

J. Mar. biol. Ass. India, 1964, 6 (2): 235-240

***LERNAEENICUS ANCHOVIELLAE* N.SP. (COPEPODA-LERNAEIDAE)
PARASITIC ON *ANCHOVIELLA BATAVIENSIS* (HARDENBERG) WITH
DESCRIPTIONS OF ITS THREE POST-LARVAL STAGES**

By M. J. SEBASTIAN AND K. C. GEORGE

Central Marine Fisheries Research Substation, Ernakulam

INTRODUCTION

THE lernaeid genus *Lernaeenicus* is represented in the Indian region by *L. polynemi* (Bassett-Smith, 1898), *L. hemirhamphi* Kirtisinghe (1932), *L. seeri* Kirtisinghe (1934), *L. ramosus* Kirtisinghe (1956), *L. nemipteri* Gnanamuthu (1953), *L. stromatei* Gnanamuthu (1953), *L. sayori* Yamaguti and *L. alatus* Rangnekar (1960). Rao (1951) recorded a species of *Lernaeenicus* without assigning a specific name. Wilson (1917) in the revision of the family Lernaeidae has recognised 12 valid species in this genus. However, this number has been doubled since, through the works of Leigh Sharpe (1927, 1934), Yamaguti (1939), Yamaguti & Utmomi (1953), Shiino (1958) and other authors already referred to above. Herein is described a new species *L. anchoviellae* and its post-larval forms.

***Lernaeenicus anchoviellae* n.sp.**

Host and record: 46 specimens of the white-bait, *Anchoviella bataviensis* (Hardenberg) infected with a total of 107 parasites were obtained on 17th September 1955, by one of the authors (K.C.G.). These fish came from a sample of 500 numbers collected from a shore-seine catch at Attankarai in the Palk Bay on the South-east coast of India.

Leigh-Sharpe (1935) records an instance of 'almost 3%' infection of the host, the sprat, obtained at Plymouth, with *L. sprattae*. In the present collection the percentage of infected host is more than 9. On a single host a maximum number of 6 parasites were met with, the average being 2-3. The preferred site of infection is the pre-anal region behind the operculum. The parasite generally pierces the lateral body wall of this region and buries its head in one of the accessible organs of the visceral cavity such as the gonads, hepatic caecae or the kidneys. However, they have also been found attached to the head (near the eyes, on the operculum, maxilla, mandible and occiput) and also on the caudal peduncle.

The sample of host fish separated into 3 mm. length groups (standard length) for other studies, covered a range of 25 to 57 mm. It is interesting to note that the infection was confined to the length groups above 44 mm. and there itself the rate of infected host in each length group almost increased with increasing length (vide Table I),

TABLE I
Showing the rate of infection in different length-groups of host fish.

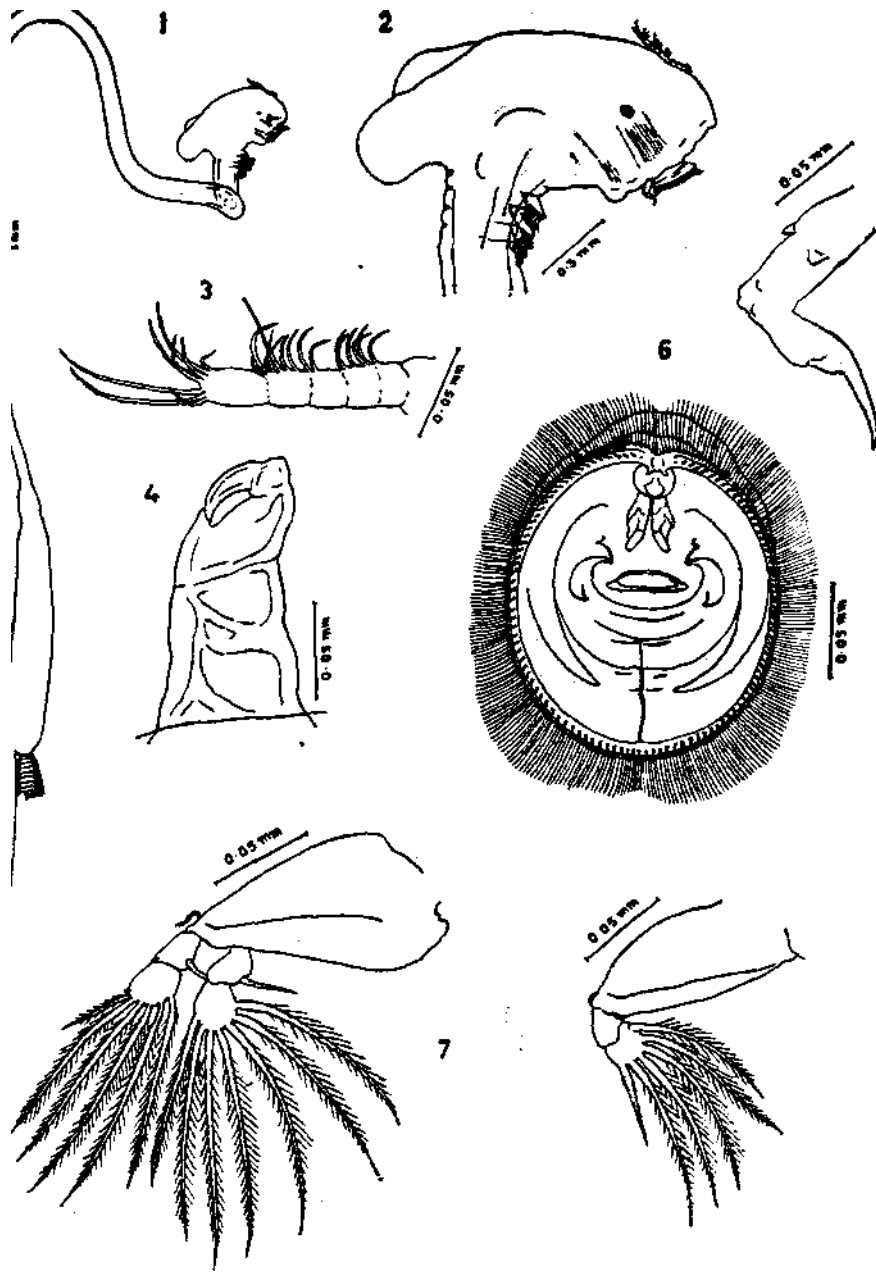
Length-groups in mm.	No. offish in each group	No. infected	% of infected host.
25-28 \	406	nil	nil
29-32 \			
33-36 \			
37-40/			
41-44 J	31	5	16.12
45-48	23	15	65.22
49-52	33	21	63.64
53-56	7	5	71.43
57-60			

DESCRIPTION OF THE SPECIES : FEMALE (Figs. 1-8)

External characters : The head is situated almost at right angles to the thorax, with two postero-dorsal horns which are shorter than the head. On the dorsal side of the head in front are situated together the first and second antennae, the first turned backwards and the second forwards. An extensible proboscis is situated in an oral depression bounded by cushions of attachment swellings. This oral depression is continued ventrally as a groove. The free thoracic segments are indicated by four pairs of appendages and the incomplete lines of fusion between them. This region is followed by the long 'neck' which tapers slightly posteriorly only to enlarge at its end to form the thrice wider genital segment or what is called 'trunk' by Leigh Sharpe (1927). A pair of egg strings, about twice the length of the 'abdomen' arises from the hind end of the genital segment. The genital segment after a marked constriction on the ventral side is continued further as the narrower tapering 'abdomen'. This clear demarcation into neck, genital segment or trunk and abdomen is not so evident in the immature specimens. At the hind tip of the abdomen is a pair of rounded prominences with a pair of setae. Annulations on the cuticle are discernible under high magnification, especially on the genital segment. A tough cuticular tunic covers the buried part of the body except the oral region.

Appendages: The first antenna which is turned backwards is indistinctly marked into 5 segments and bears no less than 22 setae. The second antenna is three-jointed, arises close behind the base of the first but extends forwards pressed on to the surface of the head. It is stout and subchelate. The rim of the proboscis bears an inner ring of curved spines and an outer radially striated fringe. Inside the proboscis are the curved conical mandibles, each with a proximal spiniform process. Regarding the identity of the two pairs of maxillae opinions differ. Gnanamuthu (1953) has figured two pairs of maxillae in front of the mandible and* calls a pair of appendages found posteriorly at the base of the proboscis, 'Wilson's maxillae', as the maxillipedes. The maxillpede is three-segmented with rows of spiny prominences on the basal segments and the distal segment transformed into a strong claw.

The first two pairs of thoracic legs are biramous and the remaining two, uniramous. The basipods are broad plates and the rami, two-segmented. The



FIGS. 1-8. *Lermaenicus anchoviellae* n.sp. 1. Adult female; 2. Cephalothorax and free thoracic segments; 3. First antenna; 4. Second antenna; 5. Maxillipede; 6. Proboscis; 7. First leg; 8. Third leg.

basipod has distally a small plumose seta on the outer side. In the first two pairs of legs, the proximal segments of both exo- and endopods have each a single spiny seta* on the inner side. In the first leg the distal exopod segment has two small spiny setae and 5 long plumose setae whereas the distal endopod segment has 7 long plumose setae. The second pair of legs is similar to the first except in the setation of the distal exopod segment which bears one spiny seta and 6 plumose setae. The uniramous third pair has on its distal segment 1 spiny seta and 5 plumose setae, whereas the fourth pair has 1 spiny seta and 4 plumose setae only.

THE POST-LARVAE (Figs. 9-11)

Three post-larval stages were obtained by us on careful teasing of the infected host tissue under the microscope. The first stage (Fig. 9 a-f) corresponds to the metamorphosed larva of *L. stromatei* described by Gnanamuthu (1953). However, an interesting new observation made through these studies is the finding of the presence of a stout, elongated, two-jointed and spiniform palp for the mandible (Fig. 9 d & e). It is clearly discernible in the first post-larval stage. However, it is not found in the mandible of the adult. It may be noted here that its presence is not recorded by earlier authors either in the mandible of the adult or in that of the metamorphosed larva.

Stage I. Body copepodiform, cephalothorax long and narrow and dorso-ventrally flattened with no trace of a dorsal bulging. Unlike the adult the head and thorax are in the same plane. The antennae are placed anterior most and not in an antero-dorsal position as is seen in the adult, to which position they are shifted through the growth of the region around the proboscis. Attachment swellings are not formed on the rim of the oral depression. However, a pair of ridges ending posteriorly in a pair of spiniform process is seen antero-laterally starting from the base of the second antennae. Likewise, the lateral edges of the ventral oral groove each ends in a spiniform projection anteriorly. A double median eye is quite visible. There is no demarcation into neck, genital segment and abdomen, the whole region being of uniform width.

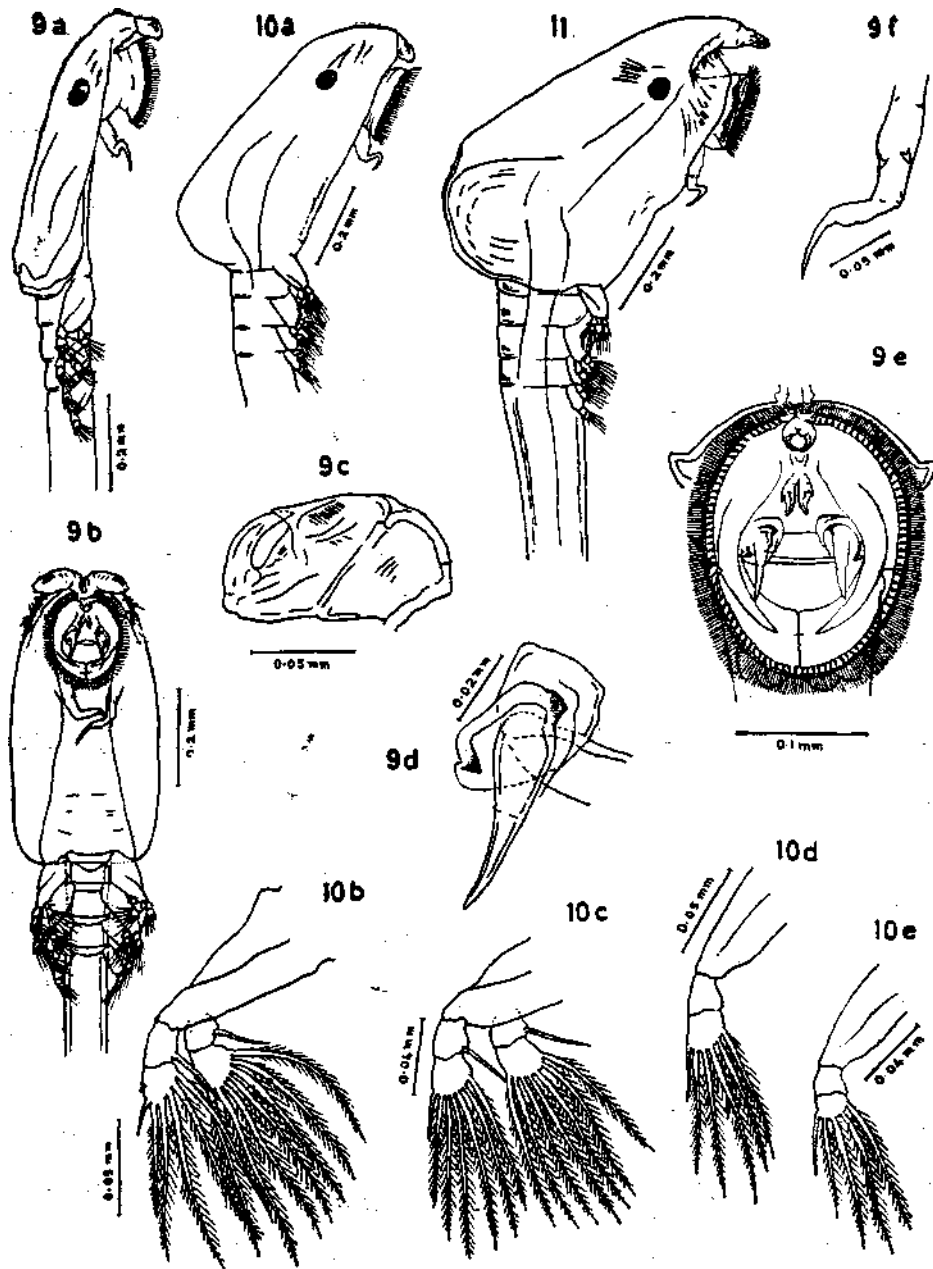
The thoracic appendages though comparatively large and held out laterally are similar to those of the adult.

Stage II. In this stage the development of dorsal horns are initiated by a simple bulging out of the postero-dorsal region of the cephalothorax. The plane of the cephalothorax has become slightly bent from that of the free thorax. The thoracic appendages are held out laterally and are figured in detail (Figs. 10 b-e).

Stage III. Here, the bulged out postero-dorsal region of the cephalothorax has given rise to the rudiments of the two dorsal horns. The cephalothorax has become short with the proboscis placed on a ventral bulging of the oral region with the result that the long axis of the cephalothorax is bent more from the plane of the free thorax.

REMARKS

In the presence of only two horns on the head, the present species differs from all others except *L. affixus* Wilson, 1917 and *L. sprattae* (Sowerby) 1806. How-



FIGS. 9-11. *Lanchoviellae* n.sp. The three post-larval stages. 9a. Post-larva, stage I, lateral view of cephalothorax and *free' thorax; b. same, ventral view; c. Second antenna; d. Right mandibular palp; e. Maxilliped; 10a. Post-larva, stage II, lateral view of cephalothorax and 'free' thorax; b. First leg; c. Second leg; d. Third leg; e. Fourth leg; 11. Post-larva, stage III, lateral view of cephalothorax and free thoracic segments.

ever, the present form differs from *L. affixus* in the presence of the much elongated abdomen (which is as long as the genital segment, whereas it is only about a third of the length of the genital segment in *L. affixus*), in the disposition of the cephalic horns and in the absence of attachment plates. *L. sprattae* differs from *L. anchoviellae* n.sp. in the monoliform nature of its neck, its very short abdomen, the lateral disposition of the cephalic horns and in the setation of the thoracic appendages. The preferred site of infection of *L. sprattae* is the eyes of the host (Scott T. & A. 1913) whereas in the present form it is the visceral region.

Three post-larval stages of this species are described and figured. The presence of a palp in the mandible of the first post-larval stage is a new observation.

The holotype female and the post-larvae are deposited in the reference collection museum of the Central Marine Fisheries Research Institute, Mandapam Camp.

ACKNOWLEDGEMENT

The authors are indebted to Dr. S. Jones for his interest in this work and the publication of this paper. Our thanks are due to Miss Nora G. Sproston for the benefit of discussions on the subject.

REFERENCES

- BASSETT-SMITH, P. W. 1898. Some new parasitic copepods found on fish at Bombay. *Ann. Mag. Nat. Hist.* No. 1(7).
- GNANAMUTHU, C. P. 1953. Three lernaeid copepods parasitic on South Indian fishes. *Jour. Parasitol.*, 39:1-8.
- KIRTISINGHE, P. 1932. Two new parasitic copepods from Ceylon. *Parasitol.*, 24:548-51.
- . 1934. *Gloiopotes watsoni* n.sp. and *Lemaenicus seeri* n.sp., parasitic copepods of fish from Ceylon. *Ibid.*, 26:173-175.
- 1956. Parasitic copepods from fishes of Ceylon. *Ibid.*, 46 :19-20.
- LEIOH-SHARPE, W. H. 1927. Report on a parasitic copepod of *Atherina pinguis* (*Lemaenicus cerberus* n.sp.) *Trans. Zool. Soc. London*, 22 :179-183.
- . 1934. The copepods of the Siboga Expedition. *Siboga. Exped. Monogr.*, 29b : 34-35.
- . 1935. Two copepods (*Lemaenicus*) parasitic on *Clupea*. *Parasitol.*, 27:270-275.
- RANGNEKAR, M. P. 1960. Copepods parasitic on fishes of Bombay. 1. Lernaeopodoida, *Jour. Univ. Bombay*, 29 :198-200.
- RAO, T. S. S. 1951. Occurrence of *Laernaenicus* sp. on *Scomber scomber*, Lawson's Bay, Wallair. *Curr. Sci.* 21 (4) : 103-104.
- SCOTT, T., and SCOTT, A. 1913. *The British Parasitic Copepoda*, Ray Society. 1:156.
- SHIINO, S. M. 1958. Copepods parasitic on Japanese fishes. 17. Lernaeidae. *Rep. Fac. Fish. Pref. Uni. Mie*, 3(1) : 75-100.
- WILSON, C. B. 1917. North American Parasitic Copepods belonging to the Lernaeidae with a revision of the entire family. *Proc. U.S. Nat. Mus.*, 53 :56-59.
- YAMAGUTI, S. 1939. Parasitic copepods from fishes of Japan. Part 5. Caligoida. *JH. Volumen Jubilare Prof. Sadao Yoshida*, 2 :479-80.
- YAMAGUTI, S. and UTINOMI, H. 1953. *Lemaenicus quadrilobatus* n.sp. (Copepoda-Lernaeidae) parasitic on the lantern fish, *Diaphus coeruleus*. *Publ. Seto. Mar. Biol. Lab.*, 3(1) : 51-5?.