



ORIGINAL RESEARCH ARTICLE

A study on copepod parasites of marine fish *Johnius aneus* (Bloch, 1793) from Visakhapatnam coast, Andhra Pradesh, India.

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Abstract: Dumping of industrial wastes into the sea is a common factor in and near by coastal cities where by there are mass mortalities of fishes as well as health deterioration of fish health. These fishes are prone to secondary infections by microbial and eukaryotic parasitic species. In the present study a survey has been made on *Johnius aneus* for copepod parasites infection. The study has been conducted+ for 10 months. 3 species of parasites were recorded-*Lernanthropus otolith*, Pillai, 1963 *Caligus annularis* Yamaguti, 1954 and *Brachiella albida* Ranganekar, 1956. To know the host parasite interaction, prevalence and Mean Intensity of overall parasites and individual parasite species have been studied. It is found that over all prevalence is high being 44%, whereas Mean intensity is less being 1.6. This gives an overall view of parasitization of copepods on the fish *Johnius*. It indicates that infection with copepod parasites is common but not heavy.

Key words: *Johnius aneus*, *Lernanthropus otolith*, *Brachiella albida*, *caligus annularis*

Introduction

Visakhapatnam is one of the coastal cities of East coast of India boarded by Bay of Bengal. Bay of Bengal is richly productive and nearly 3 million tonnes of fish food is supposed to be obtained to the city from the sea. There are reports of decline in this number due to over fishing and also dumping of industrial wastes in to the sea there by polluting the water and killing the fish. Pollution kills the fish and also affects the health of remaining fish. The fish which cannot keep proper health are easily attacked by the infections of microbes and also other parasites.

Parasites are certainly responsible for mass mortalities of fish and for their poor growth, low survival and reproductive capacity. Parasites belonging to Protozoa to Crustacea take part in affecting the health of the fish. One or two parasites may not affect the health condition of a fish or may not have deleterious effects. There may be degrees of variation in host parasite interaction which cannot be generalized. Fairly extensive studies have been undertaken on parasites of marine fishes for the past few decades in India and the knowledge of the parasitic fauna of marine fishes of the East Coast, in particular, can be regarded as well known.

Copepods are the destructive ectoparasites causing extensive damage to fishes. There are a number of reports on copepod parasites globally. Southwell (1930)¹, Gnanamuthu (1951-1956)², Tripathi (1954-57)³, Pillai (1962-85)^{4,9} and Bhattacharya (2005)¹⁰ are some of the Indian contributors. In the present study of copepod parasites of *Johnius aneus*, 3 species of copepod parasites were obtained in good number. *Lernanthropus otolithi* Pillai, 1963, *Caligus annularis* Yamaguti, 1954 and *Brachiella albida* Ranganekar, 1956 have been collected. *L. otolithi* is a new host record.

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Material and Methods

It is proposed to study the copepod parasites of marine fish *Johnius aneus* Bloch at Visakhapatnam coast (Plate.1, Figure 1). *Johnius aneus* belongs to the family Scianidae. For the present study these fish were collected from fishing harbour, from other fish landing centers of Visakhapatnam and also from local markets.

A total number of 120 fishes were examined during the tenure of 10 months of my research work. Out of these, only 53 fishes were infected with Copepod parasites. Fishes of sizes ranging from 10–25 cms were brought to the laboratory for examination. Gills were removed carefully and were kept in saline solution. Gill filaments were carefully observed under microscope for copepod parasites, teased and the parasites were collected from the gills. Parasites were fixed in 10% formalin. For clearing and identification, copepods were kept in lactic acid for 12 – 24 hours. Mouth parts and appendages were dissected and diagrams were drawn with the aid of camera lucida.

Prevalence of parasitization and Mean intensity is calculated parasite-wise and total parasites wise basing on the following equations.

$$\text{Prevalence} = \frac{\text{Number of fishes infected}}{\text{Total No. of fishes examined}} \times 100$$

$$\text{Mean intensity} = \frac{\text{Total No. of parasites in host fish}}{\text{No. of infected fish}}$$

Results

Johnius aneus appears to be a good host for copepod parasites. A list of hosts parasitized and the number of parasites obtained is given below.

The parasites are described briefly for identification

slender narrowing towards the tip with two apical and two outer setae.

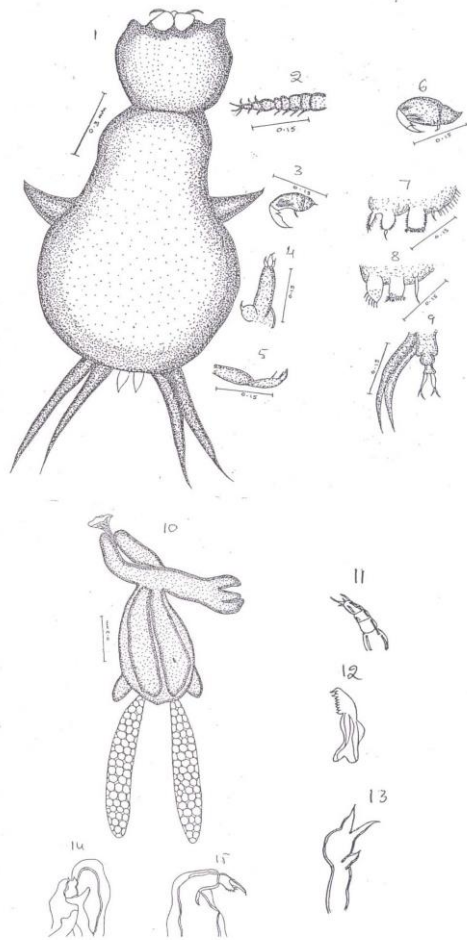


Figure 1: *Lernanthropus otolithi* (Female)
 Figure 2: First antenna
 Figure 3: Second antenna
 Figure 4: Maxillule
 Figure 5: Maxilla
 Figure 6: Maxilliped
 Figure 7: Leg-1
 Figure 8: Leg-2
 Figure 9: Posterior region of the body
 Figure 10: *Brachiella albida* (Female)
 Figure 11: Antennule
 Figure 12: mandible
 Figure 13: Maxillule
 Figure 14: Antenna
 Figure 15: Maxilliped

***Lernanthropus otolithi* Pillai, 1963** (Plate 1, Figure 1): 38 female parasites were collected from 20 host fishes. One or two parasites were collected from each host. There is no infection of other copepod species when these parasites are present.

Parasites measure 1.70-1.97 in length. Cephalothorax large, narrowing backwards and anterior border prominently trilobed. Antennular lobe projects beyond the lateral lobes. Anterior division of the trunk long, sub-cylindrical and demarcated from the dorsal plate by a constriction. Dorsal plate is nearly circular. Genital segment short but broader than the abdomen. Abdomen long and two segmented, basal longer and broader than the second. Genital segment and abdomen are covered by dorsal plate. Caudal rami long and

***Brachiella albida* Ranganekar, 1956** (Plate 1, Figure 2): 40 female parasites were obtained from 30 fishes. Parasites measure 1.78-2.68mm in length. Cephalothorax is much shorter than trunk, fairly stout, cephalon swollen with indistinct carapace. Trunk gradually widens backwards. Posterior part of trunk with a pair of short finger shaped processes. Genital processes prominent and bilobed. Only two or three parasites were obtained from each fish.

***Caligus annularis* Yamaguti, 1954** (Plate 2, Figure 1): 10 male parasites were obtained from only 3 hosts. Parasites measure 1.31mm in length. Typical Caligus shaped parasites. Cephalothorax wide and lunules are large. Genital segment barrel shaped two jointed Abdomen distinctly separated from genital segment.

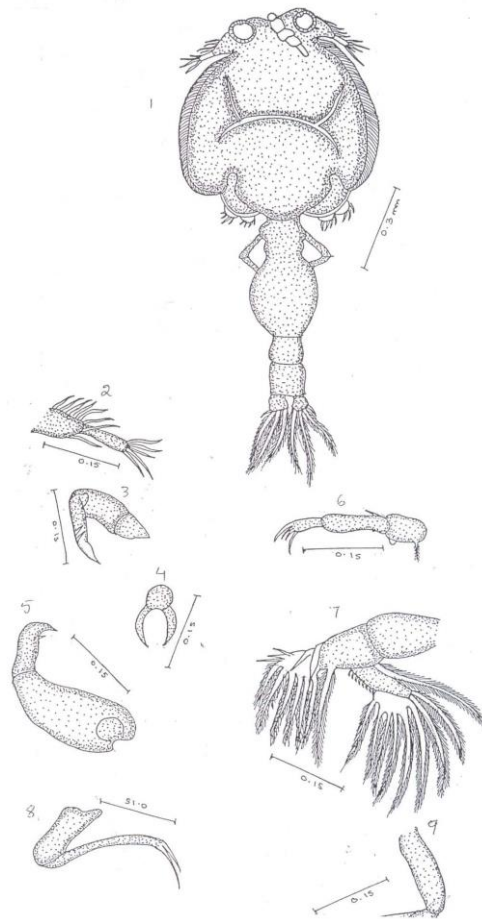


Plate 2: *Caligus annularis*
 Figure 1: Female
 Figure 2: First antenna
 Figure 3: Second antenna
 Figure 4: Sternal fork
 Figure 5: Maxilliped
 Figure 6: Leg-1
 Figure 7: Leg-2
 Figure 8: Maxilla
 Figure 9: Leg-4

Results

It is interesting to note that mostly infection is not heavy. Only two or three parasites were obtained from each fish. There is no overlapping of parasitic species in the hosts. In the present study prevalence and Mean intensity were studied parasite wise and overall.

Table showing the No. of hosts infected with parasite species, prevalence and Mean Intensity. No. of fish examined: 120.

No. of fish infected	Name of the parasite	No. of parasites collected	Prevalence	Mean Intensity
20	<i>L. otolithi</i>	38	16.6%	1.9
3	<i>Caligus annularis</i>	10	2.5%	3.3
30	<i>Brachiella albida</i>	40	25%	13
Overall prevalence		: 44%		
Overall Mean intensity		: 1.6		

Discussion

The genus *Lernanthropus* was erected by Blainville (1822)¹¹ with *L. munka* as type species. There are more than one hundred species described under this genus. *L. otolithi* was erected by Pillai (1963) from marine fish *Otolithus* from West coast of India. Later there were no reports of this species. In the present study it is a new host record. The infection is considered to be average.

The genus *Caligus annularis* was erected by Yamaguti (1954)¹⁵. A large number of species were reported under this genus from all over the world. This is one of the commonly found genus occurring in all types of fish. In the present study only few male parasites were obtained from 3 fishes.

The genus *Brachiella* was erected by Cuvier (1834)¹⁶ with type species *B. thinni*. There are only 4 more species described under this genus. In the present study only 20 parasites could be obtained. *B. albida* was described by Ranganekar (1956)¹² from west coast. After that there were no reports of this parasite. The present collection is first time report from east coast. The prevalence as well as Mean intensity are high for *Brachiella*.

Prevalence and mean intensity of infection give us an overall view of host parasite relationships. Prevalence gives us an idea about the status of parasitization of fishes. Though prevalence is less for individual species of *Caligus* and *Lernanthropus*, it is good for *Brachiella*. Overall prevalence of 44%, can be considered as high. Mean intensity is low except for *Brachiella* for which it is 13 whereas overall mean intensity is very low being 1.6. This

shows that though the number fishes infected with copepod parasites are nearly 44%, the number of parasites occurring in hosts is less which is a consoling factor as the health status of a host depends mainly on number of parasites occurring.

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