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NEMATODE PARASITES ASSOCIATED WITH THE FLATFISHES (ORDER : PLEURONECTIFORMES) OF THE KERALA COAST

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ABSTRACT

Twenty-one species of flatfishes belonging to five families, commonly available in the southwest (Kerala) coast of India, were examined for nematode parasites. Five species of nematodes — *Hysterothylacium* sp. 1 (larva), *Hysterothylacium* sp. 2 (larva), *H. aduncum*, *Procamallanus* sp. and *Philometra lateolabracis* were recorded. Twenty out of the twenty-one flatfish species examined harboured one type of nematode parasite or the other. Infection with *Hysterothylacium.* sp.1 larva was more prevalent among flatfishes. Presence of zoonotic nematode *Hysterothylacium* sp. in about 90 per cent of the flatfish species and in 50 percent of the flatfishes of the Kerala coast demands serious attention from public health authorities. Further, infection with *Philometra lateolabracis* inflicted severe damages in the ovaries of flatfishes and this warrants further studies. Most of the nematode parasites are recorded for the first time from flatfishes of India.

INTRODUCTION

NEMATODES are a group of deleterious fish parasites. In fishes growth retardation, impaired gonad development, extensive muscle destruction and/or increase in the cost of processing are known to be caused by the nematodes. Further, many nematodes are zoonotic and are very injurious to human beings, even causing such pathological conditions as meningitis (Moller and Anders, 1986).

Nematode parasites infecting freshwater fishes of India have been studied well (Soota, 1983; Sood, 1988). However, many of the marine fishes still remain to be investigated for nematode parasites, not to speak of the pathology of nematode parasites infecting flatfishes of India. Thus there are no reports of nematode infection from flatfishes of India. Hence a survey of the nematode parasites infecting the common flatfish species of Kerala coast and also a study of the nature of nematode infections were attempted.

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MATERIALS AND METHODS

Twenty-one flatfishes (order : Pleuronectiformes) belonging to five families were examined for nematode parasites. The fishes selected include: *Bothus myriaster* (Temminck & Schlegel), *Crossorhon bus azureus* (Alcock), *Engyprosopon grandisquamis* (Temminck & Schlegel), *Laeops nigrescens* Lloyd, *Pseudor-*

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hombus arsius (Hamilton), *P. elevatus* Ogilby, *P. javanicus* (Bleeker) and *P. triocellatus* (Schneider) belonging to the family Bothidae, *Cynoglossus arel* (Schneider), *C. dubius* Day, *C. lida* (Bleeker), *C. macrostomus* Norman and *C. puncticeps* (Richardson) belonging to the family Cynoglossidae, *Samaris cristatus* Gray belonging to the family Pleuronectidae, *Psettodes erumei* (Schneider) belonging to the family Psettodidae and *Aesopia cornuta* (Kaup), *Euryglossa orientalis* (Schneider), *Solea ovata* Richardson, *Synaptura commersoniana* (Lacepede) *Zebrias altipinnis* (Alcock) and *Z. synapturoides* (Jenkins) belonging to the family Soleidae.

Host fishes (except *Euryglossa orientalis*) were collected from Neendakara and Vizhinjam landing centres of the Kerala coast. *Euryglossa* orientalis was collected from Veli Lake and Akathumuri estuary. In the laboratory host fishes were examined for nematode parasites following the methods suggested by Moravec et al. (1992).

Body cavity, visceral organs, gonads and muscle of the host fishes were separated and examined thoroughly for nematode parasites. Each organ was teased by needle to locate the parasite embeded in the tissues. The number, position and pathological symptoms at and around the point of attachment were recorded.

TABLE 1. List of nematode parasites collected, with their host fish and the site of infection

Parasite	Host	Location
Hysterothylacium sp. 1 (larva)	*Bothus myriaster*	Intestine, mesentary
	Crossorhombus azureus	Intestine, mesentary
	Engyprosopon grandisquamis	Intestine, mesentary
	Laeops nigrescens	Intestine, mesentary
	Pseudorhombus arsius	Intestine, mesentary
	P.elevatus	Intestine, mesentary
	P.javanicus	Intestine, mesentary
	P.triocellatus	Intestine, mesentary
	Cynoglossus arel	Intestine muscle
	C.dubius	Intestine, mesentary
	C.lida	Intestine, mesentary
	C.macrostomus	Intestine, mesentary
	C.puncticeps	Intestine, mesentary
	Samaris cristatus	Intestine, mesentary
	Psettodes erumei	Intestine, mesentary
	Aesopia cornuta	Intestine, mesentary
	Synaptura commersoniana	Intestine, mesentary
	Z.synapturoides	Intestine, mesentary
Hysterothylacium sp.2 (larva)	*Cynoglossus arel*	Ovary
Hysterothylacium aduncum	*Crossorhombus azureus*	Intestine
	Pseudorhombus javanicus	Intestine
	Cynoglossus arel	Intestine
	Samaris cristatus	Intestine
	Zebrias synapturoides	Intestine
	Euryglossa orientalis	Intestine
Procamallanus sp.	*Pseudorhombus arsius*	Ovary
Philometra lateolabracis	*P.elevatus*	Ovary
	P.javanicus	Ovary
	P.triocellatus	Ovary
	Psettodes erumei	Body cavity

TABLE 2. Nature of nematode infection in different flatfish species

Parasite	Host	Number of fish examined	Number of fish infected (Prevalence in %)	No. of parasites collected (Mean intensity)
Hysterothylacium sp.1 (larva)	*Bothus myriaster*	45	38 (84.4)	184 (4.8)
	Crossorhombus Azureus	62	56 (90.3)	159 (2.8)
	Engyprosopon grandisquamis	55	55 (100.0)	290 (5.3)
	Laeops nigrescens	30	23 (76.7)	32 (1.4)
	Pseudorhombus arsius	45	45 (100.0)	612 (13.6)
	P.elevatus	85	85 (100.0)	453 (5.3)
	P.javanicus	36	36 (100.0)	271 (7.5)
	P.triocellatus	60	60 (100.0)	304 (5.1)
	Cynoglossus arel	254	109 (42.9)	262 (2.4)
	C.dubius	121	27 (22.3)	43 (1.6)
	C.lida	118	7 (5.9)	8 (1.1)
	C.macrostomus	259	73 (28.2)	96 (1.3)
	C.puncticeps	55	3 (5.5)	8 (2.7)
	Samaris cristatus	48	29 (60.4)	41 (1.4)
	Psettodes erumei	55	21 (38.2)	33 (1.6)
	Aesopia cornuta	48	11 (22.9)	14 (1.3)
	Synaptura commersoniana	52	7 (13.5)	13 (1.9)
	Zebrias altipinnis	36	9 (25.0)	10 (1.1)
	Z.synapturoides	61	18 (29.5)	24 (1.3)
Hysterothylacium sp.2 (larva)	*Cynoglossus arel*	254	4 (1.6)	4 (1.0)
Hysterothylacium aduncum	*Crossorhombus azureus*	62	2 (3.2)	2 (1.0)
	Pseudorhombus javanicus	36	2 (5.6)	2 (1.0)
	Cynoglossus arel	254	3 (1.2)	3 (1.0)
	Samaris cristatus	48	2 (4.2)	2 (1.0)

TABLE 2. *Contd...*

	Zebrias synapturoides	61	2 (3.3)	2 (1.0)
Procamallanus sp.	*Euryglossa orientalis*	65	1 (1.5)	1 (1.0)
Philometra lateolabracis	*Pseudorhombus arsius*	45	8 (17.8)	12 (1.5)
	P.elevatus	85	12 (14.1)	17 (1.4)
	P.javanicus	36	6 (16.7)	11 (1.8)
	P.triocellatus	60	6 (10.0)	9 (1.5)
	Psettodes erumei	55	7 (12.7)	10 (1.4)

Nematodes collected were cleaned off mucus, and killed in 70% ethanol and preserved in 70% glycerol-alcohol. Parasites were cleared in lactic acid for identification.

OBSERVATION AND DISCUSSION

Five species of nematode parasites including *Hysterothylacium* sp. 1 larva, *Hysterothylacium* sp. 2 larva, *Hysterothylacium aduncum* Rudolphi, 1802 - *Procamallanus* sp. and *Philometra lateolabracis* Yamaguti, 1935 (Deardorff and Overstreet, 1981a), were collected from 21 species of flatfishes. A list of nematode parasites collected, their hosts and site of infection are given in Table 1. The prevalence and mean intensity of these parasites in different hosts are presented in Table 2.

Twenty out of the twenty-one species of flatfishes examined harboured one type of nematode species or the other. Multiple infection with different types of parasites was also common. *Solea ovata* was found free of nematode infection.

Out of the twenty-one species of flatfishes examined, nineteen were infected with *Hysterothylacium* sp. 1 (larva). Interestingly the two species of fishes (*Euryglossa orientalis* and *Solea ovata*) found free of this parasite, were restricted more to the estuaries. *Hysterothylacium* sp. 1 (larva) infected mainly intestine and mesenteries. However, in *Cynoglossus arel*, this larva invaded the muscles. *Hysterothylacium* sp. 2 (larva) was collected from the ovary of *Cynoglossus arel*.

Both prevalence and mean intensity of *Hysterothylacium* sp. 1 larva were considerably higher than that of *Hysterothylacium* sp. 2 (larva). Prevalence of infection with the former species was 100% in all the four species of the genus *Pseudorhombus* and in *Engyprosopon grandisquamis*. Mean intensity of infection with this species was also higher in these fishes.

Hysterothylacium sp. 1 larva was represented mainly by the fourth stage larvae and less often by the third stage larvae. *Hysterothylacium* sp. 2 larva differ from the former in possessing long ventricular appendix, exceeding the mid body. Further, terminal spike observed in species 1, was lacking in this larva.

Except *Psettodes erumei* and *Cynoglossus arel* all the other 17 species of flatfishes infected are new host records for *Hysterothylacium* sp. This is the first record of *Hysterothylacium* sp. from Indian fishes.

H. aduncum infection occurred in the intestine of *Crossorhombus azureus, Pseudorhombus javanicus, Cynoglossus arel, Samaris cristatus* and *Zebrias synapturoides*. All the host fishes infected with this parasite in the present study are new hosts for this parasite.

According to Kinne (1984), Moller and Anders (1986) and Koie (1993), *Hysterothylacium* is a common parasite of flatfishes. The ascaridoid genus *Hysterothylacium* Ward & Magath, 1917 was revised by Deardorff and Overstreet (1981). Species now included in this genus were previously referred to as *Contracaecum* and *Thynnascaris*. According to this revised classification *Hysterothylacium carangis* described by Kalyankar (1971a) from *Caranx malabaricus* is the only species of this genus described from India.

Overstreet and Meyer (1981) reported that the nematode *Hysterothylacium* sp. infecting the flatfish *Paralichthys lethostigma* is a zoonotic form capable of infecting human beings. Nineteen out of the 21 species of flatfishes examined during the present study harboured *Hysterothylacium* sp. The prevalence and mean intensity of this parasites were also high. *Procamallanus* sp. is one of the most common nematode genera reported from Indian fishes and only one juvenile specimen was obtained from the intestine of estuarine flatfish *Euryglossa orientalis*. *E.orientalis* is a new host for *Procamallanus* sp.

Philometra lateolabracis is a common parasite in the gonads of marine fishes (Kalyankar, 1971b; Mohan, 1971; Ramachandran, 1975; Sood, 1988). In the present study *P. lateolabracis* infection occurred in the ovaries of *Pseudorhombus arsius, P. elevatus, P. javanicus* and *P. triocellatus*, whereas in *Psettodes erumei* this parasite was found in the body cavity, attached to the visceral organs.

The infection of the ovary of *Pseudorhombus* spp. by *Philometra lateolabracis* at times was so heavy that the ovary was practically loaded with the parasites. The infection had a prevalence of 13.9%. Infected ovaries appeared swollen and there was considerable ova atrophy; eggs were located only towards the anterior tip of the ovary.

Higher prevalence of *Hysterothylacium* spp. and *Philometra lateolabracis* in flatfishes is a matter of great concern and more investigations are warranted to find out the zoonotic potential, if any, of *Hysterothylacium* spp. and to study the extent of damage caused by the nematode, *P. lateolabracis* infecting the ovaries.

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