ON THE OCCURRENCE OF THE ROUGH-TAIL STING-RAY
DASYATIS CENTROURA (MITCHILL) IN INDIAN WATERS

E. G. SILAS AND G. S. D. SELVARAJ
Central Marine Fisheries Research Institute, Cochin.

ABSTRACT

The Rough-tail sting-ray, Dasyatis centroura (Mitchill), is recorded for the first time from Indian waters. A description of the species based on a male measuring 242 cm in length, obtained during an exploratory trawling by M. V. Bluefin from the upper continental slope off the west coast of India, is given with illustrations, and its variations from the species from the Atlantic and the Mediterranean, as has been noted from their descriptions, are detailed.

INTRODUCTION

During exploratory trawlings from the upper continental slope off the west coast of India, carried out by R. V. Varuna, M. V. Bluefin and other Government of India fishing vessels, several interesting elasmobranch fishes hitherto unknown from Indian seas have been brought to light (Silas et al. 1969, Silas 1969, Silas and Prasad 1969, Talwar 1972). One of these interesting finds is the Rough tail sting-ray, Dasyatis centroura (Mitchill) (Dasyatidae). Specimens of D. centroura have hitherto been collected only from the Atlantic and Mediterranean. Fowler (1936) has given a brief account of this species based on the collection of the American Museum—Congo Expedition (New Jersey). Soljan (1948) has given an illustrated description of this species from the Adriatic Sea and Leim and Scott (1966) have mentioned briefly the body proportions of the Canadian sample.

The present account, recording for the first time the occurrence of Dasyatis centroura in Indian waters, gives a detailed description of the species based on a male measuring 242 cm in length obtained during an exploratory trawling off Quilon (square 8.76.5.A) from a depth of 250 metres.

DASYATIS CENTROURA (MITCHILL, 1815)
(Pl. I A-F; Figs. 1 and 2)

Synonyms

Record of Dasyatis Centroura from Indian Waters


Dasybatis thalassia Monod, 1927. 'Faune Colon. francaises', p. 652. (Souelaba, Cameroon).

Material

One male, 242 cm in length, wt. 46 kg, (Fig. 1a), obtained from 250 m off Quilon (square 8.76.5.A) on 30-3-1972, during an exploratory fishing cruise by M. V. Bluefin. Morphometric measurements were taken and important portions such as mouth, skin with tubercular spines, pelvic fin with clasper, stomach and tail of the fish were preserved.

Diagnosis

Head not elevated; disc wider than long; head region armed with few flattened tubercular dermal scutes with hard stellate basal shield; spiracles close behind eyes and larger than the latter; teeth similar in both jaws; tail black, fairly thick at base, cylindrical, tapering, armed closely with tubercular spines of different sizes and with a narrow fold of skin ventrally from exactly below origin of tail spine and extending posteriorly to about 2/3 of total length of the tail; dorsal fold and median fins absent.

Description

The body measurements of the specimen, the actuals as well as percentages in both the total length and the disc length, are:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>% in Total</th>
<th>% in Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>Body length</td>
</tr>
<tr>
<td>Total length</td>
<td>2420</td>
<td>100.0</td>
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<tr>
<td>Body length</td>
<td>Disc length (Snout to caudal origin)</td>
<td>900</td>
</tr>
<tr>
<td>Disc width</td>
<td>1230</td>
<td>50.8</td>
</tr>
<tr>
<td>Parameters</td>
<td>mm</td>
<td>% in Total</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-----</td>
<td>------------</td>
</tr>
<tr>
<td>Distance from snout tip to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outer angle of disc</td>
<td>725</td>
<td>30.0</td>
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<tr>
<td>Tip of pelvic fin</td>
<td>980</td>
<td>40.5</td>
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<tr>
<td>Tail spine origin</td>
<td>1205</td>
<td>49.8</td>
</tr>
<tr>
<td>1st mid-dorsal spine</td>
<td>385</td>
<td>15.9</td>
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<tr>
<td>Vent (cloaca)</td>
<td>780</td>
<td>32.2</td>
</tr>
<tr>
<td>Eye: Snout tip to eye</td>
<td>242</td>
<td>10.0</td>
</tr>
<tr>
<td>Interorbital distance</td>
<td>170</td>
<td>7.0</td>
</tr>
<tr>
<td>Spiracle: Snout to spiracle</td>
<td>260</td>
<td>10.7</td>
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<tr>
<td>Length</td>
<td>88</td>
<td>3.6</td>
</tr>
<tr>
<td>Greatest width</td>
<td>55</td>
<td>2.3</td>
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<tr>
<td>Mouth: Snout tip to mouth</td>
<td>220</td>
<td>9.1</td>
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<tr>
<td>Width</td>
<td>85</td>
<td>3.5</td>
</tr>
<tr>
<td>Gill-slits: Snout to 1st gill-slit</td>
<td>320</td>
<td>13.2</td>
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<tr>
<td>Snout to 5th gill-slit</td>
<td>433</td>
<td>18.7</td>
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<tr>
<td>Width of 1st gill-slit</td>
<td>45</td>
<td>1.9</td>
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<tr>
<td>Width of 5th gill-slit</td>
<td>35</td>
<td>1.5</td>
</tr>
<tr>
<td>Between inner ends of 1st pair</td>
<td>242</td>
<td>10.0</td>
</tr>
<tr>
<td>Between inner ends of 5th pair</td>
<td>160</td>
<td>6.6</td>
</tr>
<tr>
<td>Nostrils: Inner narial distance: Minimum</td>
<td>103</td>
<td>4.3</td>
</tr>
<tr>
<td>Pelvic fin: Length of outer margin</td>
<td>162</td>
<td>6.7</td>
</tr>
<tr>
<td>Width</td>
<td>125</td>
<td>5.2</td>
</tr>
<tr>
<td>Length of clasper</td>
<td>85</td>
<td>3.5</td>
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<tr>
<td>Tail: Length of tail</td>
<td>1520</td>
<td>62.8</td>
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<tr>
<td>Length of tail spine</td>
<td>166</td>
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<tr>
<td>Length of lower caudal fold</td>
<td>700</td>
<td>28.9</td>
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<tr>
<td>Base of tail to tail spine</td>
<td>305</td>
<td>12.6</td>
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<tr>
<td>Base of tail to ventral fold</td>
<td>305</td>
<td>12.6</td>
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<tr>
<td>Lower fold-end to tip of tail</td>
<td>515</td>
<td>21.3</td>
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</table>
Disc partly quadrangular, 1½ times as broad as length to tip of pelves; snout angle very obtuse (120°); anterior margin of pectorals nearly straight, but broadly rounded towards outer corner; snout length in front of eye 1 1/3 in head measured to first gill opening, 3½ in disc length and 4 in snout to tip of pelves. A row of depressed dermal denticles along mid-dorsal line of body present; dorsal surface with few broad flattened tubercular plates dispersed irregularly near head region (Fig. 1a) and with numerous minute dermal denticles of same origin near snout, head and along edges of disc; other than these, skin smooth. Spiracles situated close behind and larger than eyes. Pelvic fins relatively small, devoid of tubercles and partly covered by hind limits of pectorals.
in head. Nostrils connected to mouth by a deep groove; the labial furrow present at angle of mouth, originates from nostrils and extending along lower jaw (Pl. 1 A, Fig. 1 b); nasal valves of both sides are coalescent with each other forming more or less a quadrangular flap, reaching to mouth (Pl. 1 E, A; Fig. 1 b). Sensory pores present near snout on dorsal side (Fig. 1 j) and are more on ventral side around nostrils and mouth (Fig. 1 b). Gillslits smaller in size, 5th pair being smallest; distance between inner ends of 5th pair of gills is 2/3 distance between that of 1st pair. Ventral side of body and fins smooth.

Tail slender and whip-like, with a spear-like, sharp serrated spine, situated on dorsal side at about twice length of its own from root of tail; tail thickly mailed with small flattened tubercular spines with larger ones interspersed (Pl. 1D, Fig. g1-g3). Tail about 1.7 times disc length, with a narrow fold of skin ventrally from below origin of tail spine and extending posteriorly to about 2/3 of total length of tail; length from centre of vent (cloaca) to tip of tail 2 times length from snout to vent.

**Dermal armature**

Body covered with mucus; skin smooth except for numerous tuberculated scutes on dorsal side; each tubercle with a radiating basal shield of varying size, but generally oval to round in shape with a blunt or sharp spine in centre; sharpness of the spine decreases as size of basal shield increases (Fig. 1 f, f2, g1-g3). Six broad flattened tubercular plates present on head region (Pl. 1C, 3 & 4, Fig. 1a) each with a hard, flattened, stellate basal shield and a blunt, conical spine at summit (dermal denticles or tubercles by some authors); periphery of basal shield embedded beneath skin (Pl. 1C 3, Fig. 1, f1 & f2). Apart from these, there are numerous minute denticles on dorsal surface near snout, head and along edges of disc, each provided with sharp spine in centre. Their basic structure is same as larger tubercles, with a small stellate basal shield and a spine at summit (Fig. 1, j-1).

Depressed dermal denticles present along mid-dorsal line are 21 in number, arranged at equal intervals except for a small gap in between 14th and 15th, probably indicating a missing denticle. A pair of small denticles present on each side of shoulder, arranged symmetrically along sides of 6th and 7th median tubercles. Each of these has a hard oval basal shield with a blunt summit, and is embedded in the skin, with summit exposed (Pl. 1C, & C2, Fig. 1 e1 & e2).

Tail fully strewn with very hard stellate tubercles of different shapes and sizes along its whole length from its origin. Tubercles present at base up to tail spine are broader (Pl. 1D) but becoming smaller to look like thorns towards the tapering end. Occasionally, two or three tubercles are found fused on tail region (Fig. 1 g4 & g1). A single tail spine present is 16.5 cm long, sharp, with serrated edges and with a shallow median groove on its dorsal side, originating
from base and extending to about 7/8 of its length; serrations on spine pointing
towards base and serrated edges reach nearly base of spine. Serrations start a
short distance posterior to tip of spine and increase gradually in size to half
length of spine and then decrease in size and at the same time increase in num­
bers towards spine base. Serrations are sharp, pointed, curved downwards and
their sides are smooth (Fig. 1h).

Teeth alike in both jaws; in $\frac{49-50}{57-60}$ vertical rows with $\frac{9-13}{9-15}$ teeth,
arranged in quincunx rows, the number and size of teeth gradually decreasing
towards corners in both jaws. Upper tooth plate is longer than lower and is
curved outwards; lower one is broader than upper and having more rows in
middle (Pl. I B); middle portion of lower tooth plate is curved outwards and
protrudes out a little beyond general outline of plate (Pl. E, A, Fig. 1 b).

Pelvic fin smooth, relatively small and anterior portion partly covered by
hind limits of pectorals, distal margin not rounded, but its inner angle is broadly
rounded. Claspers considerably shorter with deep groove on dorsal side, tip of
which is slightly curved outwards (Pl. I F; Fig. 1 m).

**Alimentary tract**

Mouth leads into a dorso-ventrally depressed buccopharyngeal cavity.
Roof and floor of buccal cavity are fleshy and somewhat rough by the presence
of a few scattered small knob-like protruberances. Lining of roof is thrown
anterorly into a thick fold, the maxillary valve, hanging from the roof and
covering the non-functional posterior series of teeth in upper jaw. Its free margin
is fringed into three elevated muscular ridges, one median and two lateral (Fig.
1c). All three ridges end posteriorly at beginning of pharyngeal cavity where
spiracle open inwards. Lateral ridge on each side extends anteriorly and join
gether in the middle just posterior to maxillary valve. Median ridge is almost
straight and does not join with lateral ridges. Lining of the floor of buccal cavity
extends anteriorly forming lower fold, the mandibular valve (Pl. I, Fig. 1 c),
the anterior margin of which is directed upwards covering the non-functional
mandibular teeth. Posterior to this valve, there are four fleshy oral papillae
arranged in a row and another small papilla in the middle, just anterior to the
row on the floor. Lateral one on each side is smaller than the other (Pl. I E,
Fig. 1 c). Followed by these, posteriorly arise the elevated muscular ridges on
the floor which extends posteriorly up to the pharyngeal region, and lateral
ridges are connected anteriorly by a series of minute knob-like protuberances.
Liver is considerably small, 1350 g in weight and oily. Meat is edible. Cardiac
stomach is larger than the pyloric part. Cardiac region is less muscular and pro­
nounced into several longitudinal highly convoluted folds (Fig. 1 l). Towards
pyloric stomach, folds gradually become less convoluted and then straight,
ending posteriorly in a thick elevated knob (Figs. li & lii). Pyloric part is slender and highly muscular. Stomach contained digested remains of paralepids and some crustaceans.

**Colour**

Dorsal side uniform dark-brown to dusky with stellate tubercles (dermal denticles) dispersed irregularly. Ventral side smooth, and white in colour with few irregular dusky patches near last pair of gill opening and all along posterolateral border of disc and pelvics. Anterior margin of pectorals except the outer angle is whitish. Tail black except for its numerous spines.

**Distribution**

This species has been so far known only from the coastal waters of the Atlantic and from the Mediterranean. The present description is from the Arabian Sea, based on a male 242 cm in length obtained from a depth of 250 m. This is the first record of this species from the Indian waters.

**Remarks**

As may be expected, *D. centroura* shows some geographical variations in the number and disposition of tuberculated scales, number of caudal spines, length of tail and its caudal fold, and in the shape of pelvic fin.

Leim and Scott (1966) have mentioned in their description of Atlantic specimens that 1-20 tubercles are dispersed irregularly on the central 1/3 of the body and pectorals. In Soljan's (1948) illustration (from Adriatic Sea), there are only 4 broad-based stellate tubercles in the head region, apart from the numerous minute dermal denticles, near the snout. In our specimen, there are only 6 broad flattened stellate tubercles dispersed irregularly in the head region (Fig. 1a), apart from the numerous minute dermal denticles of same origin present near the head, snout and along the edges of the disc (Fig. 1 j-e). From the available descriptions, it would appear that the number and disposition of the tuberculated scales differ from specimen to specimen and with age. An interesting thing noted here is the presence of fused tubercles more along the tail region (Fig. 1 g4 & g5). It is seen that when two or more tubercles occur close together their shields get fused with the adjacent ones.

Leim and Scott (1966) have recorded 1-3 tail spines in the Atlantic specimens, and their tail length from centre of vent is 2.4 times length from snout to vent, with the ventral caudal fold extending rearwards about 1/5 length of tail. But our specimen has a single serrated spine and its tail length 2 times only with its ventral fold extending posteriorly to about 2/3 of the total length of tail. From Fowler's (1936) description also it is clear that the Atlantic specimens have longer tail with one or more barbed spines. Another point of

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difference we have noted is in the shape of the pelvic fin: while it is convex along the outer margin in the Atlantic specimens, in our specimen it is not so but more resembles that of the Adriatic specimen.

*D. centroura* resembles *D. uarnak* in the arrangement of teeth and in the number of oral papillae, but differs in the shape of tooth plates and also in the disposition of the mid-oral papilla, which is situated posteriorly to the other four papillae (Gohar and Mazhar 1964), whereas it is located anteriorly in *D. centroura*. The tail spine resembles that of *D. sephen* and the internal lining of the stomach is more or less similar to that of *Taeniura lymma* (Gohar and Mazhar 1964). Soljan (1948) remarked that this species could be adult of *D. pastinacus*. But *D. centroura* differs from *D. pastinacus* by the absence of dorsal cutaneous fold, presence of stellate tuberculated spines on tail, width of disc, number of teeth and tail length.

Very little information is available on the breeding behaviour of this species. Leim and Scott (1966) have mentioned that the young are born alive and resemble the adults when born. The occurrence of *D. centroura* also in Indian waters shows the possibility of their being available in all tropical as well as temperature seas. There is a strong indication of geographical variations in this species, but a critical examination of materials from different geographical areas is nevertheless called for to determine whether or not the variations in the Indian material justify sufficiently for it to be considered as a distinct species.

**References**


