

ON THE PREVALENCE AND INTENSITY OF *NYBELINIA* SP.
METACESTODES IN TWO CLUPEID FISHES ALONG THE
RATNAGIRI REGION, WEST COAST OF INDIA

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ABSTRACT

The metacestode stages of tentaculairiid tapeworms infest the foregut of teleosts. Two clupeids off Ratnagiri (Maharashtra State) viz. *Ilisha megaloptera* (Swainson) and *Opisthopterus tardoore* (Cuvier) were found to harbour a large number of metacestodes of *Nybelinia* sp. and their cysts. Both the prevalence and intensity of infection were found to be the lowest in winter, unlike in previous records. Possible reasons for the differential intensity in the two clupeids have also been discussed.

Key-words: Parasites, *Nybelinia* sp., metacestodes, *Ilisha megaloptera*, *Opisthopterus tardoore*.

Tape worms are common parasites of fishes causing severe pathogenic effects at all stages of their development (Dogiel, Petrushevski and Polyanski, 1958; Williams, 1967; Sindermann, 1970). They have a characteristically complicated life history wherein the early larval stages get transformed first into procercooids and later into metacestodes (plerocercoid) in copepods and invertebrates/teleosts respectively before metamorphosing into adults in the definitive host. Typically, the metacestodes bore into the tissues of intermediate host to get encysted; they never metamorphose into adult unless consumed by a suitable final host. Thus, they keep on passing from one intermediate host to another and as such abound a large varieties of bony fishes (Stunkard, 1977). Yet, very few attempts have been made to study their taxonomy, occurrence, distribution, pathology of infection etc. particularly from India (Radhakrishnan and Nair, 1981). The present work deals with some of these aspects of *Nybelinia* sp. metacestode infection in the two clupeid fishes off Ratnagiri, Maharashtra State; west coast of India viz. the big-eye ilisha *Ilisha megaloptera* (Swainson) and the long-finned tardoore *Opisthopterus tardoore* (Cuvier). Both of these together form the bulk of clupeid fishery off Ratnagiri.

About twenty randomly selected specimens of both fishes were brought from Ratnagiri fish market every month for examination except during June to August, when the fishing activity are suspended. While studying prevalence and intensity, cysts were counted as metacestodes to avoid confusion.

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Studies on movement, measurement of total length etc. were made after transferring metacestodes to filtered seawater in which they exhibit zig-zag movement by alternately contracting and expanding their body. Later, the specimens were fixed and preserved in 5% formalin for detailed morphological studies. The terminologies indicating different parts of metacestodes are as followed by Pintner (1913), Dollfus (1942) and Stunkard (1977).

Systematic position

Order	:	Tetrahynchidea
Suborder	:	Acystidea
Family	:	Tentaculariidae
Genus	:	<i>Nybelinia</i> Poche, 1926

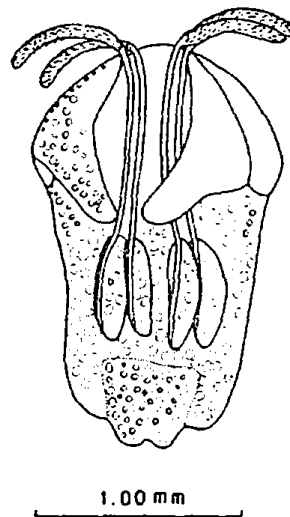


Fig.1. *Nybelinia* sp. Metacestode

Although, maximum infection occurs along the pharyngeal wall in both fishes, a few metacestodes were also attached to the oesophageal wall, gills and opercles. All of them were of almost uniform size.

Generally oval in shape, wider anteriorly with greatest width at lower portion of bothridia. Median part of body provided with four banana-shaped tentacular bulbs arranged in two pairs as shown in figure; each bulb provided with a tentacular sheath carrying an eversible tentacle. Each tentacle provided with 28 to 31 diagonal spiral rows of solid hooks (each row consisting of 6 or 7 hooks) arranged in a homeoacanthus pattern. Space below tentacular bulbs filled with numerous subequal calcareous corpuscles which, in some instances, are found also in bothridial region. Morphometric measurements are given in Table I.

Table I – Morphometric measurements of metacestodes of *Nybelinia* sp.

Characters	Measurements (mm)
1. Size in preserved condition	0.616 to 0.910 x 1.008 to 1.820
2. Maximum length attained while swimming	3.00 to 3.50
3. Length of <i>pars bothridialis</i>	0.490 to 0.840
4. Length of <i>pars post bothridialis</i>	0.490 to 0.980
5. Length of <i>pars bulbosa</i>	0.390 to 0.485
6. Size of bulbs	0.112 to 0.140 x 0.378 to 0.448
7. Length of tentacular sheaths	0.672 to 0.812
8. Length of fully extended tentacles	0.520 to 0.700
9. Width of tentacles	
a) With hooks	0.045 to 0.049
b) Without hooks	0.026 to 0.038
10. Size of hooks	0.011 x 0.0079
11. Size of calcareous corpuscles	0.014 to 0.021

Cysts ovoid (0.490 to 0.548 x 0.770 to 1.090 mm) covered by thick wall (0.007 to 0.014 mm); either found individually or in bunches attached to outer surface of pharynx.

Prevalence and intensity of infection

Table II gives the general observations, at a glance, in the two fishes.

Table II – General observations on prevalence and intensity of infection in *Ilisha megaloptera* and *Opisthopterus tardoore*.

Observations	<i>I. megaloptera</i>	<i>O. tardoore</i>
1. Number of specimens examined	176	179
2. Size range (Total length in cm)	13.0 to 28.0	16.0 to 22.0
3. Number infected	170	171
4. Prevalence of infection (in %)	96.59	95.53
5. Number of metacestodes per fish		
Range	2 to 150	1 to 70
Average	26.53	11.89

A) *Ilisha megaloptera*: Cent percent infection was noticed almost throughout the year except from December to February (winter). The lowest infection of 88.88% was recorded in January (Fig.2,A). All specimens beyond 15.0 cm TL were infected while in smaller specimens prevalence was as low as 57.14%.

Intensity of infection was also much lower during winter than in the remaining part of the year (Fig.2,A). While the highest average

intensity was recorded during October (41.38), the lowest was observed in December (11.05). Further, intensity appears to be directly proportional to the size of host – the largest size group (27.0 to 29.0 cm) exhibiting the highest average of 57.50 (Fig.2,B).

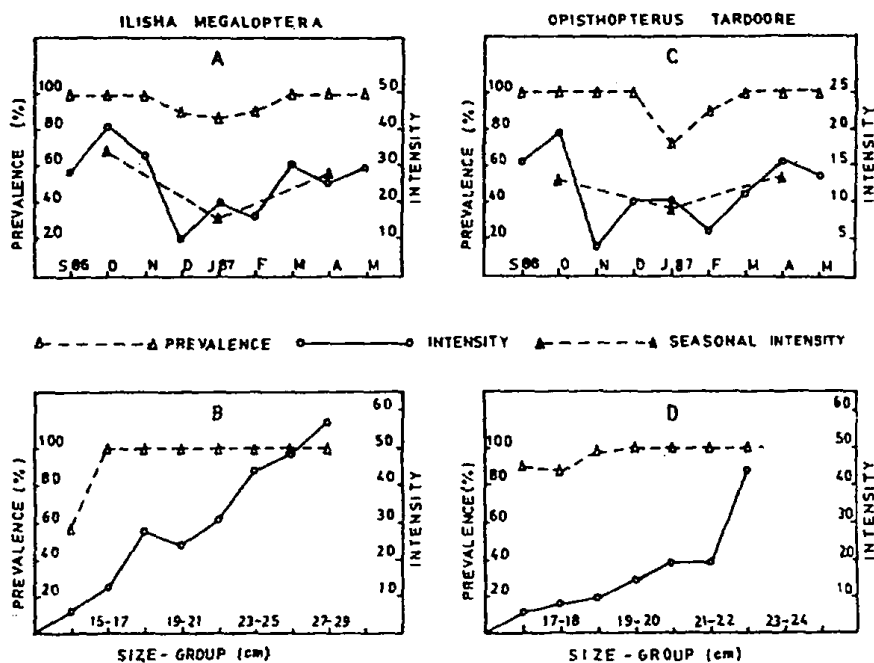


Fig.2. Monthly and seasonal variations in the prevalence and intensity of *Nybelinia* sp. infection in *Ilisha megaloptera* (A & B) and *Opisthopterus tardoore* (C & D).

B) *Opisthopterus tardoore*: Cent percent infection was recorded almost throughout the year except in January and February when the prevalence were 71.42% and 19.00% respectively (Fig.2,C). In specimens beyond 19.0 cm also cent percent infection was observed while in the smaller ones it varied between 88.63 and 97.77% (Fig.2,D).

Intensity of infection was less in winter with the lowest average (4.05) during November (Fig.2,C). The highest average was recorded in October (19.63). In this species also, intensity appears to be directly proportional to the size of fish – the largest size-group (22.0 to 23.0 cm) exhibiting the highest intensity of 44.0 (Fig.2,D).

Thus, in the present study, an unusually high rate of prevalence and intensity of infection by *Nybelinia* sp. metacestodes was observed. Radhakrishnan and Nair (1981) have given an account of *Nybelinia* sp. infection of the oesophagus of porcupine fish, *Diodon hystrix* from Trivandrum, south-west coast of India. Unlike in the present species both prevalence and intensity of metacestodes in *D. hystrix*, besides being independent of size of host

are comparatively low with averages of 55.95 and 13.22% respectively. Also, while winter is generally considered to be a season when highest infection of metacestodes occurs (Radhakrishnan and Nair, 1981), an exactly opposite condition is exhibited by the two clupeids in the present study which recorded lowest infection during winter.

The most likely route followed by metacestodes in the body of host to reach their final destination has been discussed in detail by Radhakrishnan and Nair (1981), according to whom the absence of any serious damage to the oesophageal wall despite the penetration by parasites is probably on account of a repair mechanism simultaneously at work. In spite of the high degree of infection, even in the present case, also no appreciable damage to the foregut was evident.

Generally, metacestodes as well as cysts occupy the outer wall of pharynx along its floor and roof where the corresponding gill arches of either sides unite. The higher rate of infestation in *I. megaloptera* may be probably because of the greater space available at both the above mentioned regions for attachment of metacestodes and cysts in that species. The infestation is considerably less in fishes where these regions are narrow e.g. fishes belonging to the genera *Thryssa*, *Stolephorus*, *Sardinella*, *Lactarius* etc. (personal observation).

The metacestodes of *Nybelinia* sp. are also known to be harboured by squids (Stunkard, 1977). However, none of the squids collected off Ratnagiri yielded any metacestodes, though Gore and Ranade (1971) have reported their occurrence in several penaeid prawns.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. K.N. Sankolli, Associate Dean, College of Fisheries, Ratnagiri for providing necessary facilities and constant encouragement. We are also thankful to Dr. D.R. Jalihal, who has helped us considerably.

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