

CTENOPLANA BENGALENSIS N. SP. FROM THE MADRAS PLANKTON

BY C. P. GNANAMUTHU AND R. VELAPPAN NAIR

(From the University Zoological Research Laboratory, Madras)

Received March 24, 1947

(Communicated by Prof. S. G. Manavala Ramanujam, F.A.Sc.)

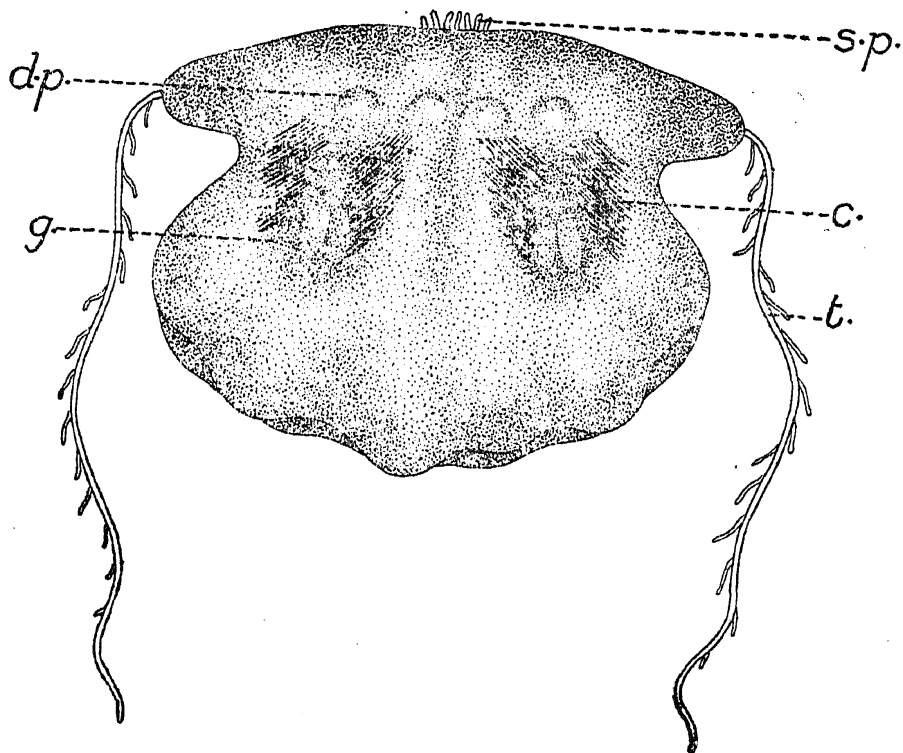
INTRODUCTION

FROM the time of the discovery of the first species, *Ctenoplana kowalevskii* by Korotneff in 1886, Willey (1897) described *Ctenoplana rosacea* and *Ctenoplana korotneffi*, Dawydoff* (1929 and 1936) recorded *Ctenoplana duboscqui* and *Ctenoplana perrieri* and Yoshi (1933) added *Ctenoplana maculomarginata* and *Ctenoplana muculosa*. Menon (1927) noted the occurrence of *Ctenoplana indica* in Madras, but as he did not publish any account of it, the *Ctenoplana* described in this paper is treated as a new species.

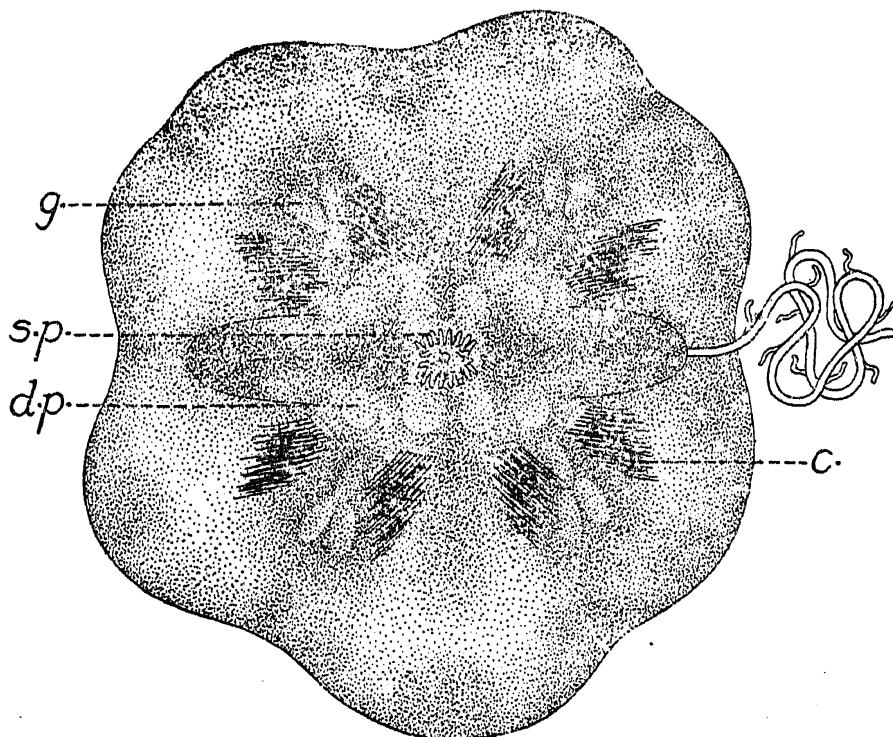
GENERAL CHARACTERS

The specimen was found in the townet collection of the coastal plankton made off Madras on the 13th November 1946, and was studied alive in the laboratory for over a week. It endured rough handling while it was frequently pipetted from slide to dish and to the aquarium for purposes of observation and for changing the sea water. It was fed with live plankton and also with the flesh of prawn. The specimen measures 4 to 4.5 mm. and about 6 mm. when fully expanded. The tentacles when fully extended measure 15 mm. in length. While swimming, the lower or stomodæal part of the body appears distinct due to a constriction above it and then the oral edge is seen to be thrown into a number of lobes which come together and nearly close the mouth. In such a condition the body measures only 2 mm. in height and the form of the animal does not differ very much from that of the typical bell-shaped swimming ctenophore. While creeping, however, the mouth is opened out and the stomodæum is completely everted and extended all round the central region of the body which appears like a conical elevation much like a helmet. The outer margin of the flattened part is entire, devoid of the lobes seen when the animal is swimming. Nevertheless

* Dawydoff has also described *Planoctena agniæ*, *Planoctena yuri* and *Planoctena caulleryi*.

TEXT-FIG. 1. Side view of *Ctenoplana bengalensis*

the entire shape of the conical as well as the flat portions of the body keep changing owing to the constant extensions and contractions in different directions.

TEXT-FIG. 2. Dorsal view of *Ctenoplana bengalensis*

The creature moves about by swimming and creeping on floating objects. Swimming is entirely ciliary and the animal keeps all the comb

plates of the eight costæ in quick motion and moves with its aboral pole forwards trailing the tentacles fully extended. Creeping or gliding over objects like a flat worm is effected by movements of portions of the flattened region of the body. This is, however, facilitated by the working of the comb plates of a few of the ribs. But when the animal is about to leave the substratum the comb plates of all the costæ are brought into play and the central thick region is elevated to its maximum height until finally it rises and swims upwards. Occasionally the animal floats on the surface of the water in a fully expanded condition. The method of ingestion of food particles is interesting. When given a small piece of prawn flesh, the animal approaches it mouth forwards lying on the side of the body. It widens its mouth and turns over covering the bit with the pharynx and erecting the aboral part of the body. If the flesh is given when the animal is creeping, it glides over the food and engulfs it. During the process of ingestion the stomodæum becomes completely everted and flattened.

The coloration is neither marked nor uniform. It is of a yellowish brown colour with darker brown patches. These patches which are scattered along the margin of the flattened part and crowded in the region of the tentacle sheaths and the gonads appear to be of cells of the nature of melanophores and have numerous slender and anastomosing extensions by the contraction of which the shape and intensity of the patches are altered. The gonads are yellowish white and stand out conspicuously. There are also white pigment spots scattered all over the body but these are not very marked or defined owing to the dull background coloration. The tentacles and their branches are colourless and transparent. The comb plates are iridescent. Though observed in the dark room the animal did not show any capacity for phosphorescence in spite of repeated provocative handling. The animal is very sensitive to bright light and energetically contracts changing its form frequently.

MORPHOLOGY

The eight costæ and their combs are very marked. Each rib is narrow and is flat at the aboral end while it tapers to a point orally. Each costa bears eight combs along its length. The width of the comb towards the oral end is narrower in accordance with the decreasing width of the rib, the last comb being extremely narrow bearing only a few cilia. The cilia are very long and are united up to about two-thirds of their length. The cilia of the upper combs are half as long as the costa itself. The cilia beat towards the mouth.

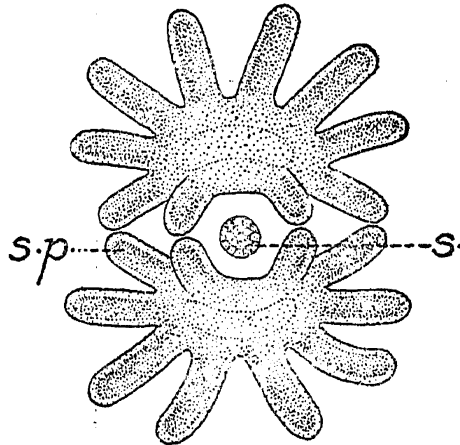
The statolith is small, spherical, opaque and granular in appearance. It is frequently hidden from view by the closing together of the finger-shaped

TABLE I

Species	Size	Colour	Shape	Sensory Papillae	Other Features	Locality
<i>C. korotneffi</i> Korotneff, 1886	7 mm. when moderately expanded. Height while swimming 3 mm.	Crimson with regular mahogany brown spots	Body in swimming attitude shaped like a truncated pyramid. Median dorsal surface concave. Free margin of skirt frilled	30-32 sensory papillae (18-20 external and 12 internal)		West coast of Sumatra and South Annam (Bay of Nhartrang)
<i>C. rosacea</i> Willey, 1897	6 mm.	Crimson	Body in swimming attitude of a quadrilateral form. Median dorsal surface convex. Free margin of skirt plain	?		Eastern Archipelago of New Guinea
<i>C. karotneffi</i> Willey, 1897	6 mm.	Green	Body in swimming attitude roof-shaped. Median dorsal surface upraised into two upright end-knobs. Free margin of skirt slightly frilled	?		Eastern Archipelago of New Guinea
<i>C. dubocqui</i> Dawydoff, 1929	5.5 mm. when fully expanded. Height while swimming 2.5 mm.	Grayish white with the central thick region olive green or intense yellow olive sprinkled with yellow dots on the peripheral region. Tentacular sheath orange brown		23 sensory papillae (15 external and 8 internal)	Costa with a single comb plate	South Annam (Bay of Nhartrang)
<i>C. maculomarginata</i> Yoshi, 1933	3 mm. when moderately expanded and twice as large when fully extended	Pale yellowish green or light grayish olive with yellowish brown spots arranged at regular intervals along the margin		20-24 sensory papillae		Misaki

<p><i>C. muculosa</i> Yoshi, 1933</p>	<p>5-8 mm. when moderately expanded and twice as large when fully spread out</p>	<p>Light greenish yellow or clear pink with 13 or 14 yellowish brown spots having dark purple pigment particles arranged along the margin</p>	<p>24 sensory papillae</p>	<p>Misaki</p>
<p><i>C. perrieri</i> Dawydoff, 1936</p>	<p>6 mm. Height while swimming 2.5 mm.</p>	<p>Bright emerald green with scattered orange vermilion spots arranged in clusters. Tentacular sheaths shining vermilion</p>	<p>24 sensory papillae (14 external and 10 internal)</p>	<p>South Annam (Bay of Nhatrang)</p>
<p><i>C. indica</i> Menon, 1927</p>	<p>4-4.5 mm. when moderately expanded and 6 mm. when fully expanded. Height while swimming 2 mm.</p>	<p>Yellowish brown with dark brown patches along the margin of the flattened portion. Regions of tentacular sheaths and gonads dark brown</p>	<p>20 sensory papillae</p>	<p>Madras (Bay of Bengal) Madras (Bay of Bengal)</p>
<p><i>C. bengalensis</i> n.sp.</p>				

sensory papillæ. There are twenty sensory papillæ. These papillæ are long and slender when extended and are capable of contraction and supple movements. The sensory region is elliptical with the semicircular ring of sensory papillæ bordering each side. The entire area containing the aboral sense organ, the polar fields and the sets of papillæ is frequently tucked in and thrust out especially when the animal is irritated. The papillæ and the polar fields are not pigmented.



TEXT-FIG. 3. The aboral sense organ

The two tentacles are long, highly contractile and bear uniseriate branches. These branches are regularly arranged, but decrease in length and number towards the distal extremity of the tentacle. The tentacle is extruded and withdrawn through the narrow mouth of the spacious tentacle sheath. Through the transparent sheath, when the pigmentation above it becomes lighter, the root of the tentacle can be seen at the proximal end of the sheath.

The gastrovascular system begins with the wide stomodæum or pharynx, the eversion of which is responsible for the planarian appearance of the creature. When not everted the stomodæum forms nearly half the height of the animal. When the animal is allowed to attach to a coverslip, an oral view into the interior of the œsophagus can be obtained. The wall of the œsophagus which is very short is produced inwards into a number of irregular highly contractile branching folds. Beyond the œsophagus, when it is widened, can be seen the stomach and the peripheral canals. Of these canals there are six on each side, those in the tentacular plane being wider. The canals branch repeatedly till they merge into the network of canals in the flattened part of the body. The stomach is spacious and is elongated along the tentacular axis. When the animal contracts its body eight sac-like projections, the dorsal papillæ, can be seen pushed out on the aboral side of the body. The anal pores and the anal canals could not be observed owing to the ramifying pigmentation.

The gonads are four in number situated in the four interradii between the tentacular and stomodæal axes.

GENERAL REMARKS

The important taxonomic features of all the known species of *Ctenoplana* as can be gathered from a complete search of the available literature is given in Table I. A comparison of the characters of the Madras form with those of the other species of *Ctenoplana* shows clearly that the species described here is new to Science. In the number and arrangement of the sensory papillæ *Ctenoplana bengalensis* differs from all the known species. The sensory papillæ of *Ctenoplana kowalevskii*, *Ctenoplana duboscqui* and *Ctenoplana perrieri* are arranged in two sets, one internal and the other external. The arrangement of these papillæ in *Ctenoplana maculomarginata* and *Ctenoplana muculosa* appears to conform with that of *Ctenoplana bengalensis*, but there is variation in the number of the sensory papillæ. There is no information about the sensory papillæ of *Ctenoplana rosacea* and *Ctenoplana korotneffi*. Similarly the coloration of *Ctenoplana bengalensis* is markedly different from that of all the recorded species of *Ctenoplana*.

It is significant that this species also like all the known species of *Ctenoplana* has been collected from the plankton. *Ctenoplana kowalevskii* was found drifting in a current of water along with numerous *Porpita*. *Ctenoplana rosacea* and *Ctenoplana korotneffi* were taken from a cuttle bone which was floating and moving along the current. *Ctenoplana duboscqui* and *Ctenoplana perrieri* were collected from the plankton while *Ctenoplana maculomarginata* and *Ctenoplana muculosa* were obtained from floating sea weeds. From these recorded observations it is evident that *Ctenoplana* is essentially a pelagic form like the majority of the ctenophores, both during the swimming and creeping conditions, and inhabits the coastal waters. Mention may be made here that all the recorded species of *Planoctena* were also collected from the plankton except *Planoctena caulleryi* which was collected from an Octocorallian belonging to the genus *Xenia*.

ACKNOWLEDGEMENTS

Our thanks are due to Mr. C. Vedachalam for bringing the specimen to our notice and to Mr. S. Gopalan Nair for translating the French articles. We are also thankful to Dr. S. G. M. Ramanujam for lending us a few journals.

REFERENCES

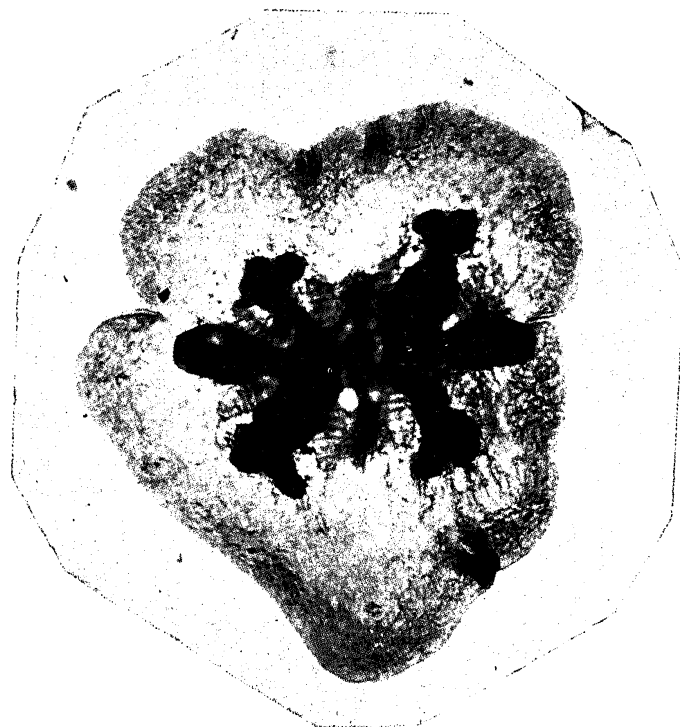
- Dawydoff, C. .. "Sur la presence du genre *Ctenoplana* dans les eaux de l'Indochine francaise," *C. R. Acad. Sci.*, 1929, **189**, 1315-16.
- .. "Quelques observations sur la morphologie externe et la biologie des *Ctenoplana*," *Arch. Zool. Exper. Gen.*, 1933, **75**, 6, 103-28.
- .. "Les *Ctenoplanidae* des eaux de l'Indochine francaise. Etude Systematique," *Bull. Biol. France Belg.*, 1936, **70**, 4, 456-86.
- Devanesan, D. W., and .. "On three new species of *Cœloplana* found at Krusadai Island, Varadarajan, S. Marine Biological Station, Gulf of Manaar," *Journ. Mad. Univ.*, 1942, **14**, 2, 181-88.
- Komai, T. .. *Studies on Two Aberrant Ctenophores—Cœloplana and Gastrodes*, Kyoto, Published by the Author, 1922.
- *————— .. "On the structure of *Ctenoplana*," *Kyoto Univ. Col. Sci. Mem.*, 1934, **9**, B, 245-56.
- Korotneff, A. .. "Ctenoplana kowalevskii," *Zeit. f. wiss. Zool.*, 1886, **42**, 648-56.
- Menon, K. R. .. "Preliminary notes on *Ctenoplana indica*, n. sp.," *Proc. 14th Indian Sci. Congr.*, 1927 (Abstract).
- Wiley, A. .. "On *Ctenoplana*," *Quart. Journ. Micro. Sci.*, 1897, **39**, 323-42.
- Yoshi, N. .. "Ctenoplana from Japan," *Proc. Imp. Acad. Tokyo*, 1933, **9**, 9, 539-40.
- * This has not been referred to in the original.

EXPLANATION OF PHOTOGRAPHS

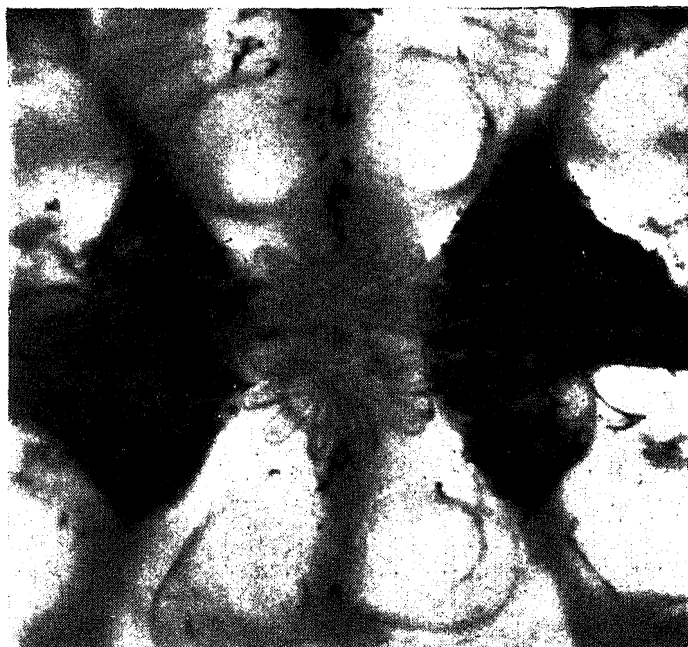
- Photomicrograph 1. Dorsal view of *Ctenoplana bengalensis*.
- „ 2. The aboral region showing the sense organ, sensory papillæ and dorsal papillæ.

KEY TO LETTERING

<i>c.</i>	costa.	<i>s.</i>	statolith.
<i>d.p.</i>	dorsal papilla.	<i>s.p.</i>	sensory papilla.
<i>g.</i>	gonad.	<i>t.</i>	tentacle.



1



2