mouth small, arched; teeth small and sharp, in up to 30 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins rather narrow, margins rounded to angular. First dorsal fin rounded to narrow; second dorsal fin considerably smaller than first and with a more narrowly rounded apex. First dorsal-fin posterior margin well behind pelvic-fin insertions; dorsal fins separated by about base-length of first dorsal; distance between second dorsal and caudal fin slightly larger than interdorsal distance. Tail rather elongate and narrow, with slender taper; caudal peduncle slender with low skin folds. Caudal fin rather large, lobes long and angular, height much less than its distance from first dorsal-fin origin; posterior margin distinctly concave.

COLOUR. Dark chocolate brown, blackish along hind margins of disc and pelvic fins; often with dark scar-like markings above; anterior base of pelvic fin and region beside eye and spiracle usually lighter. Undersurface uniformly white.



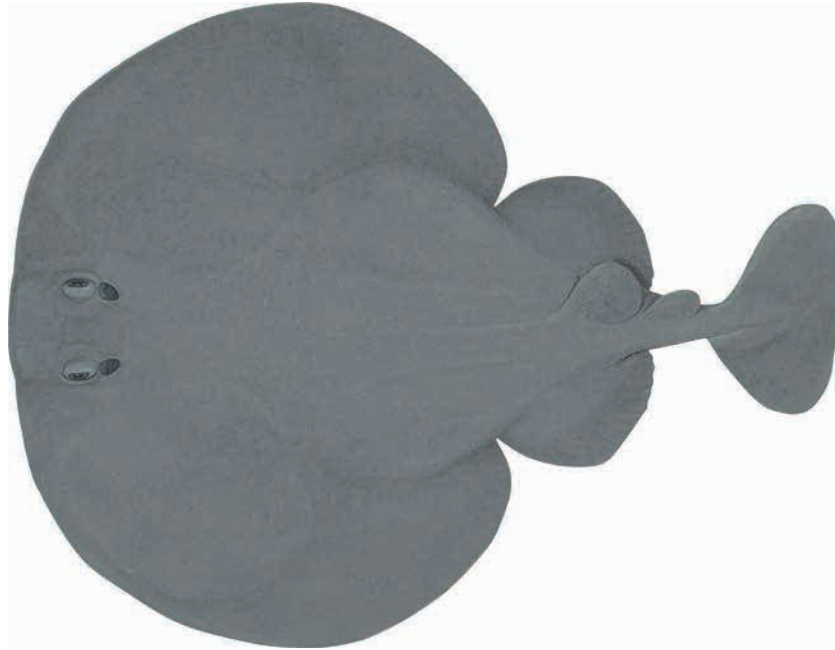
SIZE. Apparently reaches 114 cm TL but typically much smaller; males mature at ~68 cm TL; born at ~20 cm TL.

HABITAT AND BIOLOGY. North-West Pacific; Taiwan to Hokkaido (Japan). Demersal on continental slope at 220–1100 m depths. Caught occasionally as trawl bycatch, but life history unknown.

SIMILAR SPECIES. Some species of *Tetronarce* vary greatly in body shape. The co-occurring Taiwanese Torpedo (18.3) is thought to have a relatively broader disc, less angular caudal fin and shorter tail, but these species need closer scrutiny to confirm they are different species. Long-tailed forms occurring in other parts of the Indo-Pacific are presently considered variants of other species.

CHILEAN TORPEDO

18.8

Tetronarce tremens (de Buen, 1959)

DD

IDENTIFICATION. Medium-sized to large torpedo ray with a plain greyish upper surface, first dorsal fin usually completely over pelvic fin, caudal fin truncate or weakly convex, and smooth spiracles devoid of papillae. Disc broadly circular, wider than long, widest near its mid-length; very large specimens sometimes with laterally angular disc; snout anterior margin usually weakly convex, with median protuberance. Eyes small, clearly smaller than spiracle length. Spiracles large, oval, rims barely elevated. Nostrils small, oval, with distinct nasal flaps. Mouth small, strongly arched; teeth small and sharp. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins rather narrow and short, broadly rounded posteriorly. First dorsal fin broad, rounded at apex, its height up to 1.5 times its base length; second dorsal fin much smaller, more slanted, and with oval apex. First dorsal fin entirely over pelvic fins; dorsal fins usually separated by less than base length of first dorsal; distance between second dorsal and caudal fin much larger than interdorsal space. Tail rather short, broad based, shorter than disc length, tapering; caudal peduncle slender with low lateral skin folds. Caudal fin large, both lobes tall and broad, rounded at apices; posterior caudal margin straight to rounded slightly.

COLOUR. Uniform dark greyish to bluish brown above, often heavily scarred. Undersurface white, usually with narrow brownish black edges around disc and pelvic fins.



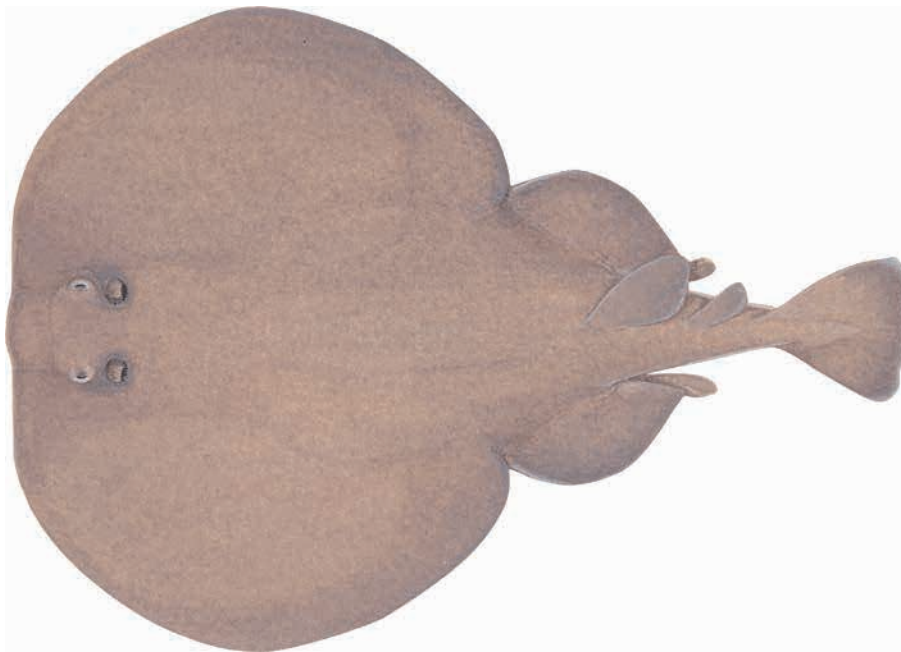
SIZE. To at least 90 cm TL; males usually mature by ~40 cm TL.

HABITAT AND BIOLOGY. Eastern Pacific; Costa Rica to Chile. Demersal and semi-pelagic inshore, and on mid-continental and insular slopes to at least 700 m depth. Feeds mostly on fishes. Otherwise, life history largely unknown.

SIMILAR SPECIES. Possibly very wide ranging in the Pacific but distribution not well defined. An unidentified specimen photographed deep underwater off Hawaii may be this species. Synonyms include *Tetronarce peruana* (Chirichigno), and *T. semipelagica* (Parin & Kotlyar) and *T. microdiscus* (Parin & Kotlyar).

ADEN TORPEDO

18.9

Torpedo adenensis Carvalho, Stehmann & Manilo, 2002

NT

IDENTIFICATION. Small to medium-sized torpedo ray, with a distinctive reddish or orange-brown dorsal colour, without distinctive spots or dorsal markings, and few knob-like spiracular papillae. Disc broad, slightly wider than long, widest at its anterior third; anterior margin almost straight with a median protuberance. Eyes slightly smaller than spiracles. Spiracles large and rounded, with slightly elevated rims; 3–8 knob-like, somewhat inconspicuous papillae on outer and posterior margins. Nostrils large, round, with well-defined nasal flaps. Mouth weakly arched; teeth small and sharp, in up to 47 upper and 39 lower rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins rounded posteriorly, but not exceedingly broad. Dorsal fins rounded at apices; second dorsal fin more slanted and much smaller than first. First dorsal situated almost entirely over posterior pelvic fins; second dorsal at mid-tail length as measured from ends of pelvic fins. Tail somewhat short and stout with a low skin fold. Upper lobe of caudal fin slightly more sloping than lower lobe; posterior margin of fin straight to rounded.

COLOUR. Reddish brown or orange-brown above, without distinctive markings; posterior margins of dorsal and caudal fins creamish. Ventrally creamy white, with orange or greyish pectoral and pelvic-fin margins; darker blotches sometimes present on ventral tail.



SIZE. Reaches ~41 cm TL; adult males reported at 39 cm TL and still adolescent at 28 cm TL.

HABITAT AND BIOLOGY. North-West Indian Ocean; Gulf of Aden. Poorly known, described from 5 specimens collected near the Yemen coastline at 25–140 m deep. No biological information exists.

SIMILAR SPECIES. No other *Torpedo* has a uniform orange-brown or reddish brown dorsal coloration. In the North-West Indian Ocean and associated gulfs, other species of *Torpedo* typically have ornate dorsal colour patterns consisting of spots, blotches and vermiculations.

CARIBBEAN TORPEDO

18.10

Torpedo andersoni Bullis, 1962

DD

IDENTIFICATION. Small torpedo ray with a tall first dorsal fin, and upper surface brownish with distinctive orange-brown spots. Disc broad, wider than long, widest at its anterior third; anterior margin relatively straight but with a slight median protuberance. Eyes slightly larger than spiracles, both moderately large, separated by a small space. Spiracles moderately large, rounded; 1 or very few discernible, inconspicuous papillae at posterior margin. Nostrils small, circular, with well-defined nasal flaps. Mouth arched, teeth in up to 16 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins rounded posteriorly, but not exceedingly broad. Dorsal fins rounded to oval at apex; second dorsal fin more slanted and much smaller than unusually large first dorsal. First dorsal fin situated entirely over posterior pelvic fins; second centred at about mid-tail length as measured from ends of pelvic fins. Tail very short and stout; lateral skin fold moderately developed. Upper lobe of caudal fin often more oblique than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to weakly convex.

COLOUR. Brown to yellowish brown above, with small, darker, orange-brown spots or blotches forming an irregular, mottled pattern on disc, tail, and pelvic, dorsal and caudal fins. Ventral surface creamy white.



SIZE. Reaches at least 22 cm TL (an adult male); smallest specimens ~15 cm TL.

HABITAT AND BIOLOGY. Western Central Atlantic; Florida Straits and off Nicaragua. Smallest torpedo ray, known from few specimens and a handful of sightings. Occupies a wide depth range, inshore to 10 m depth in coral-reef habitats as well as offshore to 230 m on the upper continental slope. Biology unknown.

SIMILAR SPECIES. This rarely seen species is the only torpedo ray in the Western Atlantic with spiracular papillae, mottled dorsal coloration and a small maximum size.

ROSETTE TORPEDO

18.11

Torpedo bauchotae Cadenat, Capapé & Desoutter, 1978

DD

IDENTIFICATION. Medium-sized torpedo ray, with an elaborate pattern of rosettes, ocelli and reticulations over dorsal disc and tail. Disc fleshy and very thick, circular; about as broad as long, widest slightly anterior to mid-disc; anterior margin broadly rounded to straight, with weak median protuberance; snout very short. Eyes bulging, separated from spiracles by a small space; orbit slightly larger than spiracles, size similar to interspiracular distance. Spiracles rounded, with 9–11 small tentacles or knob-like papillae. Nostrils with well-defined nasal flaps. Mouth arched, teeth in up to 24 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins broad, rounded posteriorly. Dorsal fins rounded to oval at apex; first dorsal fin broad, second dorsal more slender; first dorsal slightly taller than second; second dorsal with more slanted anterior margin. First dorsal fin situated entirely over pelvic fins; dorsal fins separated by shorter than base length of first; distance between second dorsal and caudal fin larger than interdorsal distance. Tail very short and stout, lateral skin fold moderately developed. Upper lobe of caudal fin larger and slightly more sloping than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to rounded slightly.

COLOUR. Brownish above, densely covered on disc and tail with numerous darker brown to purplish rosettes formed from clusters of small dark spots; bands of smaller



whitish median spots present on outer disc and fins; clusters defined by an elaborate reticulate pattern. Ventral surface creamy white.

SIZE. Reaches ~60 cm TL.

HABITAT AND BIOLOGY. Eastern Central Atlantic; Senegal to Angola. Uncommon, known from few specimens. Occurs inshore in shallow water, also deeper on continental shelf to 60 m deep.

SIMILAR SPECIES. Somewhat similar in shape to the Marbled Torpedo (18.14), but easily distinguished from it and all other torpedo rays by its intricate colour pattern, and disc and fin proportions.

BLACKSPOTTED TORPEDO

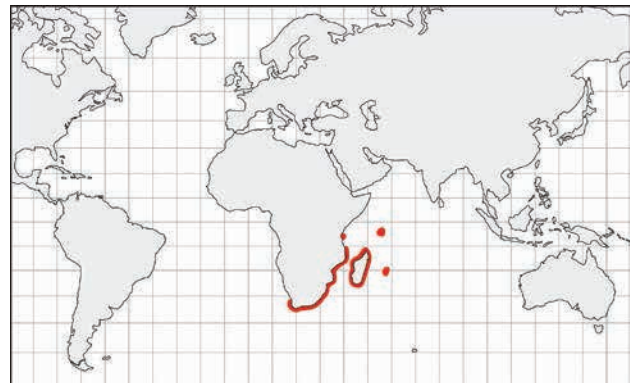
18.12

Torpedo fuscomaculata Peters, 1855

DD

IDENTIFICATION. Medium-sized torpedo ray with a highly variable but distinctive marbled colour pattern. Disc fleshy and thick, circular; about as broad as long, widest slightly anterior to mid-disc; anterior margin straight with a slight median protuberance; snout very short. Eyes small, slightly bulging, eyes and spiracles separated by a small space, and eyes closer to spiracles than to snout anterior margin; orbit smaller than interspiracular space, slightly larger than spiracles. Spiracles rounded, with up to 7 short papillae; posterior papilla longest. Nostrils with well-defined nasal flaps. Mouth arched, teeth in up to 50 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins broad, rounded posteriorly. Dorsal fins rounded to oval at apex. First dorsal broad, slightly taller than second; second dorsal more slender than first dorsal and more slanted anteriorly. First dorsal situated entirely over pelvic fins. Tail very short and stout; lateral skin fold moderately developed. Upper lobe of caudal fin larger and slightly more sloping than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to rounded slightly.

COLOUR. Highly variable, greyish, yellowish or reddish brown above, usually with numerous darker spots and blotches each smaller than interorbital space in size; sometimes with lighter outer rings forming ocelli; blotches may form irregular reticulate pattern; margins of dorsal and caudal fins sometimes lightly coloured. Undersurface creamy white.



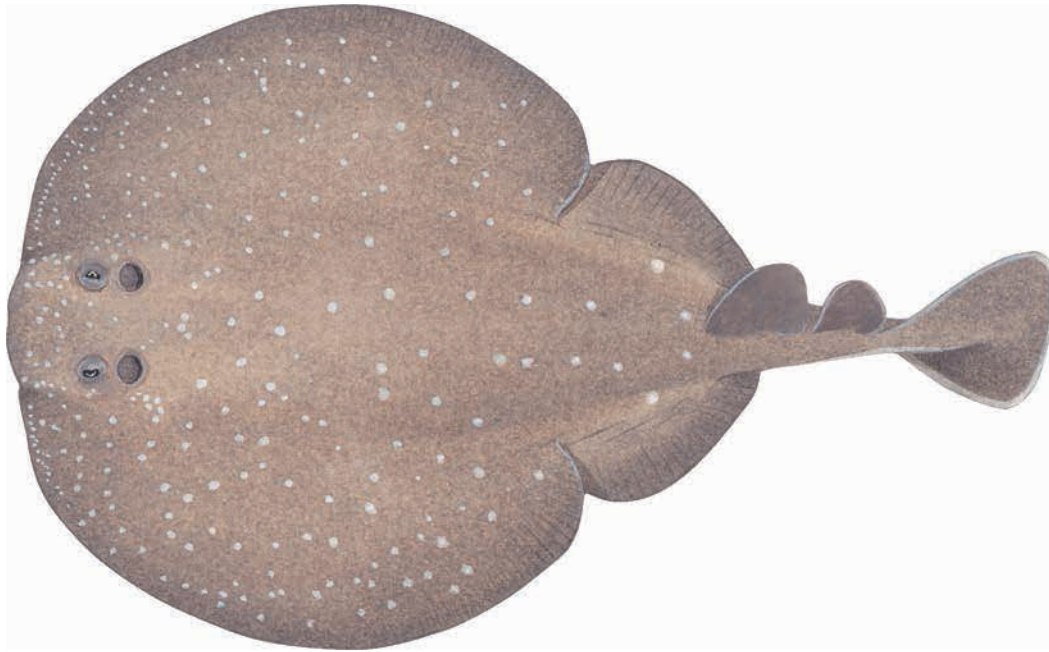
SIZE. Reaches ~65 cm TL.

HABITAT AND BIOLOGY. South-West Indian Ocean; Tanzania to South Africa, including offshore islands. Widespread in continental and insular habitats at depths to 440 m, but commonly shallower than 50 m. Enters estuaries in South Africa during periods of high salinity. Young reported to be born in the summer. Feeds on a variety of fishes and cuttlefishes. Frequent accidental catch of anglers.

SIMILAR SPECIES. Distinct from other torpedo rays of the Western Indian Ocean in colour pattern. However, coloration is highly variable between populations and regional forms may form part of a species complex.

WEST AFRICAN TORPEDO

18.13

Torpedo mackayana Metzelaar, 1919

DD

IDENTIFICATION. Small to medium-sized torpedo ray, with a distinctive rusty brown upper surface with numerous small, whitish spots, and lacking spiracular papillae. Disc rather fleshy and thick, circular, slightly broader than long, widest slightly anterior to mid-disc; anterior margin almost straight, sometimes with a small median bulge at tip; snout rather short. Eyes not bulging prominently, eyes and spiracles well separated; orbit about same size as spiracles but smaller than interspiracular distance. Spiracles rounded, without papillae of any kind. Nostrils with well-defined nasal flaps. Mouth arched, teeth in up to 38 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins not excessively broad, with more or less straight outer margins. First dorsal usually with a broadly oval to rounded apex; situated well posteriorly, over posterior pelvic fins. Second dorsal more slender, slightly smaller than first dorsal, more slanted anteriorly, and with a slightly more oval apex. Tail elongate and moderately stout; lateral skin fold only moderately developed. Upper lobe of caudal fin slightly larger and more sloping than lower lobe; both upper and lower apices rounded to oval; lower lobe curved; posterior margin of fin straight to rounded slightly.

COLOUR. Greyish brown to rusty brown above, with small, scattered white spots sometimes forming small ocelli; spots vary from very numerous and closely packed to sparse,



and from very small to about equal to eye diameter in size. Ventral surface creamy white.

SIZE. Reaches 40 cm TL; males mature at ~32 cm TL, females to ~35 cm TL.

HABITAT AND BIOLOGY. Eastern Central Atlantic; Senegal to Angola. Continental shelf in shallow water, 15–50 m deep. Presumably eats small invertebrates and fishes. Biology largely unknown.

SIMILAR SPECIES. A distinctive species, being the only member of the genus *Torpedo* with smooth-edged spiracles.

MARBLED TORPEDO

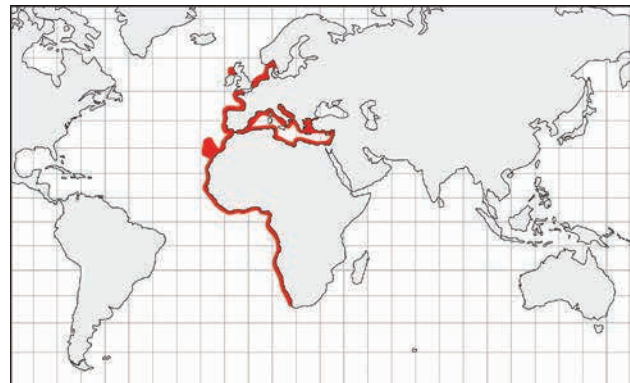
18.14

Torpedo marmorata Risso, 1810

DD

IDENTIFICATION. Medium-sized to large torpedo ray, with a distinctive light reticular coloration, and usually with long spiracular papillae. Disc fleshy and very thick, circular, about as broad as long, widest at about mid-disc; anterior margin almost straight, sometimes with a small median bulge; snout short. Eyes bulging, eyes and spiracles well separated; orbit slightly larger than spiracles, size greater than interspiracular distance. Spiracles rounded, usually with 6–9 tentacle-like papillae that extend to centre of spiracular opening. Nostrils with well-defined nasal flaps. Mouth arched, teeth in up to 26 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins extending posteriorly in a more or less straight fashion, rounded posteriorly. First dorsal usually with a broadly rounded apex, situated entirely over pelvic fins. Second dorsal more slender, not as tall as first dorsal, more slanted anteriorly, and with an oval apex. Tail short and moderately stout; lateral skin fold developed. Upper lobe of caudal fin slightly larger and more sloping than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to rounded slightly.

COLOUR. Dark brown to greyish brown above, with a complex and variable pattern of paler blotches or fine reticulations; sometimes with dense pattern of brownish black and white spots and blotches. Ventral surface creamy white.



SIZE. Reaches 100 cm TL, but more usually to 60 cm TL. Males mature at ~30 cm TL, females at ~40 cm TL, born at 10–14 cm TL.

HABITAT AND BIOLOGY. Eastern Atlantic Ocean and Mediterranean Sea; widespread. Benthic on continental shelf and slope from nearshore to at least 370 m deep. Produces large litters of 2–32 pups after a 10-month gestation. Feeds on benthic invertebrates and fishes. Its electric shock is powerful.

SIMILAR SPECIES. Shares with the Rosette Torpedo (18.11) a complex pattern of pale spots and blotches but in *T. marmorata* these markings are never organised to form distinct rosettes.

PANTHER TORPEDO

18.15

Torpedo panthera von Olfers, 1831

DD

IDENTIFICATION. Medium-sized torpedo ray, with distinctive pattern of small white spots, not clustered and smaller than eye, over a brown to reddish brown upper surface, and usually with a long posterior spiracular papilla. Disc fleshy, broadly circular, slightly wider than long, widest near mid-disc; anterior margin straight, median bulge usually inconspicuous; snout short. Eyes moderately sized, eyes and spiracles separated by a considerable space; orbit smaller than interspiracular distance, about equal to spiracle in size. Spiracles rounded, usually with 7 short papillae that do not extend to centre of spiracular opening; lateral papillae small, posterior papilla elongate. Mouth arched. Nostrils with well-defined nasal flaps. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins broad and not noticeably elongate, rounded posteriorly. First dorsal with very broadly rounded apex, situated entirely over pelvic fins. Second dorsal fin smaller than first dorsal, more slender and slanted anteriorly, with an oval apex; second dorsal originates over pelvic-fin posterior tip. Distance between second dorsal and caudal fin about equal to distance between dorsal fins. Tail short and moderately stout; skin folds rather well developed. Upper lobe of caudal fin larger and more sloping than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to rounded.

COLOUR. Pale brownish to reddish brown above, overlain with a complex pattern of irregular, white, diffuse-edged



markings; white markings not clustered, smaller than eye. Ventral surface creamy white.

SIZE. Attains 60 cm TL (reports to 100 cm TL need verifying); males mature by 28 cm TL.

HABITAT AND BIOLOGY. Northern Indian Ocean; Red Sea to eastern India. Benthic, mainly in shallow water on continental shelf, but reported from 350 m depth in the Gulf of Aqaba. Possibly more widespread in the region. Lives on coral reefs, as well as over sandy to rocky bottoms. Feeds on invertebrates and small reef fishes.

SIMILAR SPECIES. Often confused with the Persian Gulf Torpedo (18.16), but distinguished by colour pattern.

PERSIAN GULF TORPEDO

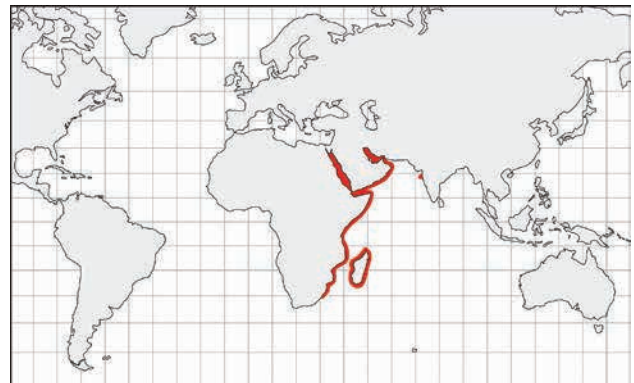
18.16

Torpedo sinuspersici von Olfers, 1831

DD

IDENTIFICATION. Medium-sized to large torpedo ray, with an elaborate reticulate dorsal coloration. Disc fleshy, broadly circular, slightly wider than long, widest at about mid-disc; anterior margin almost straight with small median bulge at tip. Eyes moderately sized, eyes and spiracles separated by considerable space; orbit smaller than interspiracular distance, about equal to spiracle in size. Spiracles rounded, usually with 9–10 rather short, subtriangular papillae that do not extend to centre of spiracle opening; lateral papillae smaller, posterior papilla more elongate. Mouth arched. Nostrils with large nasal flaps. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins broad and not very elongate, rounded posteriorly. First dorsal with very broadly rounded apex, not as tall as caudal fin, situated entirely over pelvic fins. Second dorsal fin smaller than first dorsal, more slender, and anteriorly slanted with oval apex; second dorsal originates over pelvic-fin posterior tip. Distance between second dorsal and caudal fin usually larger than between dorsal fins. Tail short and moderately stout; skin folds rather well developed. Upper lobe of caudal fin larger and more sloping than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to rounded.

COLOUR. Dorsally highly variable, adults usually brownish or blackish brown, covered with highly elaborate pale reticulate pattern (formed by fused spots); young specimens



sometimes sparsely covered with white spots. Ventrally mostly creamy white.

SIZE. Attains 80 cm TL, but reported to ~130 cm TL; males reach adulthood smaller than 30 cm TL.

HABITAT AND BIOLOGY. Western Indian Ocean; South Africa to Persian Gulf. Benthic on continental shelf to 150 m depth. Occurs on coral reefs, including sandy and rocky bottoms. Feeds on benthic invertebrates and fishes.

SIMILAR SPECIES. Highly variable and confused with the Panther Torpedo (18.15). Their colorations are distinct with the Persian Gulf Torpedo having a more reticulate pattern. Possibly a species complex.

RED SEA TORPEDO

18.17

Torpedo suessi Steindachner, 1898

DD

IDENTIFICATION. Small torpedo ray, adults with a slender reticulate pattern and large circular spots dorsally on disc. Disc fleshy, broadly circular, slightly wider than long, widest at near mid-disc; anterior margin almost straight with a very small median bulge at tip. Eyes moderately large, almost equally distant from anterior snout margin and spiracles; orbit smaller than interspiracular distance, slightly larger than spiracles. Spiracles rounded, usually with a few short lateral papillae (not extending to centre of spiracular opening); posterior and central papilla elongate. Mouth arched. Nostrils with well-defined nasal flaps. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins rather broad, not very elongate, rounded posteriorly. First dorsal with a very broadly rounded apex, similar to caudal fin in height, situated entirely over pelvic fins. Second dorsal fin smaller than first, more slender and anteriorly slanted, with an oval apex; second dorsal originates over pelvic-fin posterior tip. Tail short and moderately stout; skin folds developed. Upper lobe of caudal fin larger and more sloping than lower lobe; both upper and lower apices rounded to oval; posterior margin of fin straight to rounded.

COLOUR. Brownish to light reddish brown above on disc with a darker reticulate pattern surrounding 8 large (width exceeding interorbital space), irregular, dark brown spots with lighter margins. Ventral surface creamy white.



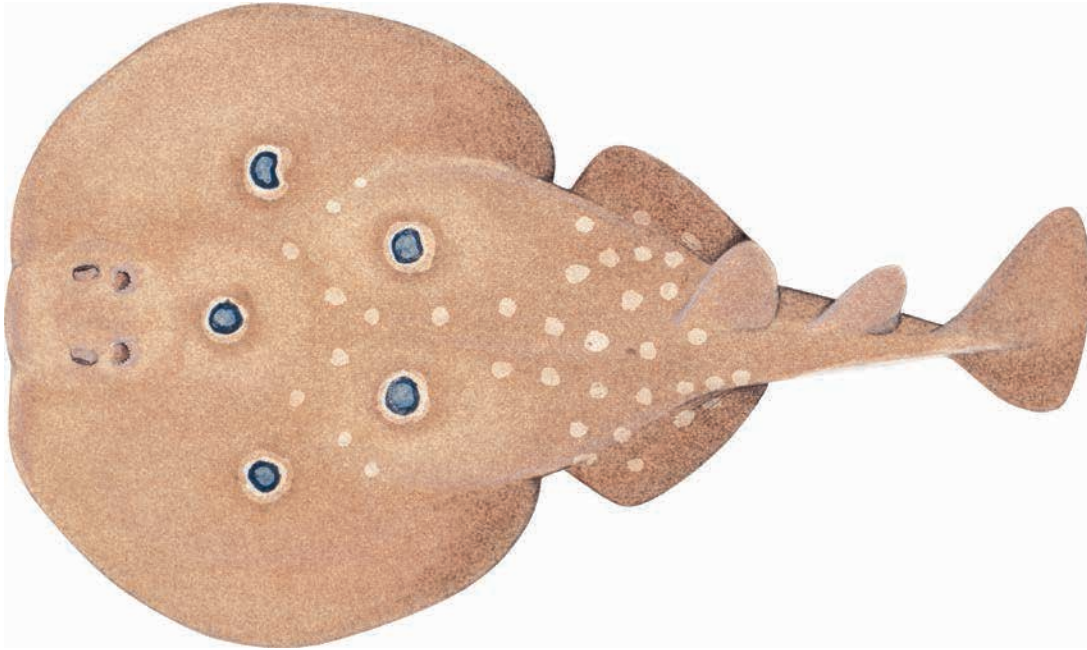
SIZE. Attains at least 30 cm TL, but probably reaches ~40 cm TL; males reach adulthood before 23 cm TL.

HABITAT AND BIOLOGY. North-West Indian Ocean; Red Sea, off Yemen and possibly Sudan. Poorly understood, nothing about its biology known.

SIMILAR SPECIES. Most similar to Panther Torpedo (18.15) in body proportions and overall shape, these species differ mostly in colour pattern. The Red Sea Torpedo has large spots but these do not form distinct ocelli.

OCELLATE TORPEDO

18.18

Torpedo torpedo (Linnaeus, 1758)

DD

IDENTIFICATION. Medium-sized torpedo ray, with a distinctive dorsal colour with bluish-centred ocelli with slender black ring and broad whitish outer ring, as well as small white spots. Disc fleshy and thick, circular, slightly broader than long, widest slightly anterior to mid-disc; anterior margin broadly rounded to straight, with a median protuberance. Eyes slightly bulging, slightly larger or about equal to spiracles; eyes and spiracles separated by a small space. Spiracles rounded, with 8–10 small triangular papillae. Mouth arched; nostrils with moderate nasal flaps; teeth in up to 34 rows. Electric organs more clearly visible in ventral than dorsal view. Pelvic fins somewhat slender, elongate, and rounded posteriorly. First dorsal fin broad with rounded apex; second dorsal more slender, with oval apex; first dorsal more broad and slightly taller than second; second dorsal has more slanted anterior margin. First dorsal situated entirely over pelvic fins. Tail somewhat slender and long posterior to pelvic fins; lateral skin fold moderately developed. Upper lobe of caudal fin larger and slightly more sloping than lower lobe; upper apex oval, lower apex more broad, rounded; posterior margin of caudal fin usually straight or weakly rounded.

COLOUR. Pale brown, tan or reddish brown above, with 2–7 (usually 5, sometimes none) symmetrically positioned pectoral ocelli; ocelli with blue centres surrounded by a darker ring, and a lighter, broader, outer ring; usually with



smaller white spots scattered on disc and pelvic fins. Ventral surface off-white to dusky grey.

SIZE. Reaches 60 cm TL; born at ~9 cm TL.

HABITAT AND BIOLOGY. Eastern Atlantic; Bay of Biscay to Angola, including the Mediterranean Sea. Benthic in shallow waters on continental shelf to ~70 m deep. Feeds on benthic invertebrates and smaller fishes. Litters often large (up to 21 pups).

SIMILAR SPECIES. Colour pattern is unique within the family. Occasionally lacks ocelli, but this torpedo is easily identified by a reddish or brownish dorsal coloration, long tail, and unique fin proportions.

de Carvalho M.R., Last P.R., Séret Bernard.

Torpedo rays : family Torpedinidae.

In : Last P.R. (ed.), White W.T. (ed.), de Carvalho M.R. (ed.), Séret Bernard (ed.), Stehmann M.F.W. (ed.), Naylor G.J.P. (ed.), Marshall L. (ill.). Rays of the world.

Clayton South : CSIRO, 2016, p. 185-203.

ISBN 978-0-643-10913-1