SHARKS AND RAYS of PAPUA NEW GUINEA

Identification Key: Families and Genera

Key to families and genera

1. A single external gill opening on each side of head..... Chimaeridae (ghost sharks)

   Lateral line with tight undulations..... ..... *Chimaera* (fig. 1; p. 294)

   Lateral line nearly straight to slightly undulating ..... *Hydrolagus* (fig. 2; p. 296)

   5 or 6 pairs of gill openings 2

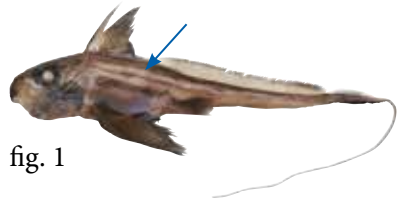


fig. 1

2. Snout saw-like, flattened and armed with lateral teeth ..... Pristidae (sawfishes)

   Lower lobe of caudal fin relatively large, more than half length of upper lobe ..... *Anoxypristis* (fig. 3; p. 192)

   Lower lobe of caudal fin small, less than half length of upper lobe ....*Pristis* (fig. 4; p. 194)

   Snout not saw-like, no rostral teeth 3

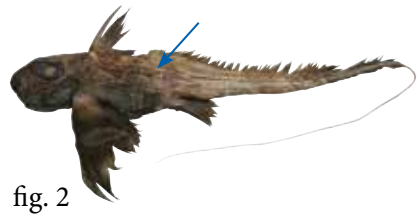


fig. 2

3. Gill openings on sides of head 4

   Gill openings on undersurface of head 24


fig. 3

4. A single dorsal fin; 6 or 7 gill openings on each side of head .... Hexanchidae (sixgill sharks) fig. 5; p. 34

   Two dorsal fins; 5 gill openings on each side of head 5


fig. 4

5. Anal fin absent 6

   Anal fin present, sometimes small 9

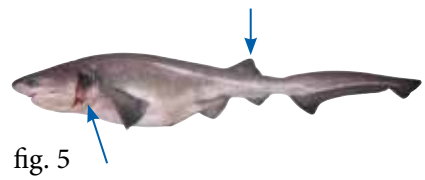


fig. 5

6. Caudal fin without a subterminal notch; teeth similar in shape in both jaws .... Squalidae (dogfishes) fig. 6; p. 36

   Caudal fin with a subterminal notch (usually obvious); teeth in upper jaw differing in shape to those in lower jaw 7


fig. 6

7. Ventral surface, sides and caudal fin with dark (luminescent) markings; upper teeth with lateral cusplets .... Etmopteridae (lanternsharks) fig. 7; p. 52

   No dark luminescent markings on ventral surface, sides and caudal fin; upper teeth with a prominent cusp but no lateral cusplets 8


fig. 7

8. Dorsal-fin spines prominent; lower teeth short, broad and oblique; head not conical ... . Centrophoridae (gulper sharks)

   Preoral snout very long, much longer than distance from mouth to pectoral-fin origin ..... *Deania* (fig. 8; p. 50)

   Preoral snout shorter than distance from mouth to pectoral-fin origin ..... *Centrophorus* (fig. 9; p. 48)


fig. 8

   Dorsal-fin spines absent; lower teeth with tall, triangular cusps; head conical .... Dalatiidae (kitefin sharks) fig. 10; p. 58


fig. 9


fig. 10

9. Head laterally expanded, hammer-shaped .... Sphyrnidae (hammerhead sharks)

   Head very broad, narrow and wing-like; width of head about half of total length ..... *Eusphyra* (fig. 11; p. 184)

   Head not as broad or wing-like; width of head less than 40% of total length ..... *Sphyrna* (fig. 12; p. 186)


fig. 11


fig. 12

   Head not hammer-shaped 10

10. Upper caudal-fin lobe very long; equal to or more than half total length; body not spotted or banded ..... Alopiidae (thresher sharks) fig. 13; p. 84


fig. 13

    Upper caudal-fin lobe much less than half total length (caudal fin also long in *Stegostoma*, but body spotted and/or banded) 11

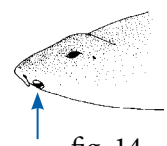


fig. 14

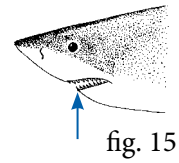


fig. 15

11. Whole mouth forward of front margin of eye (fig. 14) 12

    Mouth partly beneath or behind front margin of eye (fig. 15) 16

12. Mouth very broad and at front of head (terminal); caudal fin with a well-developed lower lobe ....Rhincodontidae (whale sharks)
    fig. 16; p. 82

    Mouth narrower and not at front of head (subterminal); caudal fin without an obvious lower lobe 7

13. Outer margin of nostril with a fleshy lobe and groove (fig. 17) 14

    Outer margin of nostril without a fleshy lobe or groove (fig. 18) 15

14. Caudal fin very long, almost equal to trunk length; strong ridges present on side of body ..... Stegostomatidae (zebra sharks)
    fig. 19; p. 80

    Caudal fin shorter, less than half trunk length; no ridges on sides of body ....Ginglymostomatidae (nurse sharks)
    fig. 20; p. 78

15. Body strongly depressed anteriorly; skin flaps along side of head behind nostrils ....Orectolobidae (wobbegongs)

    Dermal lobes extensively branched, forming a dense fringe around front of head .... *Eucrossorhinus* (fig. 21; p. 60)

    Dermal lobes mostly simple, not forming a dense fringe .....*Orectolobus* (fig. 22; p. 62)

    Head and body cylindrical, not depressed; no skin flaps along side of head ....Hemiscylliidae (longtailed carpetsharks)

    Nostrils subterminal on snout; no black ocellus behind fifth gill slit .... *Chiloscyllium* (fig. 23; p. 68)


fig. 16

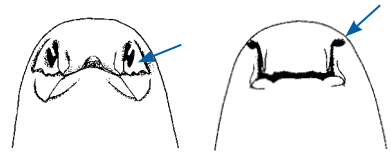


fig. 17 fig. 18

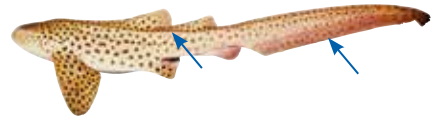


fig. 19


fig. 20


fig. 21


fig. 22


fig. 23


fig. 24

Nostrils almost terminal on snout; a large black or brown ocellus behind fifth gill slit .....*Hemiscyllium* (fig. 24; p. 72)

16. Caudal fin upper and lower lobes of almost equal length; a strong keel on either side of caudal peduncle..... .....Lamnidae (mackerel sharks)
fig. 25; p. 88

Caudal fin upper lobe much longer than lower lobe; no, or only a low, keel on each side of caudal peduncle 17


fig. 25

17. Eyes very large, more than half greatest height of snout; gill openings extending onto dorsal surface of head ....Pseudocarchariidae (crocodile sharks)
fig. 26; p. 94

Eyes smaller, less than half greatest height of snout; gill openings not extending onto dorsal surface of head 12


fig. 26

18. Eyelid fixed, not capable of closing over eye . ..... Odontaspididae (sandtiger sharks)
fig. 27; p. 92

Eyelid nictitating (capable of closing over eye) 19


fig. 27

19. First dorsal-fin origin well behind pelvic-fin origin..... 20

First dorsal-fin origin well in front of pelvic-fin origin 21

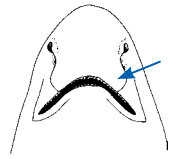


fig. 28

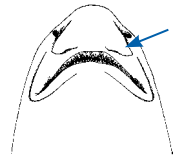


fig. 29

20. Supraorbital crests present on the cranium; a distinct colour pattern present .... Scyliorhinidae (catsharks)

Anterior nasal flaps greatly expanded, reaching mouth (fig. 28); dorsal fins similar in size..... *Atelomycterus* (fig. 30; p. 96)

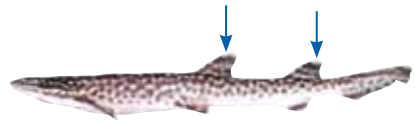


fig. 30

Anterior nasal flaps much shorter, not reaching mouth (fig. 29); first dorsal fin much larger than second ....*Cephaloscyllium* (fig. 31; p. 100)

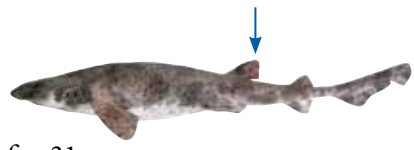


fig. 31

No supraorbital crests present; colour typically plain, sometimes with faint blotches or saddles .... Pentanchidae (deepwater catsharks)

a. Upper labial furrows very long, more than 3 times spiracle diameter, usually extending to front of eye (fig. 32)..... ..... *Apristurus* (fig. 34; p. 102)

Upper labial furrows much shorter, never extending to front of eye (fig. 33) ..... b

b. Body dark brownish to brownish grey, without saddle-like markings ....*Parmaturus* (fig. 35; p. 112)

Body greyish with distinct dark saddles present on sides and on caudal fin .... *Galeus* (fig. 36; p. 110)

21. Precaudal pits absent; leading edge of upper lobe of caudal fin smooth .... Triakidae (hound sharks)

a. First dorsal fin very long, its base about as long as caudal fin ....*Gogolia* (fig. 37; p. 116)

First dorsal fin much shorter .....b

b. Origin of first dorsal fin over anterior half of pectoral inner margins; dorsal fins black-tipped ..... *Iago* (fig. 38; p. 120)

Origin of first dorsal fin about over pectoral inner free rear tips; dorsal fins white-tipped ..... *Hemitriakis* (fig. 39; p. 118)

Precaudal pits present; leading edge of upper lobe of caudal fin typically rippled..... 22

22. Caudal peduncle with lateral keels; upper labial furrows very long, reaching forward to front of eyes (fig. 40); body with a series of vertical dark bars on sides ....Galeocerdidae (tiger sharks) fig. 41; p. 182

Caudal peduncle without lateral keels (weak keels present in *Prionace*); upper labial furrows rudimentary, or short to moderately long, but never reaching forward to front of eyes; body without vertical bars on sides .. 23

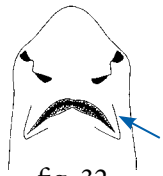


fig. 32

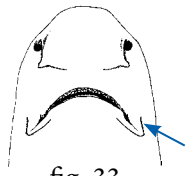


fig. 33


fig. 34


fig. 35


fig. 36

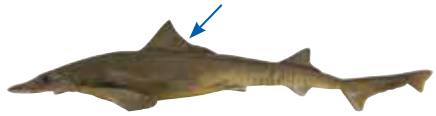


fig. 37


fig. 38


fig. 39


fig. 40


fig. 41

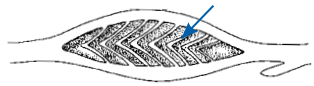


fig. 42

23. Small spiracles present; intestine with spiral valves (fig. 42) ..... Hemigaleidae (weasel sharks)

    Teeth noticeably protruding from mouth when closed; upper teeth narrow and slender; fins strongly falcate ..... *Hemipristis* (fig. 43; p. 124)

    Teeth not protruding from mouth when closed; upper teeth broad and short; fins only moderately falcate ..... *Hemigaleus* (fig. 44; p. 122)

    Spiracles absent; intestine with a scroll valve (fig. 45)..... Carcharhinidae (whaler sharks)

    a. Second dorsal fin half or greater than half height of first dorsal fin ..... b

       Second dorsal fin less than half height of first dorsal fin ..... d

    b. First dorsal and upper caudal fin with distinct white tips; teeth with a single cusp and one or more large lateral cusplets (fig. 46) ..... *Triaenodon* (fig. 47; p. 180)

       First dorsal and upper caudal fin without white tips; teeth with a single cusp, no lateral cusplets c

    c. Second dorsal fin almost same height as first dorsal fin; upper precaudal pit deep and crescent-shaped ..... *Negaprion* (fig. 48; p. 170)

       Second dorsal fin about half height of first dorsal fin; upper precaudal pit a shallow, longitudinal depression ..... *Glyphis* (fig. 49; p. 164)

    d. Second dorsal-fin origin well behind anal-fin origin (usually over anal-fin insertion, fig. 50); posterior margin of anal fin shallowly concave (fig. 50); ridges in front of anal fin very long (subequal to anal-fin base length) ..... e

       Second dorsal-fin origin usually about level with anal-fin origin (sometimes more posterior but always well anterior of anal-fin insertion, fig. 51); posterior margin of anal fin deeply concave or notched (fig. 51); ridges in front of anal fin short (about half anal-fin base or less) ..... f


fig. 43


fig. 44

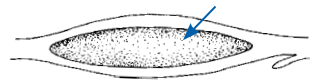
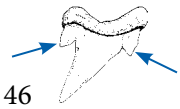


fig. 45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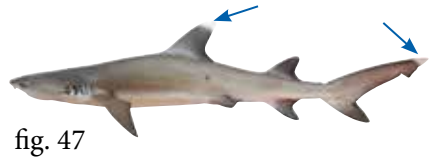
fig. 47

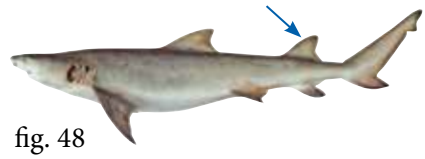
fig. 48


fig. 49

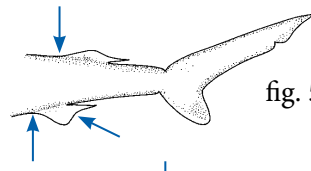
fig. 50

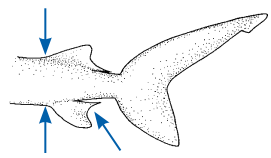
fig. 51


fig. 52

e. Notch present at posterior edge of eye (fig. 52); first dorsal-fin origin well behind adpressed pectoral-fin free rear tips..... ..... *Loxodon* (fig. 53; p. 168)

Posterior edge of eye without a notch; first dorsal-fin origin over or only just behind adpressed pectoral-fin free rear tips..... ..... *Rhizoprionodon* (fig. 54; p. 174)

f. First dorsal-fin base much closer to pelvic- than pectoral-fin bases; colour brilliant dark blue above; a low, weak keel present on each side of caudal peduncle..... ..... *Prionace* (fig. 55; p. 172)

First dorsal-fin base centred between pectoral- and pelvic-fin bases; colour light to dark greyish, greyish brown or brownish above; no keels on caudal peduncle .... *Carcharhinus* (fig. 56; p. 126)

fig. 53

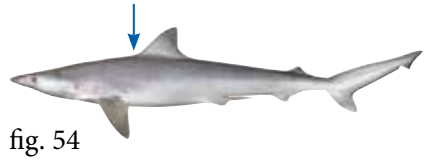

fig. 54

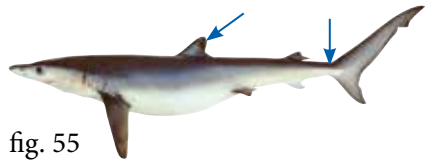

fig. 55

fig. 56

24. Pelvic fin divided into two lobes (fig. 57) . 25

Pelvic fin with a single lobe (fig. 58) 27

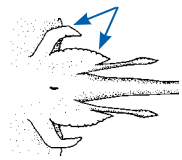

fig. 57

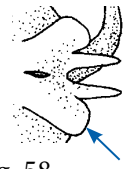

fig. 58

25. Dorsal surface entirely smooth; preorbital snout more than 8 times eye diameter; tail very short, thin and filamentous .... Anacanthobatidae (legskates) fig. 59; p. 220

Dorsal surface with thorns or fine denticles; preorbital snout much less than 8 times eye diameter; tail longer and slender, but not filamentous 26

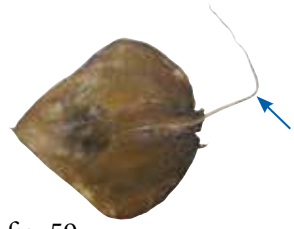

fig. 59

26. Snout soft, with rostral cartilage thin and flexible ... Arhynchobatidae (softnose skates) fig. 60; p. 216

Snout firm, with a stiff rostral cartilage..... .....Rajidae (hardnose skates) fig. 61; p. 218

fig. 60

27. Two prominent dorsal fins 28

No dorsal fins or a single dorsal fin 32

fig. 61

28. Body soft, flabby and smooth; electric organs present 29

Body firm to the touch and rough 30

29. Disc large relative to tail; first dorsal fin much larger than second .... Torpedinidae (torpedo rays)
fig. 62; p. 214

Disc much smaller relative to tail; dorsal fins similar in size ..... Narcinidae (numbfishes)
fig. 63; p. 212

30. Caudal fin with a well-developed ventral lobe; pectoral and pelvic fins not touching.... ..... Rhinidae (wedgefishes)

Head triangular; upper disc with small thorns ..... *Rhynchobatus* (fig. 64; p. 202)

Head broadly rounded; upper disc with ridges lined with large thorns ....*Rhina* (fig. 65; p. 200)

Caudal fin without a well-defined lower lobe; pectoral and pelvic fins touching or overlapping 31

31. Nostrils long and narrow, anterior nasal opening rectangular, very large (fig. 66) .... Glaucostegidae (giant guitarfishes)
fig. 68; p. 210

Nostrils not greatly elongate, anterior nasal aperture circular or oval, relatively smaller (fig. 67) ..... Rhinobatidae (guitarfishes)
fig. 69; p. 206

32. Anterior part of head extended beyond disc (fig. 70); eyes located laterally on side of head (fig. 70) 33

Anterior part of head not extended beyond disc (fig. 71); eyes located dorsally and well inward from disc margin (fig. 71) 36

33. A pair of long, paddle-like flaps (cephalic lobes) extending forward from sides of head; teeth minute, in many rows .... Mobulidae (devilrays)
fig. 72; p. 284

No cephalic lobes, instead with a single, fleshy rostral lobe or a pair of broadly rounded lobes; teeth much larger 34

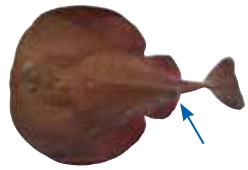
fig. 62


fig. 63


fig. 64


fig. 65


fig. 66


fig. 67


fig. 68


fig. 69

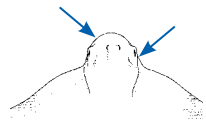
fig. 70

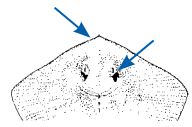
fig. 71


fig. 72

34. Margin of rostral lobe with a deep central notch forming two rounded lobes .... Rhinopteridae (cownose rays)
fig. 73; p. 282

Margin of rostral lobe rounded, not bilobed 35


fig. 73

35. Margin of nasal curtain deeply notched (fig. 74); teeth in both jaws in a single row ... . Aetobatidae (pelagic eagle rays)
fig. 76; p. 280

Margin of nasal curtain straight or slightly undulated to fringed (fig. 75); teeth in both jaws usually in 7 rows ....Myliobatidae (eagle rays)
fig. 77; p. 276

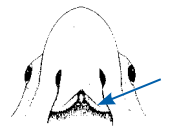
fig. 74

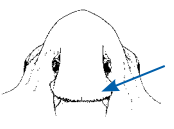
fig. 75

36. Six pairs of gill openings on ventral surface; spiracles widely separated from eyes ..... Hexatrygonidae (sixgill stingrays)
fig. 78; p. 222

Five pairs of gill openings on ventral surface; spiracles close to eyes..... 37


fig. 76


fig. 77

37. Disc very broad (more than 1.5 times wider than long); tail very short and filamentous ... . Gymnuridae (butterfly rays)
fig. 79; p. 224

Disc width less than 1.5 times length; tail moderately long to very long with a thick base..... 38

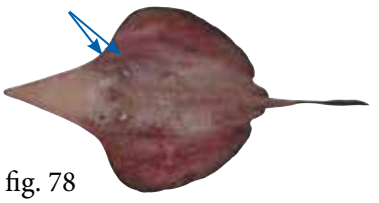
fig. 78

38. Caudal fin present ....Urolophidae (stingarees)

Dorsal surface of disc smooth; tail without thorns ..... *Urolophus* (fig. 80; p. 274)

Dorsal surface of disc with some fine denticles; tail with small thorns along its midline ..... *Spinilophus* (fig. 81; p. 272)

Caudal fin absent..... Dasyatidae (stingrays)

a. No skin folds on tail; base of tail narrow and typically rounded to slightly compressed in cross-section (fig. 82) ..... b

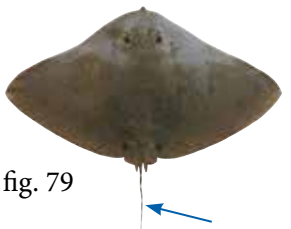
fig. 79


fig. 80


fig. 81

Skin folds present on undersurface of tail (also sometimes on dorsal surface behind sting); base of tail relatively broad, distinctly depressed (fig. 83) ..... g

b. No stinging spine on tail; numerous long, sharp thorns over entire disc.... *Urogymnus* (in part, *U. asperrimus*; fig. 84; p. 266)

One or more stinging spines on tail (scar visible if missing); no long, sharp thorns present on disc (low thorns near midline of disc in some species) c

c. Strong dorsal colour pattern of spots, ocelli or reticulations... *Himantura* (fig. 85; p. 228)

Dorsal colour either plain or with small dark spots, not strongly patterned ..... d

d. Disc subcircular to oval ..... e

Disc rhombic ..... f

e. Disc quite depressed; snout broadly triangular ..... *Pateobatis* (in part, *P. hortlei*; fig. 86; p. 252)

Disc more robust and less depressed; snout obtuse ..... *Urogymnus* (in part, 3 species; fig. 87; p. 264)

f. Tail with alternating black and white bands (less obvious in adults); dorsal surface with black or white spots ..... *Maculabatis* (fig. 88; p. 232)

Tail plain, without banding; dorsal surface plain, without spots ..... *Pateobatis* (in part, *P. fai* and *P. jenkinsii*; fig. 89; pp. 250, 254)

g. Ventral skin fold on tail tall and extending to tail tip ..... h

Ventral skin fold on tail lower and terminating well before tail tip (when undamaged) i

h. Disc oval in shape; dorsal surface with numerous blue spots over a brownish background ..... *Taeniura* (fig. 90; p. 258)

Disc subcircular in shape; dorsal surface with black and white mottling; no blue spots on body ... *Taeniurops* (fig. 91; p. 262)

i. Distance from cloaca to stinging spine

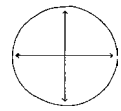

fig. 82

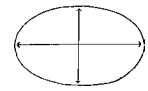

fig. 83

fig. 84

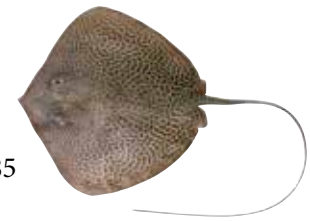

fig. 85

fig. 86

fig. 87

fig. 88

fig. 89

fig. 90

exceeding half of disc width; ventral skin fold on tail relatively tall (maximum height equal to or exceeding spiracle length) ..... *Pastinachus* (fig. 92; p. 248)

Distance from cloaca to stinging spine less than half of disc width; ventral skin fold relatively low (maximum height much less than spiracle length) .....j

j. Disc shape cone-like, with a broadly rounded anterior profile; both dorsal and ventral surfaces entirely dark .....*Pteroplatytrygon* (fig. 93; p. 256)

Disc not cone-like (oval, subcircular or rhombic); ventral surface whitish ..... k

k. Tail banded black and white behind sting; dark, transverse, mask-like band over eyes .....*Neotrygon* (fig. 94; p. 238)

Tail not banded beyond sting; without dark, transverse band through eyes l

l. Disc very broadly angular; tail extremely broad at base, tapering rapidly at caudal sting ..... *Megatrygon* (fig. 95; p. 236)

Disc rhombic, not broadly angular; tail moderately broad-based ....*Hemitrygon* (fig. 96; p. 226)

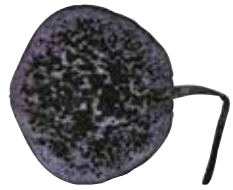

fig. 91

fig. 92

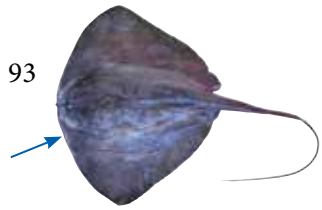

fig. 93

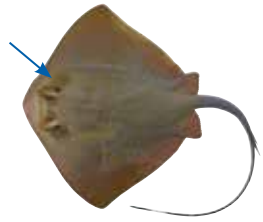

fig. 94

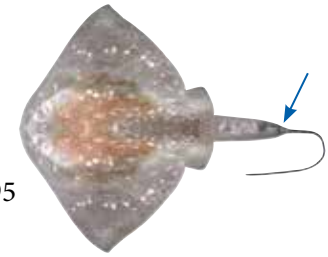

fig. 95

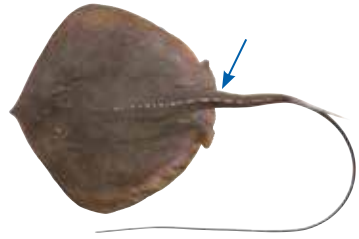

fig. 96