ON A NEW SPECIES OF THE RARE CYMOTHOID GENUS *AGARNA* SCHI. & MEIN., PARASITIC ON THE CLUPEID FISH *NEMATALOSA NASUS* (BL.) IN THE BAY OF BENGAL

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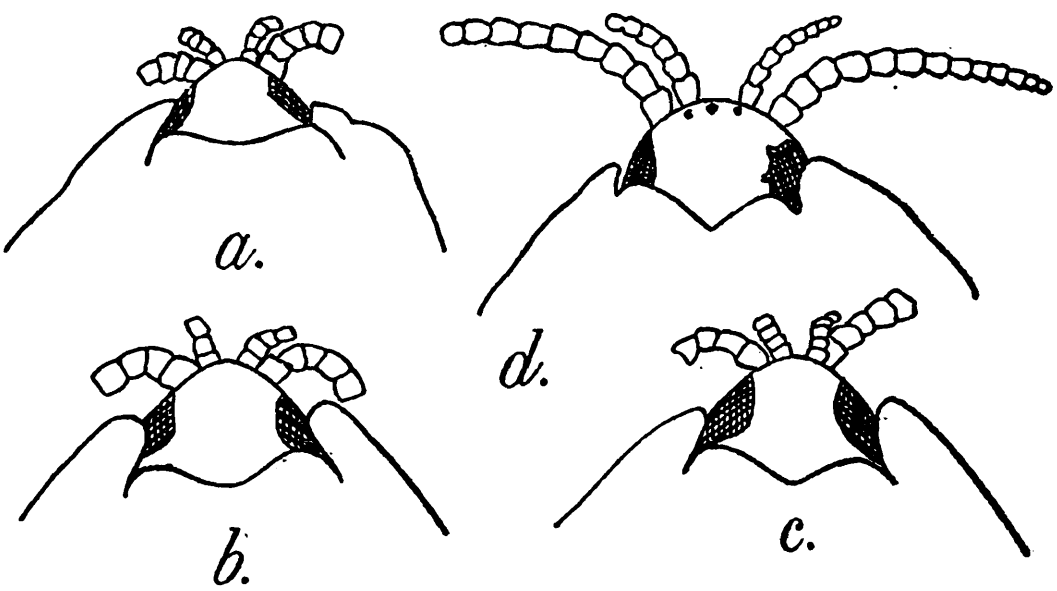
(Plate VI.)

Shri M. N. Datta, Assistant Superintendent, Zoological Survey of India, forwarded to me some specimens of a cymothoan parasite from the branchial chamber of a clupeid fish, *Nematalosa nasus* (Bl.), which his son, Shri Malay Kumar Datta, purchased from Bow Bazar, Calcutta. Three of the specimens were detached while one was preserved *in situ* inside the host. The parasites on examination proved to belong to an undescribed species of the cymothoid genus



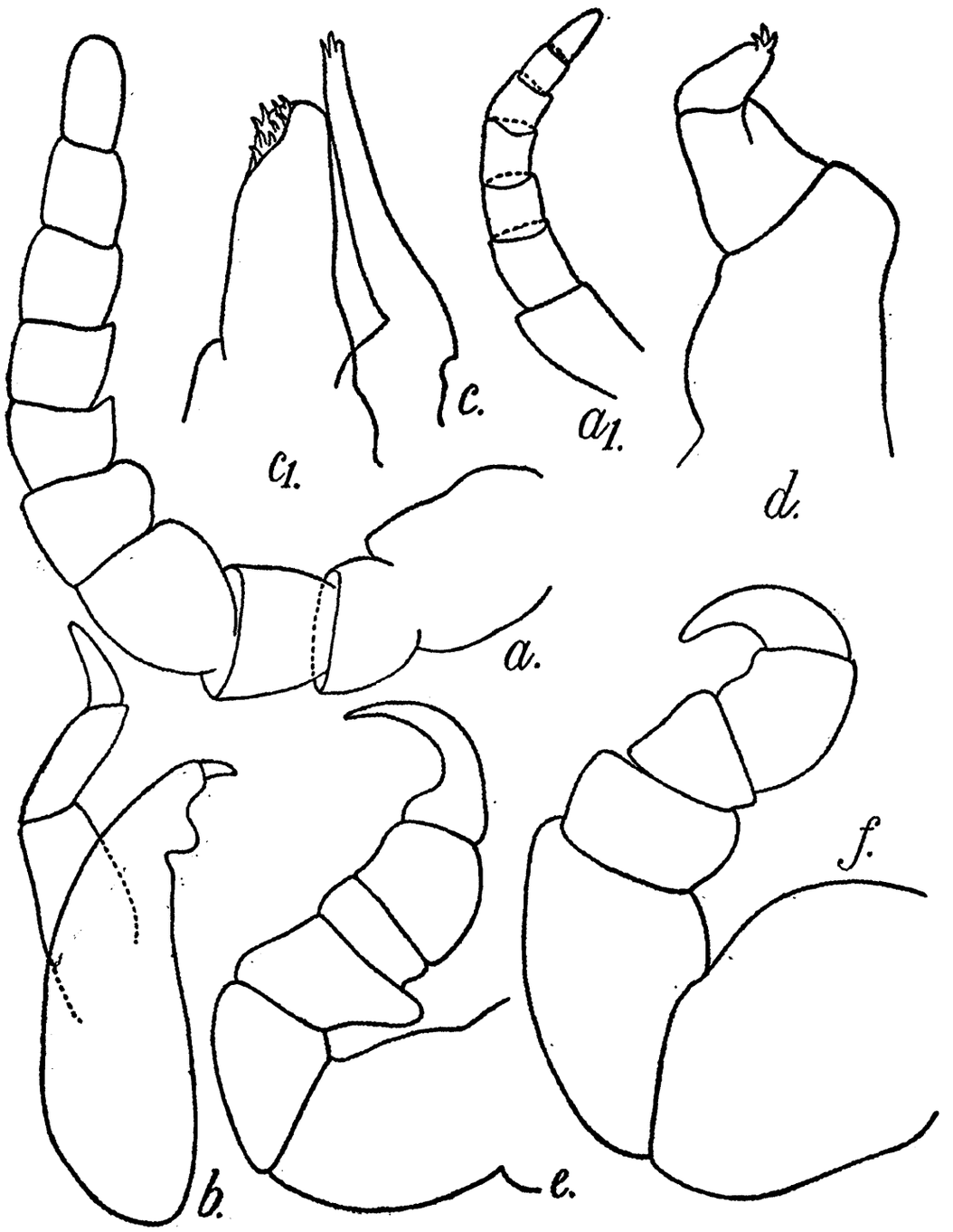
TEXT-FIG. 1.—Head and first thoracic segment of *Agarna malayi*, sp. nov., showing variations in the outline of the anterior margin of the first thoracic segment : × 8.

Agarna Schiodte & Meinert (1884), which is so far known to contain two species only. Some more examples were brought by Shri Malay Kumar Datta later on. This fine series of specimens has enabled me to draw up the following account of the new species which I have great pleasure in associating with the name of Shri Malay Kumar.

Agarna malayi, sp. nov.

The body of the parasite is very asymmetrical and hunched. Seen in dorsal view, one side is almost straight in outline, while the other is strongly arched, the maximum width at the level of the fourth thoracic segment being about two-thirds of the total median length of the body.

The head and the first thoracic segment are almost symmetrical but behind the latter there is an abrupt increase in the width of the thorax which reaches its maximum in the fourth thoracic somite, posterior to which the width again decreases. The hunch, which is roughly pyramidal in shape, likewise begins in the second thoracic segment, reaching its maximum height in the fourth somite.



TEXT-FIG. 2.—*Agarna malayi*, sp. nov.
a. Antenna : × 36 ; a^1, Antennule : × 36 ; *b*. Mandible : × 36 ; *c*. Maxillula : × 36 ; c^1. Maxilla : × 36 ; *d*. Maxilliped : × 36 ; *e*. First peraeopod : × 20 ; *f*. Seventh peraeopod: × 20.

The head is sub-pentagonal in shape (Text-fig. 1 *a-d*) and is broader than long. Its length is about four-fifth of the width of its posterior margin. The anterior border of the head is convex. The eyes are situated in the postero-lateral portion of the head.

The first thoracic segment is longer than the head as well as the following trunk somites. It is about twice as broad as long. Its anterior

margin is generally concave, but its outline is subject to much variation as depicted in Text-figure 1. The antero-lateral angles of the first thoracic segment are conspicuously incised, the corresponding margins having been produced into narrow projections which embrace about half of the posterior region of the head. The posterior margin of the first thoracic segment is convex. The succeeding thoracic somites are all shorter than the first, but distinctly broad, the width increasing posteriorly and reaching its maximum in the fourth. The segments posterior to the fourth are flattened on the longer side of the body. The lateral margins of second to seventh thoracic segments are wider on the longer side and the postero-lateral corners are rounded in segments four to seven. The seventh thoracic segment has its posterior border emarginate.

All the thoracic segments with the exception of the first have epimera, which are almost transversely placed on second and third segments, but in somites four to seven they are obliquely disposed on the antero-lateral face of the lateral margin (Pl. VI, figs. 3, 4). The epimera of fourth to seventh segments are triangular in shape, with the posterior angle produced and free from the somite. The epimera of the two sides are similar in appearance.

The abdomen (Pl. VI, fig. 2) is not narrower than the peraeon. Its median length is slightly more than a third of the total length of the body. The anterior three segments of the pleon are immersed in the concavity of the last trunk somite. The abdominal somites are very short and subequal, and the lateral parts of the first three project beyond the sides of the seventh thoracic segment. The telson is long, being about two-thirds of the total length of the abdomen and is about twice as broad as its median length. Its posterior margin is broadly rounded.

Antennules are short and compressed (Text-fig. 2*a*[1]), their bases are almost contiguous, and they are 8-jointed. Antennae are stout (Text-fig. 2*a*), about twice as long as the antennules, compressed and the number of their joints varies from 10 to 13. The mandible (Text-fig. 2*b*) has an incisor process produced in to a single chitinised tooth, below which there is a small ridge, perhaps representing the molar process. The mandibular palp is three-jointed, the basal joint being very broad, and the apical joint short and bluntly conical. First maxillae (Text-fig. 2*c*) are long and tubular with the usual number of apical spines. The second maxillae (Text-fig. 2*c*[1]) are bilobed and have a number of minute hooks at the apex. The maxillipedes (Text-fig. 2*d*) have a two-jointed palp, the terminal segment of which is armed with two hooks.

The peraeopods are prehensile, and their length increases successively posteriorwards (Text-fig. 2*e* and *f*). The bases of the last four pairs are conspicuously carinated.

The uropods are narrow (Pl. VI, fig. 2) and extend almost up to the posterior margin of the telson on the shorter side.

All the specimens are females, some having eggs in the brood pouch. The table given below gives important dimensions of eight females.

Measurements of *Agarna malayi*, sp. nov. (in millimeters).

	1. ♀	2. ♀	3. ♀	4. ♀	5. ♀	6. ♀	7. ♀	8. ♀
I. *Body :*								
i. Median length	18·6	19·3	17·8	16·7	18·3	17·9	17·2	16·7
ii. Maximum breadth	11·7	11·2	11·3	11·4	12·0	11·7	11·6	9·1
iii. Maximum depth	8·5	6·2	6·0	6·4	7·6	7·9	7·6	5·3
II. *Head :*								
iv. Median length	1·7	1·7	1·4	1·6	1·9	1·8	1·2	1·5
v. Breadth at the posterior margin	2·0	1·9	1·9	1·9	2·1	2·1	1·5	2·0
III. *1st Thoracic segment* :								
vi. Median length	2·4	2·7	2·5	2·7	2·5	2·3	2·5	2·5
vii. Breadth	5·8	5 0	4·8	5·4	5·2	4·9	4·7	5·0
IV. *Abdomen :*								
viii. Median length	7·1	..	6·4	6·3	6·5	6·2	6·6	6·5
ix. Length of last segment (Telson)	4·6	..	4·0	4·2	4·2	4·2	3·6	4·2
x. Breadth of the same	8·3	..	8·0	8·5	8·0	7·7	7·3	7·3
V. *Ratios :*								
xi. Body $\frac{\text{Breadth}}{\text{Length}}$	0·63	0·58	0·63	0·67	0·66	0·66	0·67	0·55
xii. Body $\frac{\text{Depth}}{\text{Length}}$	0·46	0·32	0·33	0·38	0·42	0·44	0·44	0·32
xiii. Head $\frac{\text{Length}}{\text{Breadth}}$	0·85	0·90	0·74	0·84	0·91	0·86	0·80	0·75
xiv. First thoracic segment	0·42	0·54	0·52	0·50	0·48	0·47	0·53	0·50
xv. $\frac{\text{Abdomen length}}{\text{Body length}}$	0·38	..	0·36	0·38	0·35	0·35	0·38	0·39
xvi. Telson $\frac{\text{Length}}{\text{Breadth}}$	0·56	..	0·50	0·50	0·51	0·53	0·47	0·58

Holotype—1♀, Regd. No. C3121/1, Zoological Survey of India.

Paratypes.—6♀♀, Regd. No. C3122/1, Z.S.I.

Host.—*Nematalosa nasus* (Bl.), purchased from Bow Bazar, Calcutta. The parasite was located in the branchial chamber of the fish. (Coll. Shri Malay Kumar Datta, 15-16.iv.1952.)

Remarks.—This species resides in the branchial cavity of the clupeid fish, *Nematalosa nasus* (Bl.), between the operculum and the upper ramus of the first gill arch (Pl. VI, fig. 1). The head of the parasite points anteriorwards, while parts of the telson and the uropods project outside through the opercular slit. The dorsal part of the body of the parasite is closely adpressed against the upper rami of the gill arches of the host and the lining of its branchial cavity, while the soft belly presses against the inner wall of the operculum. Corresponding to the hunch of the animal a depression is formed in the upper part of the branchial cavity of the fish. This depression involves the gill filaments

also which become closely pressed against each other. The longer side of the animal is the one which faces the dorsal aspect of the branchial cavity. Although the legs are prehensile they do not seem to play any part in the attachment of the parasite to the host. In fact once the parasite enters the branchial cavity of the host and grows, it cannot possibly escape as it is too thick to wriggle out through the narrow gill slit.

An examination of a number of parasitised fishes revealed that each fish had only one parasite, either in the right or in the left branchial chamber. Those parasites which inhabited the right brachial chamber were dextrally assymmetrical *i.e.*, the left side was straight and short while the right side was curved and longer, and in those which were obtained from the left branchial cavity the left side was arched and vastly the longer.

Except for the depression formed in the upper part of the branchial cavity there did not appear to be any other visible effect of the presence of the parasite on the host. The operculum did not show any bulging, and but for the protruding part of the pleon the presence of the parasite could easily go undetected in an external examination of the host.

Affinities.—So far only two species of the genus *Agarna* are known to science. The type species, *A. carinata* Schi. & Mein. emanates from St. Croix, West Indies, found parasitic on *Teuthys chirurgus*. The other known species, *A. engraulidis* was described by Barnard (1936) from the operculum (?) of *Engraulis setirostris* caught off the mouth of the Debi River, Orissa coast, in the Bay of Bengal.

The new species, *Agarna malayi,* differs from both the above-mentioned species. Among the obvious characters which separate *A. malayi* from *A. engraulidis* is the shape of the head and the first thoracic segment. In the former species the head is broad and fairly well immersed in the antero-lateral projections of the first thoracic segment, one of which is very prominent and large, and both of which are gibbose. Again the hunch is less prominent in Barnard's species and the bases of the first antennae are fairly wide apart. Further the shape of the epimera in *A. engraulidis* is different from those in *A. malayi* and the telson in the former is distinctly longer than half its breadth.

A. carinata differs from *A. malayi* in the shape of head and the first thoracic segment, the structure and disposition of the epimera and in the shape of the telson. Richardson (1905) states that in *A. carinata* the epimera are absent from the first and the seventh thoracic somites and that the latter has no peraeopods, while the fourth thoracic segment is provided with two pairs of epimera and two pairs of legs. This seems to be a peculiar condition indeed, since in none of the Indian species of *Agarna* the fourth thoracic somite is provided with two pairs of epimera and two pairs of peraeopods. In both the Indian species thoracic segments 2—7 are provided with a pair of epimera each and each trunk somite has one pair of peraeopods. Unless it be an error of observation, the condition described by Richardson for *A. carinata* is really unique and interesting.

ACKNOWLEDGEMENT.

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REFERENCES.

Barnard, K. H., 1936.—Isopods collected by the " R. I. M. S. Investigator ". *Rec. Indian Mus.* **38**, pp. 147-191. (*Agarna engraulidis* pp. 169-70.

Richardson, H., 1905.—A Monograph on the Isopods of North Americao *Bull. U. S. Nation. Mus.* No. **54**, pp. 1-727 (*A. carinata*, pp. 244-245).

Schiodte, J. C. & Meinert, Fr., 1884.—Symbolae ad Monographiam Cymothoarum Crustaceorum Isopodum Famillae. *Naturhis. Tidss* (3)14,pp. 221-433, pls. vi-xviii. (*Agarna carinata*, pp. 329-334 pl. xiii figs, 1-6),