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Prevalence of a spirurid nematode in *Tor putitora* (Hamilton-Buchanan) from Seer Khad, District Bilaspur (Himachal Pradesh)

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Abstract
This study was carried out to evaluate the distribution of the nematode parasites of *Tor putitora* (Hamilton-Buchanan) during the months of May, August and November 2015. A total of 82 fish hosts were examined out of which 68 were found infected by the nematode worm, *Rhabdochona (Filochona) hellichi turkestanica*. The prevalence, mean intensity and relative abundance came out to be 82.92%, 4.14, 3.13 respectively. The prevalence was high (85%) in May and November whereas mean intensity and relative abundance were high in November (4.79, 4.07) only.

Keywords: prevalence, mean intensity, relative abundance, *rhabdochona*, bilaspur

1. Introduction
Fish diseases due to nematode parasites is one of the important problems in fish culture and fish farming. The presence of nematode parasites up to large extent detrimental for a fish population consequently, imposes big losses of fisheries and fishing industy (Binky *et al*., 2011) [1].
Nematodes belong to parasites of fish in freshwater, brackish water and marine environments throughout the world. The present knowledge of these parasites remains still incomplete, especially as to their biology and ecology, but also taxonomy, phylogeny, zoogeography (Leela, 2016) [2].
The present study was aimed to investigate the nematode intensity of *Rhabdochona (Filochona) hellichi turkestanica* (Skrjabin, 1917) [3] Moravec *et al*., 2010 [4], a common endoparasite nematode mainly found the digestive tract of fresh water fish, *Tor putitora* (Hamilton-Buchanan) from Seer Khad, a tributary of river Satluj, District Bilaspur, Himachal Pradesh.

2. Materials and Methods
A total number of 82 fish hosts (*Tor putitora)* were examined for the collection of nematode parasites from Seer Khad in Bilaspur during the months of May, August and November, 2015.
Selected sites were situated at about 35-Kms from District Bilaspur in Himachal Pradesh. The fresh fish purchased from the local fishermen were dissected along the ventral line and various organs were examined for nematode parasites and the recovered parasites were further processed by standard methods of fixation and preservation.
The ecological terms by Bush *et al.* (1997) [5] are used in the present study.

$$\text{Prevalence} = \frac{\text{Total Number of Hosts Infected}}{\text{Total Number of Hosts examined}} \times 100$$

$$\text{Mean intensity} = \frac{\text{Total Number of Parasites}}{\text{Total Number of Hosts Infected}}$$

$$\text{Relative Abundance} = \frac{\text{Total Number of Parasites}}{\text{Total Number of Hosts Examined}}$$

3. Results
Table I shows the prevalence of *Rhabdochona (Filochona) hellichi turkestanica* (Skrjabin, 1917) Moravec *et al*., 2010.

Total number of hosts examined	=	82
Infected hosts	=	68
Non-infected host	=	14
Total number of parasites	=	282
Prevalence	=	82.20%
Mean intensity	=	4.14
Relative Abundance	=	3.43

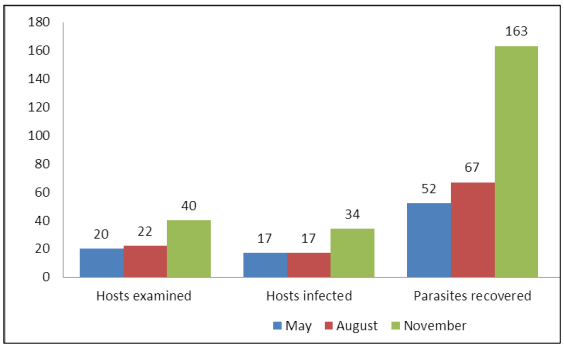

Fig 1: Number of parasites and the months of year

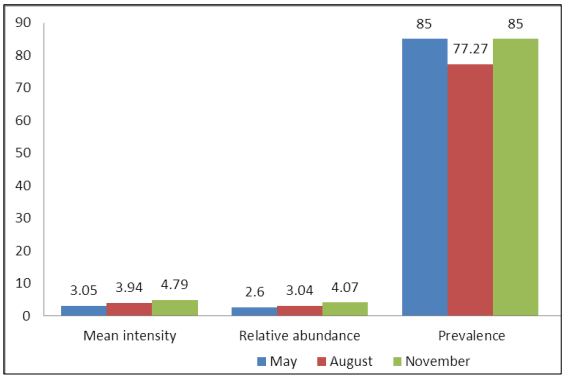

Fig 2: Variations in terms of mean intensity, relative abundance and prevalence.

Table 1

Month	Number of hosts examined	Number of host infected	Prevalence	Number of Parasites	Mean intensity	Relative abundance
May	20	17	85%	52	3.05	2.6
August	22	17	77.27%	67	3.94	3.04
November	40	34	85%	163	4.79	4.07

4. Discussion and Conclusions

The examination of 82 *Tor putitora* (Hamilton-Buchanan) hosts revealed that 68 fishes were found infected by nematode parasites and a total of 282 parasites were collected with the mean intensity of 4.14, prevalence of 82.92 and relative abundance of 3.43, whereas the examination of random sized hosts showed prevalence (85%, 77.27%, 85%), mean intensity (3.05, 3.94, 4.79) and relative abundance (2.6, 3.04, 4.07) respectively during months of May, August and November, 2015.The infected hosts mainly consisted of females (57) as compared to males (11) owing to fact that sexually mature female fish fed more aggressively, leading to more exposure towards parasitism (Mc Fedden *et al*., 1965) [6] Khan *et al*. (2004) [7] observed infection to be restricted in the late spring season while studying the seasonal occurrence of *Rhabdochona* sp. in *Schizothorax* sp. from Dal lake in Kashmir; Raissy and Ansari (2012) [8] observed that the high infection rate with *Rhabdochona denudata* (Dujardin, 1845) [9] Railliet (1916) [10] had a negative effect on native fish population in Iran's Armand river. Kalia *et al.* (2013) [11] opined that prevalence, mean intensity and relative density of *Rhabdochona (Filochona) hellichi turkestanica* were maximum during the months of May and August 2011, at two different downstream locations (Sahu and Chamba) of river Ravi in Chamba. Deepananda (2013) [12] noted *Camallanus fotedari* exhibiting low infection levels in *Puntius dorsalis* and *P. titteya*, showed higher preference to *P. dorsalis* (20%) than *P. titteya* (4.2%) whereas high prevalence, mean intensity and abundance of *Rhabdochona sarana* were reported in *P. filamentosus* as compared to *P. sarana*. Ahmad *et al*. (2014) [13] observed the prevalence (22.8%) and intensity (9.2%) for *Rhabdochona schizothoracis* in *Schizohorax* fish from river Swat, in Khyber Pakhtunkhwa. Leela and Rao (2014) [14] while studying *Rhabdochona gauai* in *Glossogobius giuris* at lower Manair dam, in Andhra Pradesh recorded high prevalence (55.83%) in the month of October and mean intensity (3.14) and relative density (1.40) being high in January. Khurshid and Ahmad (2014) [15] while studying the impact of seasons on helminths of *Schizothorax* during August 2011 – August 2013, from Shallabugh Wetland and river Sindh in Kashmir observed highest prevalence in summer followed by autumn and least during winter, whereas helminths recovered from females *Clarias gariepinus* exhibited higher prevalence (36%) than males (29%) (Egypt) Abdel-Gaber *et al*. (2015) [16]. The *Camallanus* spp. infected *Synodontis sorex* more than other parasite groups, showing 28.13% prevalence (Iyaji *et al*., 2015) [17] whereas Kundu *et al.* (2015) [18] recorded that 62 of the 540 fishes were infected with *Eustronglyoides* sp. Iyaji and Yaro (2016) [19] while studying the monthly occurrence of nematode parasites of *Synodontis* spp. recorded 57.89% prevalence for *Camallanus* spp. and 39.47% for *Contracaecum* spp. in October; 49.28% for *Procamallanus laevionchus* and 34.78% for *Spinitectus guntheri* in August, and 32.08% for *Rhabdochona congolensis* in+ June, 2014.

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