

## FAO SPECIES IDENTIFICATION SHEETS

FISHING AREA 51  
(W. Indian Ocean)

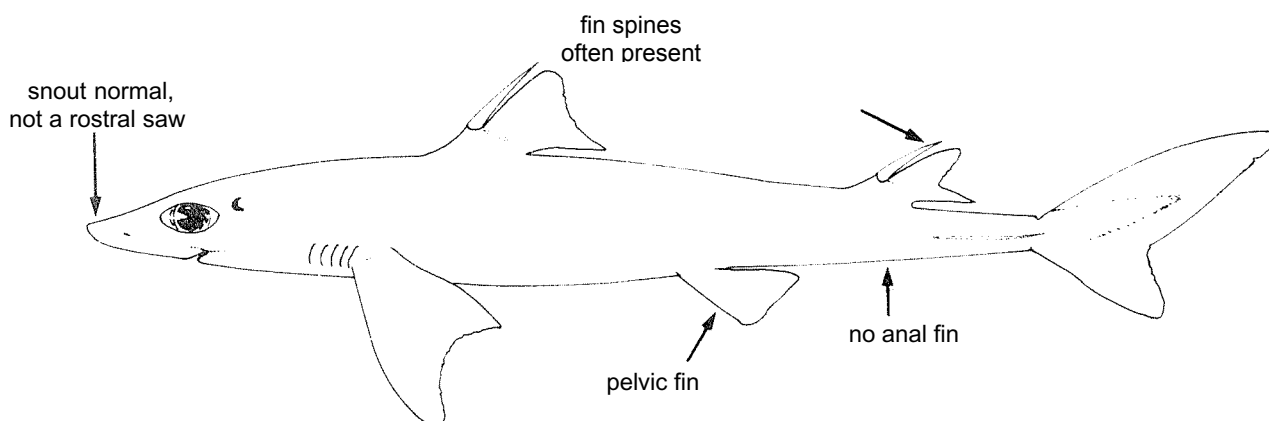
## SQUALIDAE

## Dogfish sharks

Small to moderately large sharks, with cylindrical or slightly compressed bodies, without ridges between pectoral and pelvic fins or with inconspicuous ridges (*Centroscymnus*, *Dalatias*, *Scymnodon*). Head with 5 gill slits, all anterior to pectoral fins, the fifth not abruptly longer than the others; spiracles always present, moderately large; eyes on sides of head, without nictitating eyelids. Snout short to moderately long, not formed as a rostral saw; no barbels on snout; teeth strong-cusped, alike or dissimilar in both jaws, with or without cusplets. Two dorsal fins with a long to vet short spine sometimes present (tip of latter may be concealed by skin), on their anterior margins; origin of first dorsal varying in position from a little (*Isistius*) in front of pelvic fin origins to over pectoral bases; pelvic fins equal to or smaller than second dorsal; no anal fin: caudal fin strongly asymmetrical to nearly symmetrical, with a lower lobe varying from virtually absent to very strong. Dermal denticles usually close-set, riot greatly enlarged and platelike.

Colour: back greyish in shallow-water species, dark to black in those from deep water; several species have light organs (in the area, members of the genera *Etmopterus*, *Centroscyllium*, *Euprotornicrus*, *Squaliolus*, *Isistius* and *Heteroscymnoides*).

Dogfish sharks occurring in warm-temperate and tropical areas are mostly confined to deeper water (50 m and more); those occurring in cold-temperate water are usually shallow-water forms. Dogfish sharks often form schools; they feed mainly on fishes, and may cause damage to fishing gear when preying on the catch. One species in the area, the "cookie-cutter" shark (*Isistius brasiliensis*) is semiparasitic, attaching to large fishes, whales and dolphins with its suctional lips and gouging conical plugs of flesh out of its victims. Dogfish sharks are commonly caught by trawlers and by sports fishermen off South Africa and southern Mozambique but are apparently little utilized or primarily discarded. Utilization of squalids in other parts of Fishing Area 51 is poorly known, but probably at least some species are taken by commercial offshore trawlers in deep water and at least utilized for fishmeal. In the western Pacific, squalids support important deepwater line fisheries, for their squalene-rich livers, and they could do likewise in Fishing Area 51. The family has mainly potential importance as a fishery resource for food and liver oil.



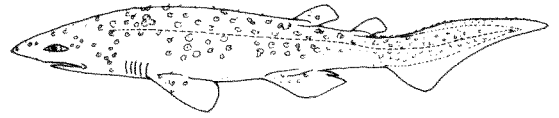
**SIMILAR FAMILIES OCCURRING IN THE AREA :**

**Echinorhinidae:** body set with sparse, large, plate-like denticles\*; spiracles small; fifth pair of gill slits abruptly longer than others; first dorsal fin origin over or posterior to pelvic fin origins; pelvic fins much larger than second dorsal fin.

**Pristiophoridae:** snout elongated into a flattened blade, with lateral teeth; barbels present in front of nostrils.

**Squatinae:** trunk much flattened dorso-ventrally, eyes on upper side of head; anterior margins of pectoral fins extending forward past gill openings and partly concealing them; pelvic fins also very broad, wing-like.

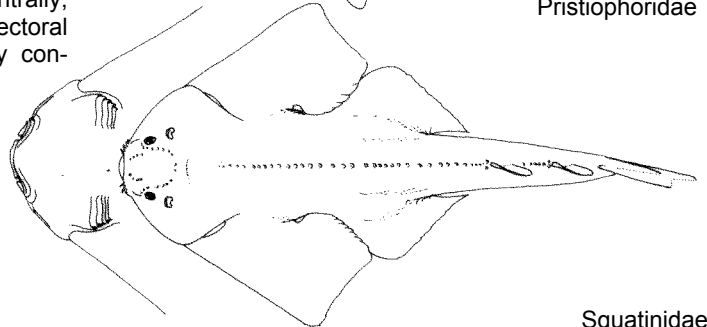
All other shark families: anal fin present.



Echinorhinidae



Pristiophoridae



Squatinae

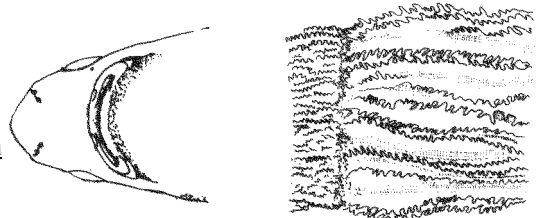
**KEY TO GENERA AND SPECIES OF SQUALIDAE CURRENTLY RECORDED FROM THE AREA:**

1a. Second dorsal fin, and usually first dorsal fin, without 3 spine

2a. Lips fringed (Fig.1b); edges of lower teeth serrated (Fig.2a) ..... Dalatias licha (Fig.1c)

2b. Lips not fringed; edges of lower teeth smooth

3a. Cusps of lower teeth erect, distal edges not notched (Fig.2b); lips expanded and suctorial; rear end of first dorsal fin base about over pelvic fin origins (Fig.3) ..... Isistius brasiliensis



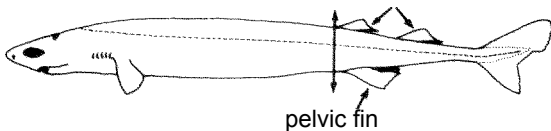
a) underside of head

b) fringed lips



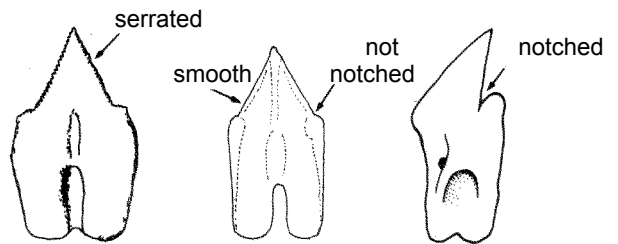
c) Dalatias licha

Fig.1



Isistius brasiliensis

Fig.3



a) Dalatias licha

b) Isistius brasiliensis

c) Euprotomiscus bispinatus

lower tooth

Fig.2

\*Character applying to species occurring in the area

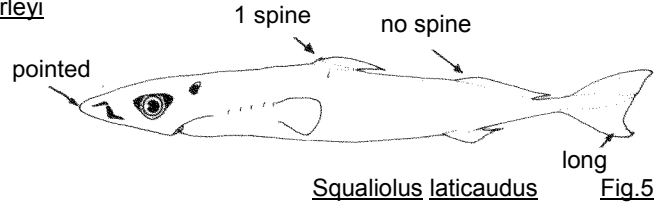
3b. Cusps of lower teeth oblique, distal edges notched (Fig.2c); lips not expanded and suctorial; rear end of first dorsal fin base well in front of pelvic fin origins (Figs 4-6)



Heteroscymnoides marleyi Fig.4

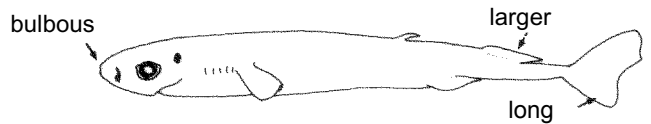
4a. First dorsal fin about as large as second; snout greatly elongated; caudal fin strongly asymmetrical, with a short lower lobe (Fig.4) .....Heteroscymnoides marleyi

4b. First dorsal fin shorter than second; snout short or moderately elongated; caudal fin nearly symmetrical, with a long ventral lobe (Figs 5,6)



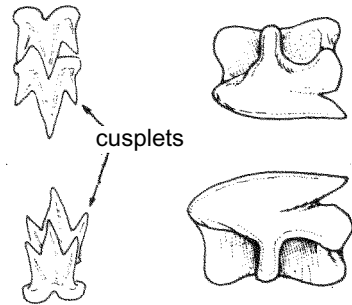
Squaliolus laticaudus Fig.5

5a. A spine on first dorsal fin, sometimes partly hidden by skin; fin length about half the length of second dorsal; fin base closer to pectoral fins than to pelvics; snout pointed (Fig.5) ..... Squaliolus laticaudus



Euprotomicrus bispinatus Fig.6

5b. No spine on first dorsal fin; fin length less than one third the length of second dorsal; fin base closer to pelvic fins than to pectorals; snout bulbously conical (Fig.6) ..... Euprotomicrus bispinatus



a) Centroscyllium ornatum

b) Squalus sp.

upper and lower tooth

Fig.7

1b. Spines present on both dorsal fins

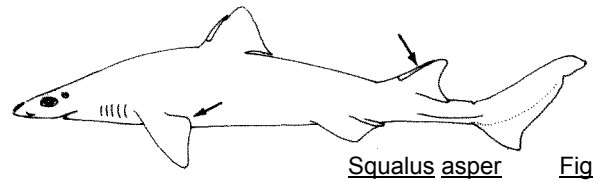
6a. Teeth not bladelike in either jaw, with slender primary cusps and one or more cusplets (Fig.7a).. Centroscyllium ornatum (Fig.8)

6b. Teeth bladelike in lower jaw or in both jaws, lower teeth without cusplets



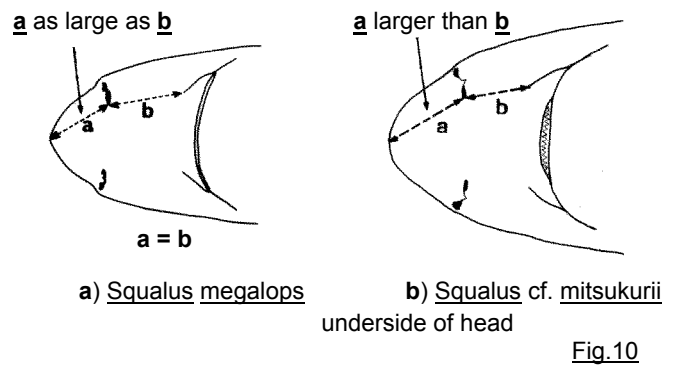
Centroscyllium ornatum Fig.8

7a. Teeth nearly alike in both jaws, the lowers not greatly enlarged; both with strongly oblique, nearly horizontal cusps (Fig.7b); fin spines without grooves on sides; no subterminal notch on caudal fin; caudal peduncle with a strong keel and usually an upper precaudal pit (Figs 9, 11,12) .....Squalus



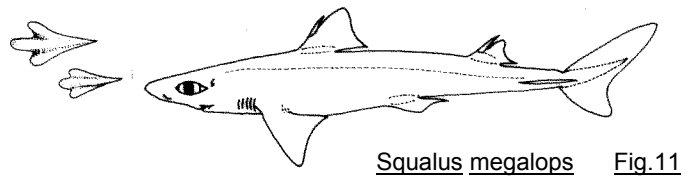
8a. First dorsal fin more posterior, origin of spine posterior to free rear tips of pectoral fins; second dorsal fin about as large as first; no precaudal pits (Fig.9).....Squalus asper

8b. First dorsal fin more anterior, origin of spine over middle of pectoral inner margins; second dorsal fin noticeably smaller than first; precaudal pit present at upper caudal fin origin (Figs 11,12)

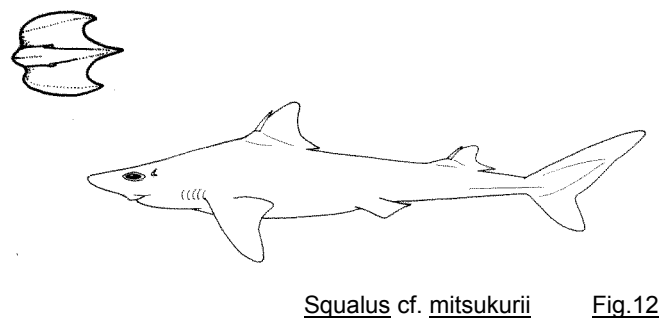


9a. Snout shorter distance from its tip to inner corner of nostril less than that from inner corner of nostril to upper labial furrow (Fig.10a); posterior margins of pectoral fins usually deeply concave, with rear tips acutely pointed; denticles from sides of body narrow and unicuspidate (Fig.11)..... Squalus megalops

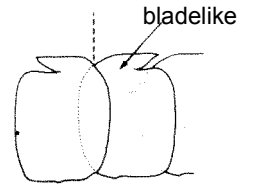
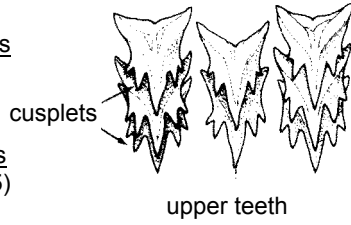
9b. Snout longer, distance from its tip to inner corner of nostril greater than that from inner corner of nostril to upper labial furrow, posterior margins of pectoral fins weakly concave, their rear tips usually broadly rounded; denticles from sides of body broad and tricuspidate (Fig.12) ..... Squalus cf. mitsukurii



7b. Teeth more or less unlike in both jaws, the lowers much larger than uppers, the latter with erect to oblique cusps; fin spines with grooves on sides; subterminal notch on caudal fin; caudal peduncle without keels or precaudal pits



10a. Upper teeth with slender primary cusp and one or more cusplets on each side (Fig.13); second dorsal fin noticeably larger than first ..... Etmopterus



11a. Dermal denticles on sides of body truncated, without cusps (Fig.14a)..... Etmopterus pusillus (Fig.15)

upper teeth

lower teeth

Etmopterus Fig.13

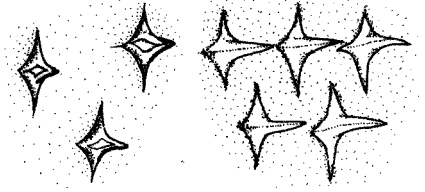
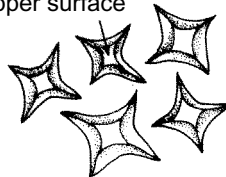
11b. Dermal denticles on sides of body cuspidate (Fig.14b,c)

12a. Denticles arranged in regular rows on sides (Fig.14b) ..... Etmopterus lucifer (Fig.16)

12b. Denticles not arranged in regular rows on sides (Fig.14c) ..... Etmopterus sentosus (Fig. 17)

10b. Upper teeth with slender to thick primary cusps but with no cusplets; second dorsal fin as large or noticeably smaller than first

truncate upper surface



13a. Snout greatly elongated. its length greater than distance from centre of mouth to pectoral fin origins (Fig.18a); dermal denticles of back pitch-fork-shaped, crowns on tall, slender pedicels (Fig.18b) ..... Deania

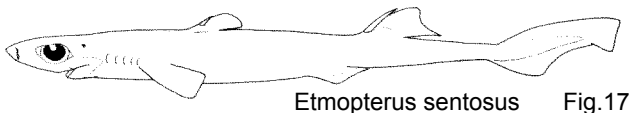
a) Etmopterus pusillus

b) Etmopterus lucifer

c) Etmopterus sentosus

dermal denticles

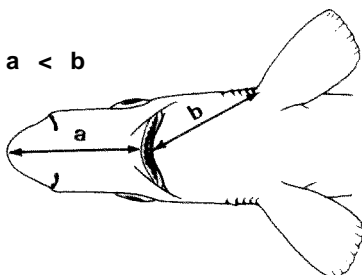
Fig.14



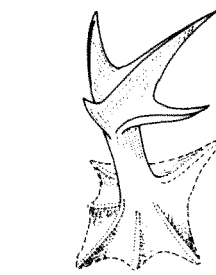
Etmopterus sentosus Fig.17



Etmopterus pusillus Fig.15

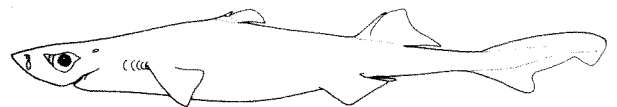


a) underside of head



b) dermal denticle

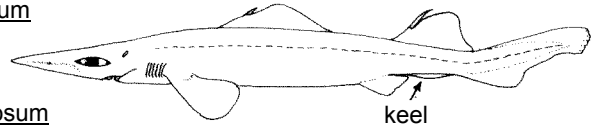
Fig.18



Etmopterus lucifer Fig.16

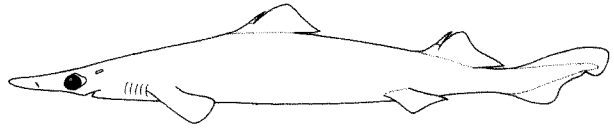
14a. A keel or flap on ventral surface of caudal peduncle (Fig.19) ..... Deania profundorum

14b. No keel or flap on ventral surface of caudal peduncle (Fig.20) ..... Deania quadrispinosum



Deania profundorum Fig.19

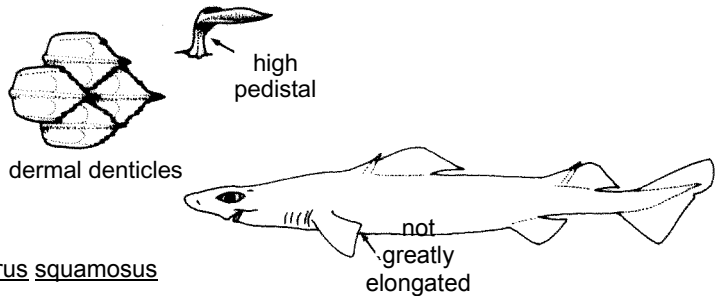
13b. Snout short to moderately elongated, its length equal or usually less than distance from centre of mouth to pectoral fin origins: dermal denticles with short pedicels and broad crowns, not pitch-fork-shaped



Deania quadrispinosum Fig.20

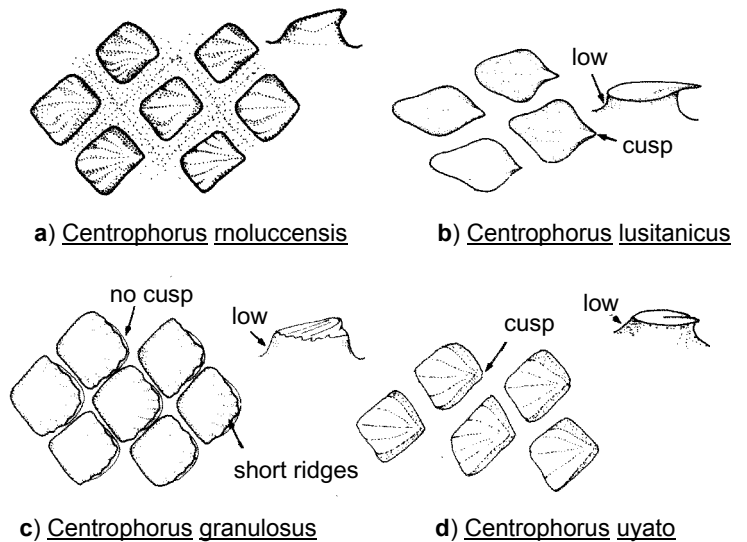
15a. Upper teeth relatively broad and low-cusped. the lowers low and wide; dorsal fin spines prominent and strong; origin of first dorsal fin spine over or just posterior to pectoral inner margins; inner corners of pectoral fins angular or greatly elongated ..... Centrophorus

16a. Dermal denticles on sides of body with leaf-shaped, overlapping crowns placed on low pedicels and armed with 3 or more cusps; inner corners of pectorals not greatly elongated (Fig.21) ..... Centrophorus squamosus



Centrophorus squamosus Fig.21

16b. Dermal denticles on sides of body with sessile crowns. thornlike in young, but with or without short crisps in adults, not overlapping (Fig.22): inner corners of pectorals greatly elongated



c) Centrophorus granulosis d) Centrophorus uyato

dermal denticles

Fig.22

17a. Second dorsal fin very small, much smaller than first dorsal, with the origin of its spine well posterior to pelvic free rear tips (Fig.23) .....Centrophorus moluccensis

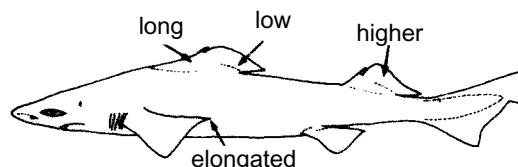
17b. Second dorsal fin large, nearly or quite as large as first, with spine origin over pelvic inner margins (Figs 24,26,27)



Centrophorus moluccensis Fig.23

18a. First dorsal fin long and low, second dorsal higher than first, but its base only half the length of first dorsal fin base (Fig.24).....Centrophorus lusitanicus

18b. First dorsal fin higher and shorter, second dorsal lower than first but its base about 2/3 to 3/4 of length of first (Figs 26,27)



Centrophorus lusitanicus Fig.24

19a. Teeth with erect cusps on upper jaw extending well lateral to symphysis (Fig. 253): denticles on sides of body without cusps in adults, broadly rounded, and with ridges confined to rear edges of crowns: oral cavity white; snout less pointed (Fig.26)..Centrophorus granulosus

19b. Teeth in upper jaw with oblique cusps except for a few rows with erect cusps close to symphysis (Fig.25b): denticles on sides of body with cusps and with ridges (running length of crown) in adults: oral cavity blackish: snout more pointed (Fig.27)..... Centrophorus uyato



a) Centrophorus granulosus b) Centrophorus uyato

teeth Fig.25

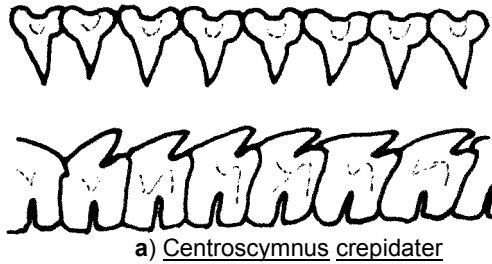


Centrophorus uyato Fig.27



Centrophorus granulosus Fig.26

15b. Upper teeth very narrow and high-cusped (except for lateral and posterior teeth of Centroscyrnus crepidater, but slender near the symphysis in this species also) (Fig.28); dorsal fin spines very small, the first dorsal spine well posterior to pectoral fin tips; inner corners of pectorals short and broadly rounded (Figs 30,31)



20a. Snout elongate, its length about equal to distance from centre of mouth to pectoral fin origins; cusps of more lateral upper teeth broad (Fig.28a); labial furrows long, lengths of uppers greater than distance between their anterior ends (Fig.29a), denticles on sides of body with incomplete medial and lateral ridges, not extending through entire length of crown in adults, and no transverse ridges (Fig.30) ..... Centroscyrnus crepidater

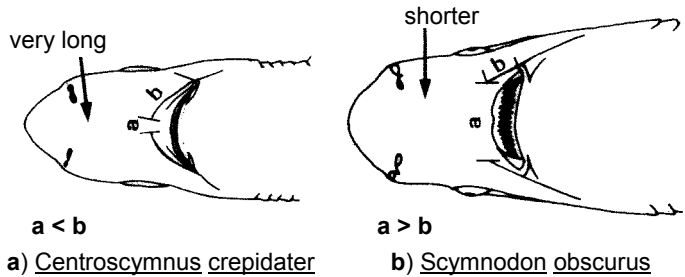
upper teeth



b) Scymnodon obscurus

Fig.28

20b. Snout shorter, its length less than distance from centre of mouth to pectoral fin origins; cusps of upper teeth slender (Fig.28b); labial furrows short, length of uppers less than distance between their anterior ends (Fig.29b); denticles on sides of body with complete medial and lateral ridges as well as transverse ridges in adults (Fig.31) ....Scymnodon obscurus



underside of head

Fig.29

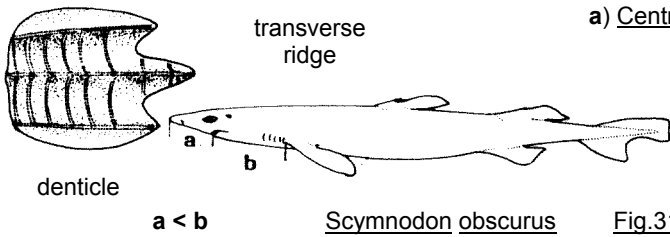


Fig.31

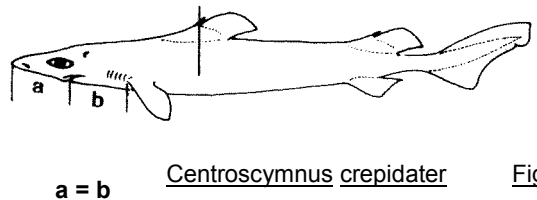


Fig.30

dermal denticle



**LIST OF SPECIES OCCURRING IN THE AREA:**

Code numbers are given for those species for which Identification Sheets are included

* <u>Centrophorus granulosus</u> (Bloch & Schneider, 1801)	SQUAL Centrop 1
<u>Centrophorus lusitanicus</u> Bocage & Capello, 1864	SQUAL Centrop 2
** <u>Centrophorus moluccensis</u> Bleeker, 1856	SQUAL Centrop 5
<u>Centrophorus squamosus</u> (Bonnaterre, 1788)	SQUAL Centrop 3
<u>Centrophorus uyato</u> Rafinesque, 1809)	SQUAL Centrop 4
<u>Centroscyllium ornatura</u> (Alcock, 1889)	
*** <u>Centroscymnus crepidater</u> (Bocage & Capello, 1864)	SQUAL Centros 2
<u>Dalatias licha</u> (Bonnaterre, 1788)	SQUAL Dal 1
**** <u>Deania profundorum</u> (Smith & Radcliffe, 1912)	
<u>Deania quadrispinosum</u> (McCulloch, 1915)	SQUAL Dean 2
<u>Etmopterus lucifer</u> Jordan & Snyder, 1902	
<u>Etmopterus sentosus</u> Bass, D'Aubrey & Kistnasamy, 1976	
<u>Euprotomicrus bispinatus</u> (Quoy & Gaimard, 1824)	
<u>Heteroscymnoides marleyi</u> Fowler, 1934	
<u>Isistius brasiliensis</u> (Quoy & Gaimard, 1824)	
***** <u>Scymnodon obscurus</u> (Vaillant, 1888)?	
<u>Squaliolus laticaudus</u> Smith & Radcliffe, 1912	
<u>Squalus asper</u> Merrett, 1973	SQUAL Squal 5
<u>Squalus megalops</u> (Macleay, 1881)	SQUAL Squal 4
***** <u>Squalus mitsukurii</u> Jordan & Snyder, in Jordan & Fowler, 1903?	SQUAL Squal 6

Prepared by L.J.V. Compagno, Tiburon Center for Environmental Studies, San Francisco State University, Tiburon, California, USA

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\*The genus Centrophorus is not well-known and is in need of a worldwide revision. It is not certain if the five species currently known from the area are the only ones that occur there. Care should be taken when examining Centrophorus specimens to make sure that other species are not being misidentified under the names of the known species

\*\*Including Atractophorus armatus Gilchrist, 1922 and Centrophorus scalpratus McCulloch, 1915

\*\*\*Including Centrophorus rossi Alcock, 1898 as a tentative synonym (holotype examined by writer); also, records of Centroscymnus owstoni Garman, 1906 from Western Indian Ocean are referable to this species, according to P.C. Heemstra (personal communication)

\*\*\*\* A third species of Deania, D. calcea (Lowe, 1839), is known from just south of the area, off the Cape coast of South Africa

\*\*\*\*\*Identification of this species provisional

\*\*\*\*\*This species is usually referred to Squalus blainvillei (Risso, 1826) but is closer to the Western Pacific S. mitsukurii and may be identical. So far, accounts of Squalus species of the S. blainvillei group from the area are of S. mitsukurii-like forms, but the true S. blainvillei, with much longer fin spines and higher first dorsal fin, may also eventually be found in the area. It is present in the Eastern Atlantic, apparently along with a S. mitsukurii-like species