

Prevalance, Mean Intensity and relative density of nematode parasite
Contracaecum sp. from the gill of *Channa striatus*.

Prevalencia, Intensidad Media y densidad relativa del parásito nematodo
Contracaecum sp. de las branquias de *Channa striatus*.

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ABSTRACT

The study deals with the investigation of nematode parasitic infection in *Channa striatus* collected from different water bodies of Mavelikara Municipality, Alappuzha district, Kerala, India. The snake head fishes collected during the study period were found to be infected with the larval nematode parasite, *Contracaecum* sp. The mean prevalence of infection of the parasite on *Channa striatus* was 62.39%. The mean intensity was 1.22 and the relative density recorded was 0.76. The present study represents a new locality record for the larval nematode parasite, *Contracaecum* sp.

Keywords: *Channa striatus*, *Contracaecum* sp., parasites

RESUMEN

El estudio trata sobre la investigación de la infección parasitaria por nematodos en *Channa striatus* recolectados de diferentes cuerpos de agua del municipio de Mavelikara, distrito de Alappuzha, Kerala, India. Se encontró que los peces cabeza de serpiente recolectados durante el período de estudio estaban infectados con el parásito nematodo larval, *Contracaecum* sp. La prevalencia media de infección del parásito en *Channa striatus* fue del 62,39%. La intensidad media fue de 1,22 y la densidad relativa registrada fue de 0,76. El presente estudio representa un nuevo registro de localidad para el parásito nematodo larval, *Contracaecum* sp.

Palabras clave: *Channa striatus*, *Contracaecum* sp., parásitos

INTRODUCTION

Channa striatus of family Channidae is one of the most important species of inland fisheries of Indian Subcontinent. It is an important food fish and it is of considerable economic importance. Air breathing *Channa striatus* can live without water for a long time because of the presence of accessory respiratory organ, pharyngeal diverticula. *Channa* are said to have medicinal value and its use has been related to faster wound healing and less discomfort after surgery (Gam *et al.*, 2006). It is a mud loving fish and due to its food habit, it can act as an intermediate host for many parasites. *Contracaecum* sp. are nematode parasites belonging to the family Anisakidae. They may infect a broad range of vertebrates and invertebrates with zoonotic relevance throughout its life cycle. The adult parasites live in the stomach or small intestine of piscivorous marine mammals and birds (Shanthala *et al.*, 2019). Over 100 species are assigned in this genus (Farzana *et al.*, 2019, Bezerra *et al.*, 2019) and it makes *Contracaecum* is the most abundant and diversified genus of the family Anisakidae. The diversity of species in this genus, as well as the vast range of host species engaged in their life cycles and the negative health effects they have on their hosts, make it important. The fish is also a host for Acanthocephalan parasite *Pallisentis nagpurensis* (Bhanu *et al.*, 1993, Chowdhury and Hossain, 2015, Nandini and Siny, 2022)

Contracaecum sp. have been reported from many freshwater fishes (Pardo *et al.*, 2009; Nagasawa, 2012; Adel *et al.*, 2013, Shrestha *et al.*, 2019). Eventhough there is a large number of studies on the life cycle of nematode parasites belong to Genus *Contracaecum*, the present study attempts a redescription of *Contracaecum* sp. obtained from *Channa striatus* from water bodies of Mavelikara municipality, Kerala. The identification of *Contracaecum* sp. from various host groups have attracted the attention of scientists in different geographical parts of the world due to its influence on human health (Younis *et al.*, 2017).

MATERIALS AND METHODS

A total of 117 individuals of *Channa striatus* were collected randomly from different water bodies of Mavelikara municipality, Alappuzha district, Kerala, India during March, 2019 to February, 2020. The collected fish samples were transferred to laboratory for further examination. The fish samples were taken in live condition and examined immediately for parasitological study using compound microscope. The nematode parasite, *Contracaecum* sp. were seen in the gills of the fish. Parasites were removed by using a brush and were preserved in 70% alcohol. Parasites were examined under a compound microscope and microphotographs were taken using LEICA DFC 295 camera. Measurements of the parasites were taken from the photo micrographic images of the parasites under study. It is done with the help of the scales given in the microscopic images. All the measurements are taken in millimeter (mm). The prevalence, mean intensity and relative density were calculated using the standard formulae.

RESULTS AND DISCUSSION

Identification of the parasite: The whitish colored parasite obtained from the gills of the host fish, *Channa striatus* was identified as the larval stage of the nematode parasite belonging to the genus *Contracaecum* (Fig. 1). 62.39% of the fishes examined during the entire study period were found to be infected with the nematode parasite, *Contracaecum* sp. (Fig. 1).

In the present study, larval stage of *Contracaecum* sp. was obtained from the gills of the host fish, *Channa striatus*. The larvae obtained has an average length of 5.45 mm and width of 0.5 mm (Table 1). The anterior half (Fig. 2) has an average length of 2.41 mm and width of 0.24 mm (Table 1). The posterior half (Fig. 3) has an average length of 2.27 mm and width of 0.25 mm (Table 1). The larvae possess a relatively small boring tooth (Fig. 4) and a tapering tail (Fig. 5). The nematode parasite is characterized by a well- differentiated cephalic structure and a slit-like transverse mouth opening (Fig 4). The anterior end modifications can be seen in Fig. 4, whereas posterior end with details can be seen in Fig. 5. The cuticle has somewhat regularly spaced, continuous, transverse grooves, which are rather broad and possess a double banded appearance. Parallel, irregularly spaced, longitudinal ridges are seen between the grooves. The excretory pore opens between subventral lips. The reproductive system is not developed at all. Similar external morphological features were given by Pardo et al. (2009) and Nagasawa (2012). Adel et al. (2013) and Younis et al., (2017) also reported the morphology of *Contracaecum* sp. in different fish hosts. As per the above morphological data obtained, the parasite was identified as the larva of *Contracaecum* sp. Since the parasite collected is in the larval stage, the species level identification was not easy. Because most characters are lacking in larval specimens, morphological identification of larval nematodes to a species level is considered unreliable.

Table 1 Average Length and Width of *Contracaecum* sp.

Parasite	Length (mm)	Width (mm)
<i>Contracaecum</i> sp.	5.45	0.5
Anterior half	2.41	0.24
Posterior half	2.27	0.25



Fig. 1 *Contracaecum* sp.

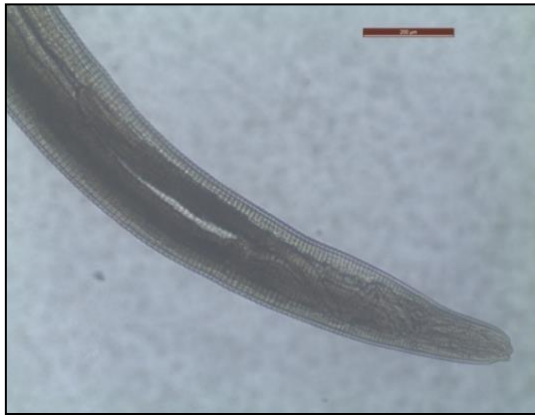


Fig. 2 *Contracaecum sp.* – Anterior end

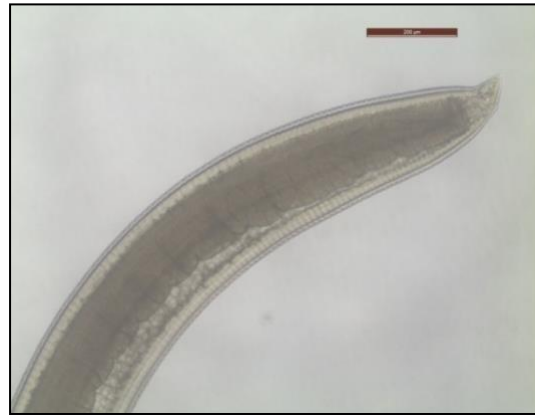


Fig. 3 *Contracaecum sp.* - Posterior end

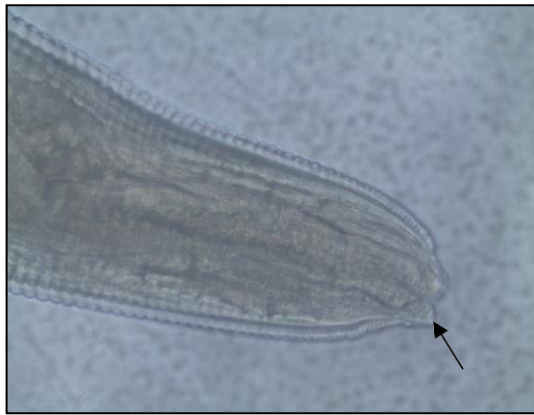


Fig. 4 *Contracaecum sp.*-Anterior end
lips and buccal modification



Fig. 5 *Contracaecum sp.* – Posterior end showing mouth,
showing details.

Prevalence, Mean Intensity and Relative Density: The total number of parasites, Prevalence, Mean intensity and relative density of infection are shown in Table 2. A total of 89 parasites belonging to the phylum nematode (*Contracaecum sp.*) were recovered from the gill of the host fish, *Channa striatus*. It was observed that the average prevalence of infection was 62.39% (Table 2) with the highest infestation (90%) in the month of May (Fig. 6) and the lowest infestation (30%) in November. Almost similar prevalence value was given by Pardo *et al.* (2013) and Adel *et al.* (2013) for infection by *Contracaecum sp.* in different hosts. The mean intensity was found to be 1.22 (Table 2) with the maximum mean intensity (1.50) during October and minimum (1) during November and December (Fig. 7). The mean value of relative density was 1.22 (Table 2). The maximum relative density (1.11.) was recorded during July and August whereas the minimum value (0.30) was observed during November (Fig. 7). Almost similar findings were also noticed by Banu *et al.*, (1993), Hossain *et al.*, (1994), Akhter *et al.*, (1997), Chandra *et al.*, (1997) and Steinauer and Font (2003).

Table 2 Prevalence, Mean Intensity, Relative Density of *Contracaecum sp.* on *Channa striatus*.

Parasite	No. of fishes examined	No. of fishes infested	Prevalence	Mean Intensity	Relative Density
<i>Contracaecum sp.</i>	117	73	62.39	1.22	0.76

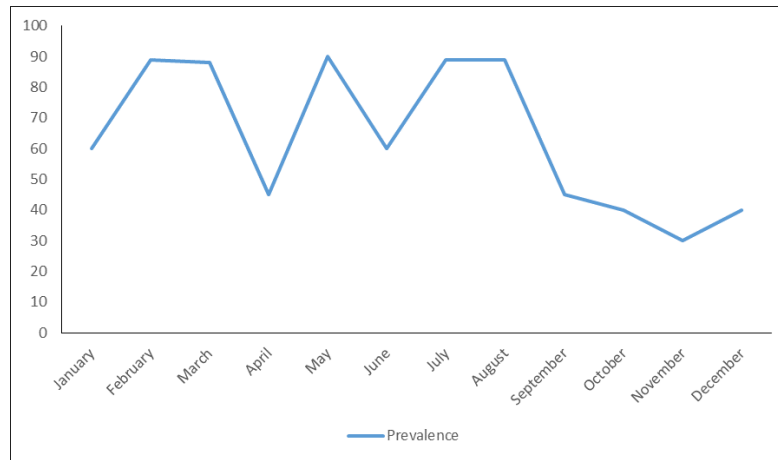


Fig. 6 Monthly variations in Prevalence of infection of *Contracaecum sp.* on *Channa striatus*.

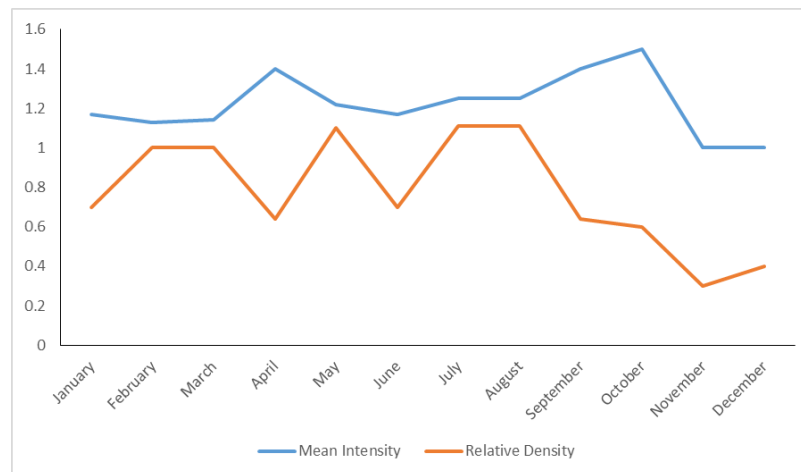


Fig. 7 Monthly variations in Mean Intensity and Relative Density of infection of *Contracaecum sp.* on *Channa striatus*

REFERENCES

- Adel, M., Azizi, H. R., Nematollahi, A. 2013. *Scomberomorus commerson*, a New Paratenic host of *Contracaecum sp.* And *Anisakis sp.* (Nematoda: Anisakidae) from Persian Gulf. *World Journal of Fish and Marine Sciences*. 5(3): 310-314.
- Akhter, M., D'Silva, J., Khatun, A. 1997. Helminth parasite of *Anabus testudineus* in Bangladesh. *Bangladesh Journal of Zoology*. 25: 135-138.

- Bezerra, T.N., Decraemer, W., Eisendle-Flöckner, U., Hodda, M., Holovachov, O., Leduc, D., Miljutin, D., Mokievsky, V., Peña, Santiago, R., Sharma, J., Smol, N., Tchesunov, A., Venekey, V., Zeng, Z., Vanreusel, A. 2019. Nemys: world database of nematodes. *Contracaecum* Railliet & Henry, 1912. Accessed through: World Register of Marine Species
- Bhanu, A.N. H., Hossain, M. A., Khan, M.H. 1993. Investigation into the Occurance of Parasites in Carps, Catfish and Tilapia, Progressive Agriculture. 5: 11-16.
- Chowdhury, S.Z., Hossain, M.M. 2015. Isolation and characterization of internal parasites in snake head. International Journal of Fisheries and Aquatic Studies. 2(4): 17-22.
- Farzana, N., Naher, J., Zafar, M A., Chandra, K.J., Ahmed, G.U. 2019. Study on infestations and biodiversity of metazoan parasites in *Channa punctatus* (Bloch), Mymensingh region. Journal of Bangladesh Agricultural University 17 (3): 409-416.
- Hossain, M.A., Bhanu, A.N. H., Khan, M.H. 1994. Prevalence of Ectoparasite in carp nursery operation of greater Mymensingh. Progressive Agriculture. 5: 39-44.
- Jay Narayan Shrestha., Ganesh Bahadur Thapa., Samjhana Shrestha. 2019 A survey on gastro-intestinal helminth parasites of *Channa* species at Kanchanrup Municipality, Saptari, Nepal. Journal of Natural History Museum Volume 31.
- Nagasawa, K. 2012. The biology of *Contracaecum osculatum* sensu lato and *C. osculatum* A (Nematoda: Anisakidae) in Japanese waters: a review. Biosphere Sci. 51: 61—69.
- Nandini, N.J., Siny, G. Benjamin. 2022 Prevalence and Infestation Rate of Intestinal Acanthocephalan Parasite *Pallisentis nagpurensis* in Fresh Water Fish, *Channa striatus*. Ecology Environment and Conservation. 28: 351-357. <http://doi.org/10.53550/EEC.2022.v28i01s.049>
- Pardo, C.S., Nuriez, D.M., Barrios, R., Prieto, M., Atencio, V. 2009. Parasitics Index and morphological description of *Contracaecum* sp. (Nematoda: Anisakidae) in Trans-Andean Shovelnose catfish *Sorubim cuspicanus* from Sinu river basin. Rev.MVZ Cordoba. 14:2.
- Steinauer, M.L., Font, W.F. 2003. Seasonal dynamics of the Helminth of Bluegill (*Lepomis macrochirus*) in a subtropical region. Journal of Parasitology. 89: 324-328.
- Shanthala, Kumar., A. Periyasamy., Nitin Venkatesh Ranga Rao., S.S.Sunil., Honnavalli N.Kumara., P.Sundararaj., G. Chidananda., A.Sathish. 2019. Multiple infestations of gastrointestinal parasites – Probable cause for high mortality of Spot-billed Pelican (*Pelecanus philippensis*) at Kokrebellur Community Reserve, India. International Journal for Parasitology: Parasites and Wildlife. 9: 68-73.
- Younis A.E., Atef Ibrahim Saad., Jihan Moharam Rabei. 2017. The occurrence of *Contracaecum* sp. larvae (Nematoda: Anisakidae) in four teleostean species from Lake Nasser, Egypt: morphological and molecular studies. The Journal of Basic and Applied Zoology 78.1:1-13.