



International Journal of Fisheries and Aquatic Studies

E-ISSN: 2347-5129

P-ISSN: 2394-0506

(ICV-Poland) Impact Value: 5.62

(GIF) Impact Factor: 0.549

IJFAS 2018; 6(6): 33-36

© 2018 IJFAS

www.fisheriesjournal.com

Received: 14-09-2018

Accepted: 18-10-2018

Rekha J Nair

Demersal Fisheries Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

Archana C

Marine Biotechnology Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

NK Sanil

Marine Biotechnology Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

PK Seetha

Demersal Fisheries Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

M Radhakrishnan

Demersal Fisheries Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

Sunil KTS

Demersal Fisheries Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

Akhildev S

Demersal Fisheries Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

Correspondence

Rekha J Nair

Demersal Fisheries Division,
ICAR-Central Marine Fisheries
Research Institute (ICAR-
CMFRI), Kochi, Kerala, India

First report of *Philometra* sp. infestation in Yellow edged lyretail grouper *Variola louti* (Forsskål, 1775) from Indian waters

Rekha J Nair, Archana C, NK Sanil, PK Seetha, M Radhakrishnan, Sunil KTS and Akhildev S

Abstract

Studies were carried out to assess the prevalence of nematode infestation in the gonads of the yellow edged lyretail grouper, *Variola louti*, over a two year period. The results showed the presence of nematodes during post monsoon months. Incidences of gonad atrophy were also noted leading to isolation and identification of the nematode. The Yellow edged lyretail a species which contributes to the hooks and line fishery, was seen to be infected with nematodes from the *Philometra* genera. Since the nematode is very specific to each fish further studies are essential for its identification.

Keywords: *Philometra*, nematode, *Variola*, grouper, parasitic infestation

Introduction

Variola louti, commonly called the Yellow edged lyretail grouper, is a commercially important species contributing to the hook and line fishery in Kerala, on the south west coast of India (Fig.1). This species is distributed in the tropical Indo-West Pacific from Durban, South Africa to the Red Sea; the southwest Indian coast, southern Japan through the Coral Sea and east to the Pitcairn Islands, including southern Japan to Australia. This species is common and abundant in the Western Indian Ocean, but has lower densities in the far eastern parts of its range in the Western Pacific. In the Western Indian Ocean, this species contributes to both commercial (Grandcourt, 2005) [3] and the Live Reef Food Fish Trade (LRFFT). Landings along the Kerala coast of India have increased from 0.8% of the total grouper catch in 2004 to 6% in 2015. In Kochi, India it comprised 0.8% of the grouper catches in 2011/2012 (2,875 tons). Commercial landings of *Variola louti* in India increased from 23 tonnes in 2011 to 26 tonnes in 2015 (CMFRI Annual report 2014-2015). In Kerala alone, during 2016-17, groupers contributed 32.3% of the total marine landings with a CPUE of 515.82 kg. (CMFRI, 2016) [1].

Very little is so far known about the infection of fish gonads by parasitic nematodes in general. However, according to Moravec (2006) [11], philometrids are a diverse group of parasites with a worldwide distribution that is characterized by specific biological peculiarities and morphological features. Philometrid nematodes (Philometridae) which infect fish gonads are reported by Moravec *et al.* (2011) [12] to be distributed in the marine waters of the Atlantic, Indian and Pacific Oceans as well as in associated brackish waters environments. Studies by Moravec & de Buron, (2013) [13] have pointed to the pathogenic behaviour of these nematodes on the fish ovaries which can cause changes in reproduction. In addition, groupers being protogynous hermaphrodites also change sex from female to male after sexual maturity after attaining a certain body weight. *Philometra ocularis* has been recorded from the ocular cavity of *V. louti*, but there are no reports from the gonadal and gut area for this nematode species (Moravec & de Buron, 2013) [13]. Moreover, many species of philometrids are reported (Moravec, 2004) [10] to have a pronounced seasonal cycle in maturation, with the larvigerous females occurring only within a short period in spring and summer, and hence collection of information on the occurrence of larvigerous females of these parasites are important. The occurrence of different species of these parasites in different species of congeneric hosts in the same region indicates a high degree of host specificity of gonad-infecting philometrids. Therefore, it is necessary to emphasize the necessity of studying the conspecific males for the

correct species identification of these parasites. Identifications based solely on females may mask the presence of two or more morphologically similar species and may then lead to wrong conclusions.

Seven philometrid nematodes, which are known to affect fish gonads have been reported from a variety of marine fishes belonging to different families from the Indian Ocean region. Notable examples recorded are *P. cephalus*, *P. globiceps*, *P. lateolabracis* (Yamaguti, 1935) [7], *P. neolateolabracis* Rajyalakshmi, Hanumantha Rao et Shyamasundari, 1985 [20], *P. rajani* Mukherjee, 1963 [15] and *P. terapontis* Moravec, Gopalakrishnan, Rajkumar, Saravanakumar *et al.* Some gonad-infecting philometrids which could not be identified to species level also have been reported from this same region as *Philometra* sp. (Mukherjee 1963, Rasheed 1963, 1965, Parukhin 1976, 1989, Rajyalakshmi *et al.* 1985, Petter and Sey 1997, Kardousha 1999, Hesp *et al.* 2002, Moravec 2006, Mohamed *et al.* 1988, Moravec *et al.* 2011a) [15, 21, 22, 17, 18, 20, 19, 7, 5, 11, 9, 12]. However, to date, only one species has been recorded from Epinepheline groupers from Indian waters. The presence and identity of the nematode parasites in Indian waters are poorly known due to difficulties in isolation and identification as well as their morphological and biological peculiarities. This work aims to carry out, for the first time, a report on the parasitic occurrence in the *Variola louti* a commercially important species of grouper. This will be done in order to investigate the species' commercial importance both in the local and in the export market as well possible inference in the reproductive strategy also since the occurrence of the parasites in fish gonads have reported to cause egg losses so as to provide the necessary information for fishery management and aquaculture.

Material and Methods

Studies on the biology of all commercially important groupers of Kerala have been undertaken during the period 2014-2017. Weekly sampling for groupers was done at the Cochin Fisheries Harbour for species specific samples landed by hooks and lines and gillnets throughout the year except in the monsoon fishery ban period of June-July. The weekly subsamples of Yellow edged lyretail grouper (n= 20) collected were brought to the laboratory in iced condition. The fishes were then washed thoroughly to remove any extraneous debris; their length and weight were measured to the nearest mm and gram respectively in the laboratory. The lyretail groupers were then cut open and examined in detail for maturity stages, gut content, incidence of parasites on the gut wall, gonad, etc. Gonad stages were classified based on Gunderson (1993) [2] with slight modifications. The nodules and cysts in the gonads and mesentery were isolated and transferred to a petri dish for further study and genetic evaluation using cytochrome oxidase 1 (CO1) gene.

Results and Discussion

During the period under study, grouper landings by all gears was observed at Cochin Fisheries Harbour at Southwest coast, Kerala, India. *Variola louti* was landed in the hooks and line

fishery more during the post monsoon months of August – March at Cochin Fisheries Harbour. An estimated 72 fishes in the length range 480 - 610 mm were observed to have incidence of parasites out of the 140 sampled. Of these 49 fishes were females and the rest males. The parasites were noted in mostly female fishes, while incidences of parasites in male fishes were less. Even though the parasites were present in all gonadal stages from immature, maturing, mature and spent/recovering stages, infestation was more predominant in the mature and spent/recovering stages. Percentage occurrence of parasites in maturing, mature and spent gonad were 35, 4 and 61 percent respectively. The adult female infested with the parasite had atrophied ovary. This contributed to the heavy percentage of the spent gonads in the lyretails groupers. In some groupers, the parasites were seen as red coloured thin thread like strands, while in larger gonads they are seen as tar deposits (Fig 1.) or even hardened tar deposits occupying the whole ovary. Within the lyre tail grouper, the size of the parasite differs in length ranging from 25 mm to 75 mm. In some cases due to heavy infestation the whole ovary was occupied by the parasites rendering the ovary black and an occurrence of ova atrophy (Fig.2). The nematode infestation of groupers was heavy in the months of September –November of 2016 and 2017 with the parasitic nodules being found in the gut, in the abdomen attached to the coelenteric wall as well as in the gonad.

Characterization of the nematodes indicated the presence of the *Philometroides* sp. They usually exhibit a high degree of host specificity, such that each species of fish is parasitized by its own gonad-infecting species of *Philometra*. In Figs. 1, 2, there are only visible black masses in fish ovaries, apparently representing remnants of dead worms from previous infections. In Fig. 3, there is the presence of a broken, red-coloured female of *Philometra* with a dark intestine. However, to identify the species of these parasites, it is necessary to have well-preserved specimens, including the minute conspecific males, and to study them under a scanning electron microscope. The problem with philometrid identification is that the males of the parasitic nematode are very small (usually about 2-4 mm long), thin and colourless whereas the larvigerous, red-coloured females are large - may be up to some 50 cm long in some species (Fig. 3). Since some marine parasites are known to inhibit the reproductive activity of their hosts and cause castration, as in certain molluscan hosts (Obreski, 1975; Huxham *et al.*, 1993) [16, 6], the presence of these nematodal parasites may also cause damage to these fishes; further studies on these lines are required especially in the context on the importance of these fishes in the export market.

Apparently, many new philometrid species, including those from groupers, can be expected to be discovered and described during subsequent investigations. This is indicated by numerous published records of specifically undetermined philometrids (reported as *Philometra* sp.) parasitizing marine fishes. More studies are essential on these lines especially in the context on the importance of these fishes in the export market.



Fig 1: Sampling location on the south west coast of India



Fig 2



Fig 3



Fig 4

Conflict of interest

We declare that we have no conflict of interest.

References

1. CMFRI, CMFRI Annual Report, 2016 -2017.
2. Gunderson DR. Surveys of Fisheries Resources. John Wiley and Sons, 1993.
3. Grandcourt EM. Demographic characteristics of selected epinepheline groupers (Family: Serranidae; Subfamily: Epinephelinae) from Aldabra Atoll, Seychelles. Atoll Research Bulletin. 2005; 539:201-216.
4. Hanafy MH, Gab-Alla AAFA, Hassanine RME. Larval trematode (Digenea: Lepocreadiidae) infection in the gonads of the commercial bivalve *Venerupis decussata* from Lake Timsah, Suez Canal. Journal of the Egyptian-German Society of Zoology. 1997; 24(D):167-181
5. Hesp SA, Hobbs RP, Potter IC. Infection of the gonads of *Glaucosoma hebraicum* by the nematode *Philometra lateolabracis*: occurrence and host response. Journal of Fish Biology. 2002; 60:663-673
6. Huxham M, Raffaelli D, Pike A. The influence of *Cryptocotyle lingua* (Digenea; Platyhelminthes) infection on the survival and fecundity of *Littorina littorea* (Gastropoda: Prosobranchia); an ecological approach. Journal of Experimental Marine Biology and Ecology, 1993; 168:223-238
7. Kardousha MM. The first record of *Philometra lateolabracis* Yamaguti, (Nematoda: Spirurida; Philometridae) from teleost fishes of the Arabian Gulf. Qatar University Science Journal. 1999; 18:131-136.
8. Lopez-Neyra CR. *Sanguinifilaria jordanoi* n. sp. (Nematoda; Filaroidea). Granada: Bolletin de Universidad de Granada - Facultad de Farmacia. 1951, 291-293.
9. Mohamed AL, Kamal AB, Al-Khyat JA. Age determination and growth studies of *Lethrinus nebulosus* (Family: Lethrinidae) of Qatar waters, Arabian Gulf. Bulletin of the Institute of Oceanography and Fisheries. 1988; 14(2):87-98.
10. Moravec F. Some aspects of the taxonomy and biology of dracunculoid nematodes parasitic in fishes: a review. Folia Parasitologica. 2004; 51:1-13
11. Moravec F. Dracunculoid and Anguillicoloid Nematodes Parasitic in Vertebrates. Academia, Prague, 2006, 634.
12. Moravec F, Justine JL. Two new gonad-infecting species of *Philometra* (Nematoda: Philometridae) from the marine fish *Lutjanus vitta* (Perciformes: Lutjanidae) off New Caledonia. Folia Parasitologica. 2011; 58:302-310.

13. Moravec F, Isaure de Buron. A synthesis of our current knowledge of philometrid nematodes a group of increasingly important fish parasites. *Folia Parasitologica*. 2013; 60(2):81-101.
14. Moravec F, de Buron I, Baker TG, González-Solís D. Some gonad-infecting species of *Philometra* (Nematoda, Philometridae) from offshore fishes of South Carolina and Georgia, USA, including *Philometra charlestonensis* sp. nov. from the scamp *Mycteroperca phenax*. *Acta Parasitologica*. 2008; 53:382-391.
15. Mukherjee RP. On a new nematode from the ovary of Indian fishes. *Journal of the Zoological Society of India*. 1963; 15:76-78
16. Obrebski S. Parasitic reproductive strategy and evolution of castration of hosts by parasites. *Science*. 1975; 188:1314-1316.
17. Parukhin AM. Parasitic Worms of Commercial Fishes of the Southern Seas. Naukova Dumka, Kiev, (In Russian.), 1976, 183.
18. Parukhin AM. Parasitic Worms of Benthic Fishes of the Southern Seas. Naukova Dumka, Kiev, (In Russian.), 1989, 154.
19. Petter AJ, Sey O. Nematode parasites of marine fishes from Kuwait, with a description of *Cucullanus trachinoti* n. sp. from *Trachinotus blochi*. *Zoo systema*. 1997; 19:35-59.
20. Rajyalakshmi I, Hanumantha Rao K, Shyamasundari K. On *Philometra neolateolabracis* n. sp. (Philometridae Baylis and Daubney, 1926) from the ovary of marine fish, *Johnius argentatus* Fowler. *Rivista di parassitologia*. 1985; 2(46):417-422.
21. Rasheed S. A revision of the genus *Philometra* Costa, 1845. *Journal of Helminthology*. 1963; 37:89-130.
22. Rasheed S. Additional notes on the family Philometridae Baylis and Daubney, 1926. *Journal of Helminthology*. 1965; 39:349-362.