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ON THE OCCURRENCE OF THE SPINY SHARK *ECHINORHINUS BRUCUS* (BONNATERRE) FROM THE EAST COAST OF INDIA WITH A NOTE ON ITS DISTRIBUTION.

By R. V. NAIR and R. S. LAL MOHAN.

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On the occurrence of the spiny shark *Echinorhinus brucus* (Bonnaterre) from the east coast of India with a note on its distribution

R. V. NAIR and R. S. LAL MOHAN

Central Marine Fisheries Research Institute, Mandapam Camp, Tamil Nadu

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ABSTRACT

The occurrence of spiny deep-sea shark *Echinorhinus brucus* is reported from the east coast of India. The external morphological characters are illustrated and described in detail. Its global distribution is figured in relation to mean annual isotherms. The characteristics of its oil is also studied.

The spiny shark *Echinorhinus brucus* (Bonnaterre, 1788) (Squaloidae: Echinorhinidae) is reported for the first time from the east coast of India, thereby extending its range of distribution in Indian waters. A detailed study shows certain differences between this specimen and the earlier records from Indian Ocean and elsewhere.

One specimen was recorded off Mandapam (Gulf of Mannar), 250 fathoms, 08°50'N, 79°05'E. Its total length was 1,740 mm and weight was 35·5 kg; ♂2. (CMFRI-F. 198/632).

Family : Echinorhinidae

ECHINORHINUS BRUCUS (BONNATERRE) (FIG. 1)

Squalus brucus Bonnaterre, *Tabl. Encyc. Meth. Ichthyol.* **11**, 1788.

Squale boucle Lacépède, *Hist. nat. Poiss.* 4 edn; **1:** 167, 283, pl. 3, fig. 2, 1798.

Squalus spinosus Gmelin, *in* Linnaéus, *Syst. nat.* **1**(3): 1,500, 1789.

Echinorhinus spinosus Blainville, *Bull. Soc. Philom. Paris*, **121:** 1816; Günther, *Cat. Br. Mus.* **8:** 428, 1870; Day, *Fish. Gt Brit.* **2:** 323, pl. 162, fig. 2, 1880–4; Jordan, *Rep. U.S. Commn Fish:* 793, (1885) 1887; Goode and Bean, *Smithson. Contr. knowl.* **30:** 8, pl, 3, fig. 9, 1895; Regan, *Ann. Mag. nat. Hist.* (8)**2:** 42, 1908; Le Danois, *Ann. Inst. Océanogr. Monaco*, **5**(5): 21, 1913; Barnard *Ann. S. Afr. Mus.* **21**(1): 46, 1925.

Scymnus spinosus Cuvier, *Regne Animal* **2:** 131, 1817; Risso, *Hist. nat. Europe merid.* **3:** 136, 1826.

Squalus (Symnus) spinosus Voigt, *in* Cuvier, *Tierreich*, **2:** 513, 1832.

Goniodus spinosus Agassiz, *Poiss. Foss.* **3:** 94, pl. E, Fig. 13, 1835–1838.

Echinorhinus obesus Smith, III. *Zool. S. Afr.* pl. 1, 1849.

Echinorhinus brucus Garman, *Mem. Harvard Mus. Comp. Zool.* **36:** 243, 1913; Waite, *Rec. Canterbury (N.Z.) Mus.* **2**(1): 17, 1913; Fowler, *Bull. U.S. natn. Mus.* **100**(13): 277, 1941; Bigelow and Schroeder, *Fish. W. north Atlantic*, **1:** 528–32, 1948; Smith, *Sea Fish. S. Afr. Capetn:* 55–56, 1969; Silas *et al.*, *Curr. Sci.* **38:** 105–6, 1969; Musick and McEachran, *Copeia*, pp. 206–207, 1969.

Echinorhinus cookei Pietschmann, *Anz. Akad. Wiss. Wien* **27:** 297, 1928; *Bull. Bishop Mus.* **73:** 3, 1930.

Echinorhinus (Rubus qualus) maccoyi Whitely, *Aust. Zool.* **6:** 311, 1931; *Mem. Qd Mus.* **10**(4): 200, 1934; *Fish. Aust.* **1:** 151, 1944.

In total length, tip of snout to first gill opening, 5·3* (18·9)**; depth at pectoral origin, 9·2 (10·2); depth at second dorsal origin, 7·5 (13·3); snout

*Proportions; **Proportions in per cent.

length, 12·5 (7·9); eye diameter, 43·5 (2·3); length of first gill opening, 19·5 (5·1); fifth gill opening, 24·5 (4·1); interorbital space, 10·4 (9·6); interspiracle space, 8·1 (12·3); mouth to snout tip, 13·3 (7·5); width of jaw, 9·4 (10·4); pectoral fin length, 7·8 (12·7); length of first dorsal, 13·3 (7·6); length of second dorsal, 14·5 (6·9); prepectoral length, 1·6 (60·4); prepelvic length, 1·8 (56·3); lateral line, origin to snout tip, 4·1 (24·1); longest gill raker, 19·3 (5·2); and in eye, diameter of spiracle, 8·0 (12·5).

Trunk subcylindrical; head flattened above; snout ovate, tapering from eye; eyes lateral; spiracle posterior to eye; mouth cresentic; labial furrows at corners of mouth; lateral line in a well-marked white furrow which originates above fourth gill-opening and terminates at caudal end; lateral line continues on head as about 45 pores up to interorbital space; cephalic canals, ampullae of Lorenzini and pit organs well developed on head; head and body with scattered dermal denticles (tubercles) as flat shields varying in size from 2 to 20 mm, each with a well-developed conical spine in centre from which numerous furrows radiate to outer margin. Denticles strongly embedded in body; no concentration of denticles on any part of body; denticles single or 2 or 3 fused together (Fig. 2); ventral side of the body with a few denticles. Teeth alike in both jaws, $\frac{10+1+10}{10+1+10}$, each with a pointed median cusp flanked by 2 small cusps on each side; lower jaw with 3 series and upper jaw with 2 series of teeth (Fig. 3). Gill arches with 3 well-developed gill-rakers on lower arm, longest (middle) about twice the diameter of eye (Fig. 4). Anal fin absent, dorsal fins small, placed posteriorly; first dorsal orginates above origin of pelvic fin, and second dorsal above posterior end of pelvic fins; pelvic fins large; caudal fin with tapering tip, its posterior end evenly concave without definite subterminal notch; pectoral fins larger than dorsal fins, originates very close to last gill opening.

Intestine short, spiral valves well developed. Stomach empty; liver cylindrical and symmetrically bilobed.

The present record differs from that of other localities of Indian Ocean (Smith,

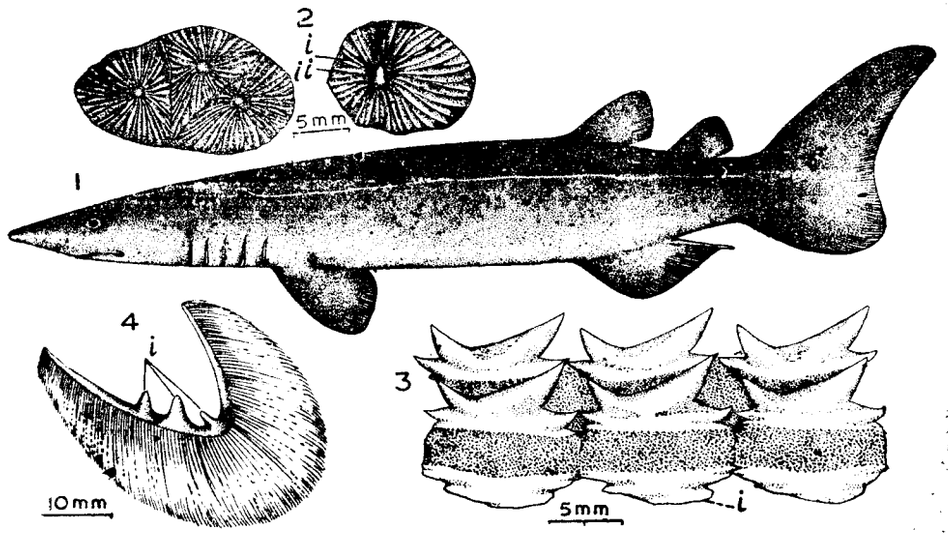

Fig. 1. *Echinorhinus brucus* (Bonnaterre); total length 1,740 mm.
Fig. 2. Dermal denticles: (i) radiating canals; (ii) central spine.
Fig. 3. Upper jaw teeth: *i* outer row.
Fig. 4. Gill arch: *i* gill rakers.

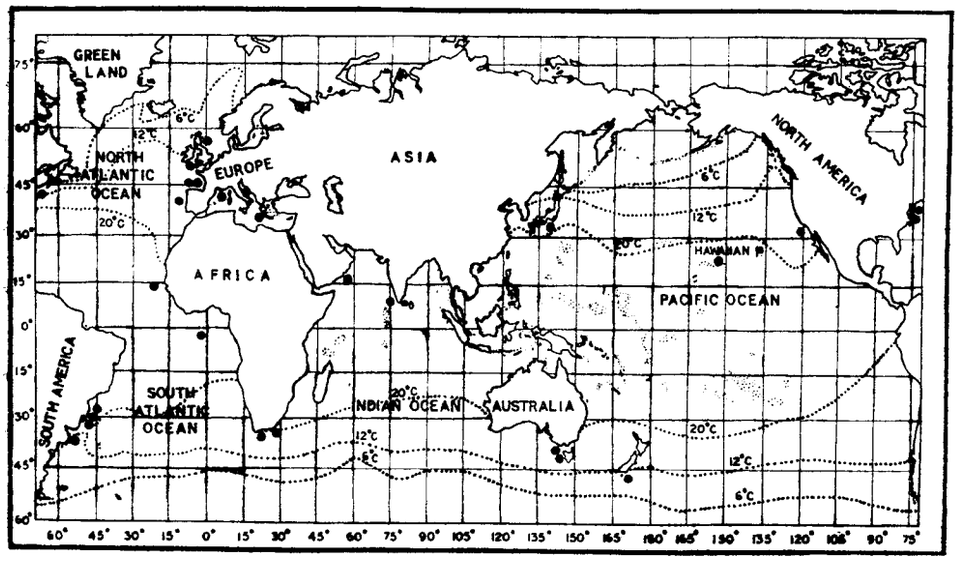

Fig. 5. Global distribution of *E. brucus* indicating 6°, 12° and 20°C mean annual isotherms.

1961; Silas *et al.*, 1969) and also that from Pacific and Atlantic (Bigelow and Schroeder, 1948) in having very sparsely arranged denticles and in having the origin of lateral line above the fourth gill opening. In other records lateral line originates above the first gill opening; the denticles are also arranged very closely. There seems to be no mention of gill-rakers by other workers. However, as the range of distribution of the species is very wide, the specific importance of these differences can be judged only after studying the specimens from other regions.

Being chiefly a bathypelagic species its distribution also is not restricted by the mean annual isotherms (Fig. 5) as indicated by Misra and Menon (1955) for other bathypelagic species.

ECONOMIC IMPORTANCE

Smith (1961) observed that the oil from the liver of the shark has a reputation as a medicament among native and coloured races in South Africa and commands an exceedingly high price. In India, as people are not familiar with the deep-sea sharks, it does not command much value in the markets.

Liver of a shark yielded 5,720 ml of oil. The liver weighed 7,200 g and 503·6 g before and after the extraction of oil.

Higashi *et al.* (1955) and Silas (1969) found low vitamin A content in liver oil of deep-sea sharks. The oil content of the liver of the *E. brucus* is very high. The oil has high iodine value and non-saponifiable matter when compared with other commercially important sharks. Muscles of *E. brucus* have high phosphorus and moisture content (Silas, 1969) when compared with the composition of muscle of other commercially important fishes.

Result of preliminary analysis of the liver of E. brucus

Saponification value	99·63
Iodine value	196·00
Iodine value of fatty acid	172·00
Iodine value of non-saponifiable matter	205·2
Non-saponifiable matter	30 percent
Vitamin A	376 USP

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