



A NEW SPECIES AND FIRST HOST RECORD OF *RHABDOCHONA* RALLIET, 1916 (NEMATODA: THELAZOIDEA) IN FRESH WATER FISH *TOR PUTITORA* FROM POONCH RIVER OF J&K STATE, INDIA

Aurangzeb Anjum

Dept. of Zoology, University of Jammu, Jammu, J & K, India

ABSTRACT

A new nematode species, *Rhabdochona putitori* sp. n. is described from the intestine of fresh water fish *Tor putitora* from Poonch river of J&K state (India). The body of parasite is cylindrical and attenuated at both ends. Mouth is provided with two lips. Head is truncated somewhat rounded and smooth. Peristome is funnel shaped, supported by 3-5 sharp longitudinal ridges. Cuticle is thin and finely striated. *Rhabdochona putitori* differs from all congeners mainly in (i) having numerous small sized, thin shelled eggs which are neither having any filament, nor provided with any other type of surface ornamentation (ii) the eggs exhibit a specific pattern of placement, giving beaded appearance, along the alimentary canal in the present form.

KEYWORD: *Rhabdochona* n. sp., Fresh water fish *Tor putitora*, Poonch River.

INTRODUCTION

Genus *Rhabdochona* was proposed by Railliet (1916) for *Dispharagus denudatus*, Dujardin, 1845, which forms the type of the genus. Alongwith other genera he also included *Rhabdochona* in the family Thelaziidae. Gendre (1921), while giving an account of some helminth parasites from Africa, gave a historical account of the genus *Rhabdochona*. Travassos, Artigas and Pereira (1928) proposed a new sub family Rhabdochoninae for three genera, *Rhabdochona* Railliet, 1916, *Spinitectus* Pourment, 1883, *Cystidicola* Fischer, 1792. Skrjabin (1924) however did not agree to place Rhabdochoninae under Spiruridae Cerley, 1885. Skrjabin, *et al* (1967) incuded four genera, namely *Rhabdochona*, *Filochona*, *Pseudorhabdochona* Liu and Wu, 1941 and *Parascarophis* Campana-Rouget, 1955 under the sub-family Rhanbdochoninae and recognized 39 species under *Rhabdochona* (including 4 *Rhanbdochona* sp.) and 13 species under *Filochona*. Agarwal, (1965) stated that under this genus *Filochona smythi* should also be added as it has eggs with a single polar filament. A total of 67 mature worms were recovered from the intestine of 25 fish hosts *Tor putitora*, inhabiting fast moving Poonch stream

(Station I) during the course of present investigation. On preliminary investigation the worm was broadly confirmed to the diagnostic features of the genus *Rhabdochona* and have therefore, been described below as *Rhabdochona* sp.

MATERIALS AND METHODS

The host *Tor putitora* was obtained from Poonch river of J&K state. Recovery of parasites was done as per methods employed by Moravec *et al.* (1997). The nematodes were fixed in hot 70% alcohol and preserved in 10% glycerine alcohol. These specimens were cleared in lactophenol for appropriate observations. En face preparations followed the methods of Anderson (1958), and identification of nematodes to species level was based on Yamaguti (1961), Moravec and Arai (1971) and Sood (1989).

Observations:-

Family : Rhabdochonidae

Genus : *Rhabdochona* Railliet, 1916

Rhabdochona putitori sp. n.

Materials : 5 males, & 5 females

Host : *Tor putitora*

Location : intestine

Locality : Poonch river of J&K state.

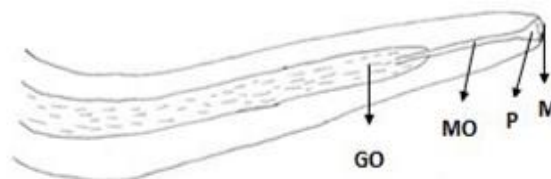


fig. 1

FIGURE 1: Anterior region showing funnel shaped peristome, biliped mouth, muscular and glandular esophagus

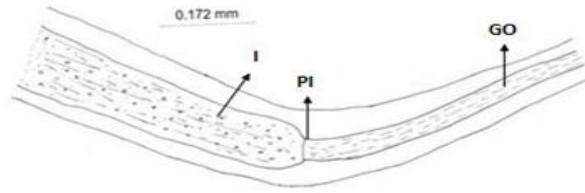


fig. 2

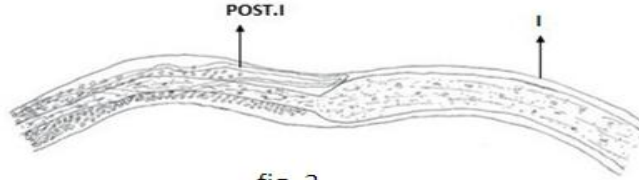


fig. 3

FIGURE 2 : Showing pharyngio-intestinal junction & **FIGURE 3**: Posterior region of alimentary canal showing reduction in dia and leading to anus

FIGURE 1-3: Camera lucida drawings of *Rhabdochona putitori* sp.

M- Mouth. ; P- Peristom (funnel shaped) ; MO- Muscular oesophagus, GO- Glandular oesophagus ; PIJ- Pharyngio-intestinal junction, Post.I- Posterior part of intestine leading to Anus.

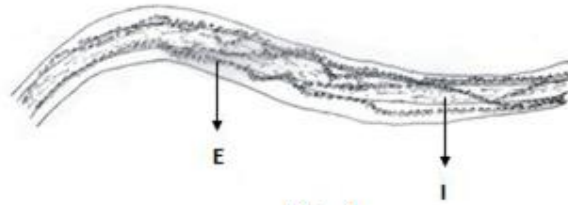


Fig. 4

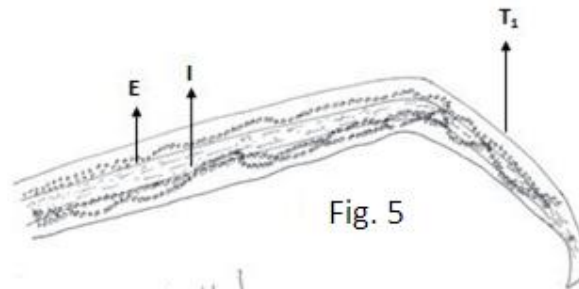


Fig. 5

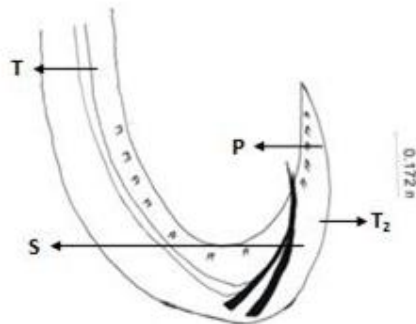


Fig. 6

FIGURE 4 : Middle region of female showing rows of eggs giving beaded appearance

FIGURE 5 : Posterior region of female

FIGURE 6 : Posterior region of curved of male showing spicules and papillae

FIGURE 4-6 : Camera lucida drawings of *Rhabdochona putitori* n.sp

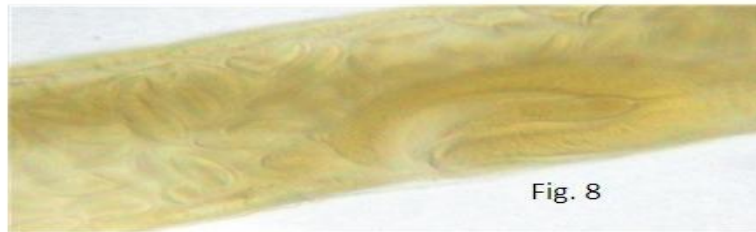


FIGURE 7 : Anterior end showing funnel shaped poristome, muscular and glandular oesophagus

FIGURE 8 : Middle region showing vulva with posteriorly directed vagina

FIGURE 9 : Middle part showing numerous, thin shelled eggs.

FIGURE 10 : Tail region of female

FIGURE 7-10 : Microphotographs of female *Rhabdochona putitori* n.sp

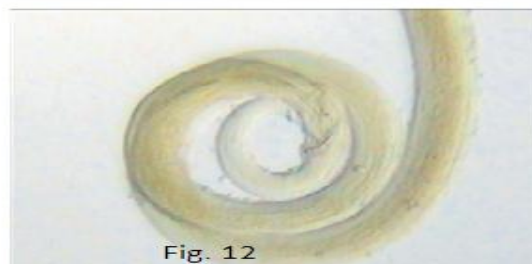
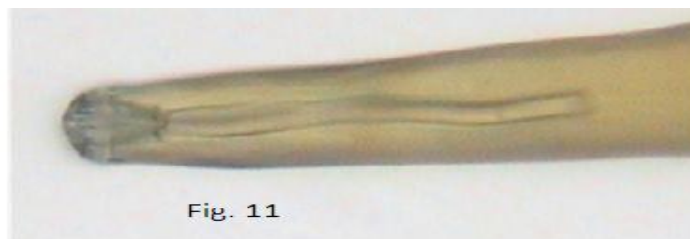


FIGURE 12 : Anterior end showing funnel shaped peristome, bilipped mouth .sp

FIGURE 13 : Showing coiled tail of male.

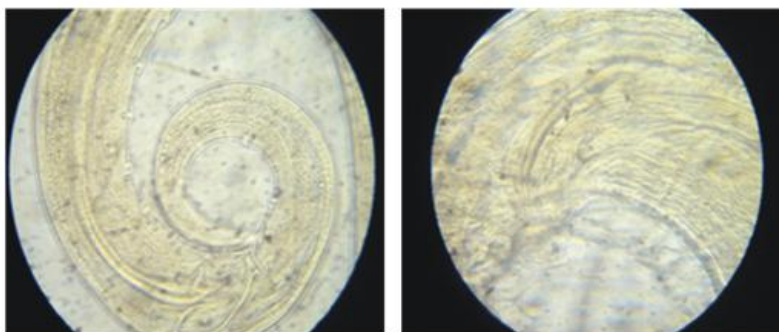


Fig. 13

Fig. 14

FIGURE 14: Curved tail of male showing papillae and spicules.
FIGURE 12-14: Microphotographs of male *Rhabdochona putitori* n.sp

Description

Cylindrical, thread-like and whitish worms. Mouth provided with two lips. Head truncated somewhat rounded and smooth. Peristome funnel shaped, supported by 3-5 sharp longitudinal ridges. Oesophagus divided into an anterior muscular and a posterior glandular portion.

Female

Body: 3.57-4.8 in length and 0.09-0.099 in width. Head: 0.008 in diameter. Prostome: 0.006 long and mesostome: 0.06 long; oesophagus: bipartite, anterior muscular portion 0.05-0.07 x 0.016-0.026 and posterior glandular portion 0.41-0.61 x 0.02-0.028 (Fig.105,111 & 115,Table-17); nerve ring: lying in the anterior half of the muscular oesophagus; intestine: simple and broader than oesophagus; vulva: post equatorial 0.34-0.40 from post end and 3.26-4.16 from anterior end (Fig.112); vagina: posteriorly directed and provided with two long divergent uterine tubes packed with eggs; ovaries: two, anterior ovary extending as far forward as the oesophagus, forming

loop and the posterior ovary reaching out to the cloacal region; eggs: numerous thin shelled 0.0068 x 0.0066 in diameter (Fig.108, 113); tail: 0.30mm long pointed and tapering (Fig.109,114).

Male

Body: 4.92 in length and 0.08 in width; head: diameter 0.0170; prostome: 0.012 long and mesostome: 0.06 long; oesophagus: bipartite, anterior muscular portion 0.05 in length, glandular portion 2.1; genital papillae: sessile, seven preanal and five post anal pairs. No papille in circum-anal position; spicules: two in number, simple, aspinose and unequal. The left spicule longer and more prominent, measuring 0.13 in length, right comparatively much smaller and measuring 0.07 in length (Fig.110,117&118). Gubernaculum: absent; tail: 0.14 long, curved and pointed (Fig.110,116,117&118).

Host : *Tor putitora* (Hamilton)

Location : Intestine

Locality : Poonch Station I

TABLE 1: Species of *Rhabdochona* known parasitic from South Asia in fishes. (Cited from Singh, 1997)

Rhabdochona sp.	Fish host	Location	Authority & Year
<i>R. hellichi</i>	<i>Schizothorax plagiostomus</i>	Intestine	Chitwood, 1933
<i>R. hospeti</i>	<i>Tor (Barbus) tor</i>	Stomach	Thaper, 1950
<i>R. kashmirensis</i>	<i>Schizothorax niger</i>	Intestine	Thaper, 1950
<i>R. barbi</i>	<i>Puntius (Barbus) kolus</i> and <i>Tor (Barbus) khudree</i>	Intestine	Karve & Naik, 1951
<i>R. glyptothoracis</i>	<i>Glyptothorax lonah</i>	Intestine	Karve & Naik, 1951
<i>R. sarana</i>	<i>Puntius (Barbus) sarana</i> and <i>Labeo rohita</i>	Intestine	Karve * Naik, 1951) Kalyankar, 1971
<i>R. singhi</i>	<i>Glossogobius giuris</i>	Intestine	Ali, 1956
<i>R. garuai</i>	<i>Clupisoma (Pseudeutropius) garua</i>	Intestine	(Agarwal, 1965) Sood, 1972,
<i>R. symthi</i>	<i>Tor (Barbus) tor</i>	Intestine	Duggal &
<i>R. mazeedi</i>	<i>Mystus vittatus</i>	Intestine	Nobusting, 1984 and Duggal &
<i>R. dasi</i>	<i>Eutropiichthys Vacha</i> and <i>Wallago attu</i>	Intestine	Kour, 1986
<i>R. bosei</i>	<i>Ompok bimaculatus (Callichrous pabda)</i>	Intestine & Stomach	Agarwal, 1965
<i>R. baylist</i>	<i>Eutropiichthys Vacha</i> and <i>wallago (Wallagonia) attu</i>	Intestine	(Sahay & Prasad, 1965) Gupta and Masoodi,1982, Sahay & Parsad, 1965
<i>R. magna</i>	<i>Clupisome (Pseudeutropius) garua</i>	Intestine	Sahay, 1966b and Verma, 1972
<i>R. barusi</i>	and	Intestine	Rai, 1969
<i>R. alii</i>	<i>Eutropiichthys vacha</i>	Intestine	(Khan & Yaseen, 1969) Zaidi &
<i>R. ghaggari</i>	<i>Rita rita</i>	Intestine	Khan, 1975
<i>R. labonis</i>	<i>Barilius sp.</i>	Intestine	and Siddiqi & Khattak, 1984a
<i>R. yarrelli</i>	<i>Labeo rohita</i>	Intestine	Majumdar & De, 1971
			Kalyankar, 1971

<i>R. cavasius</i>	<i>Tor tor</i>	Intestine	(Sood, 1972b) Sood et. al., 1977
<i>R. chanawanensis</i>		Intestine	and Siddiqi &
<i>R. minima</i>	<i>Labeo rohita</i>	Intestine	Khattak, 1984b
<i>R. oligopapillata</i>	<i>Bagarius bagarius (Bagarius</i>	Intestine	Kalyankar, 1972
<i>R. parastromaeti</i>	<i>yarrelli)</i>	Intestine	Verma, 1972
<i>R. unispinate</i>	<i>Mystus cavasius</i>	Intestine	Rehana & Bilqees, 1973
<i>R. bariliusi</i>	<i>Europiichthys vacha</i>	Intestine	Zaidi & Khan, 1975
<i>R. bagarli</i>	<i>Nemacheilus inglisi</i>	Intestine	Moravec & Daniel, 1976
<i>R. chhaprai</i>	<i>Scomberomorus guttatus (Cypium</i>	Intestine	Arya & Johnson, 1977
<i>R. chitalai</i>	<i>guttatum)</i>	Intestine	Bilqees, 1979, 1982
<i>R. nemacheli</i>	<i>Parastromateus niger, Otolithes</i>	Intestine	Arya, 1980
<i>R. Tori</i>	<i>argenteus</i>	Intestine	Soota & Sarkar, 1981
<i>R. charsaddiensis</i>	<i>Scomberomorus guttatus (Cybium</i>	Intestine	Gupta & Srivastava, 1982
<i>R. noemacheili</i>	<i>guttatum)</i>	Intestine	Gupta & Srivastava, 1982
<i>R. schizothoracis</i>	<i>Barilius bendelisis</i>	Intestine	Gupta & Srivastava, 1982
<i>R. sp.</i>	<i>Bagarius bagarius</i>	Intestine	Rautela & Malhotra, 1982
<i>R. sp.</i>	<i>Labeo sp.</i>	Intestine	Gupta & Srivastava, 1982
<i>R. sp.</i>	<i>Notopterus notopterus</i>	Intestine	Siddiqi & Khattak, 1984b
<i>R. moraveci</i>	<i>Nemacheilus rupicole</i>	Intestine	Chopra & Singh, 1984
	<i>Tor tor</i>		Siddiqi & Khattak, 1984b
	<i>Barilius sp., puntius sp. and</i>		Karve & Naik, 1951
	<i>Nemachilus sp.</i>		Sood, mehta & Virk, 1977
	<i>Nemacheilus montanus</i>		Naidu, 1983
	<i>Schizothorax labiatus and S.</i>		Duggal & Kour, 1987
	<i>plagiostomus</i>		
	<i>Notopterus notopterus</i>		
	<i>Mystus seenghala</i>		
	<i>Mastacembelus armatus</i>		
	<i>Barbus tor</i>		

TABLE 2: Morphological variation among different species of *Rhabdochona* having thin shelled eggs.

Organs / Characters	<i>R. parastomatei</i> Bilqees, 1979	<i>R. bagarii</i> Gupta and Srivastava, 1982	<i>R. chitalai</i> Gupta and Srivastava, 1982	<i>R. chaprai</i> Gupta and Srivastava, 1982	<i>R. nemacheli</i> Rautela and Malhotra, 1982	<i>R. tori</i> Gupta and Srivastava, 1982	Present author
Female specimens							
Body	13.89-22.3	17.00 x 0.30	18.1-26.9 x 0.22-0.27	14.3 x 0.22	2-7 x 0.064-0.014	9.72-14.10 x 0.16-0.19	3.57-4.8 x 0.091-0.099
Muscular oesophagus	0.28-0.38	0.47 x 0.045	0.32-0.51 x 0.045-0.07	0.38 x 0.04	0.224-0.322 x 0.016-0.032	0.50-0.62 x 0.042-0.05	0.05-0.07 x 0.016-0.026
Glandular oesophagus	2.3-3.2	3.75 x 0.054	1.2-1.3 x 0.40-0.65	2.1 x 0.065	1.103-2.380	1.45-2.70 x 0.05-0.07	0.41-0.61 x 0.02-0.028
Vulva	Pre equitorial 5.55	equitorial	post equitorial	post equitorial 8.5 from ant. end	post equitorial at 1.84-4.426 from ant. end	equitorial at 4.9-7.1 from ant. end	post equitorial at 3.26-4.46 from ant. end
eggs	0.029-0.044 x 0.018-0.025	0.023-0.032 x 0.018-0.023	0.017-0.022 x 0.012-0.020	0.028-0.032 x 0.018-0.021	0.014-0.021 x 0.014-0.021	0.021-0.031 x 0.017-0.02	0.0068-0.0070 x 0.0066-0.0068
Male Species							
Body	10.53-15.61	16.2 x 0.15	12.45 x 0.185	19.8 x 0.25	2-5 x 0.037-0.098	6.9-10.5 x 0.160-0.175	4.92±0.12 x 0.08±0.0
Muscular oesophagus	0.28-0.34	0.65 x 0.05	0.65 x 0.05	0.48 x 0.05	0.140-0.280 x 0.12-0.028	0.36-0.45 x 0.03-0.052	0.05±0.01
Glandular oesophagus	2.1-2.4	3.4 x 0.85	1.07 x 0.072	1.24 x 0.06	0.826-1.526	1.70-1.85 x 0.075-0.10	2.1±0.2
Spicules	3-4+1+6=10-11 Rt. 0.48-0.50 Lt. 0.10-0.12	12+1+8=21 pairs Rt. 0.07 Lt. 0.16	6+0+5=11 pairs Rt. 0.05 Lt. 1.100	13+0+7=20 pairs Rt. 0.30 Lt. 0.52	6+0+5=11 pairs Rt. 0.07-0.098 Lt. 0.24-0.378	11+0+5-6=16- 17 pairs Rt. 0.10-0.11 Lt. 0.135-0.14	Rt. 0.07± Lt. 0.13±0.

DISCUSSION

Detail study of the present material reveals that it belongs to genus *Rhabdochona*, Ralliet, 1916. The genus was

erected by Ralliet in the year 1916 with *R. denudate* from *Cyprinus euritharophthalmus* as the type species. The genus *Rhabdochona* includes large number of species all

over the world. Yamaguti (1916) listed about 30 species under the genus *Rhabdochona*, Ralliet, 1916 from different hosts from various parts of the world. Sahay (1970) revised the genus *Rhabdochona* with a key to the Indian species. Moravec (1972, 1975, 1978) extensively studied the genus *Rhabdochona*. Sood (1988) provided key to the species of *Rhabdochona*, Ralliet, 1916 from fishes in South Asia. The present species differs from all the known species described from various parts of the world.

Extensive review of available literature on the species *Rhabdochona* described from South Asian fish hosts (Table 1) reveals that the av

Species Group I: In which the females produce filamentous eggs and the number of these filaments per egg may vary from one to many and includes *R. hellichii*, *R. hospeti*, *R. kashmirensis*, *R. barbi*, *R. glyptothoracis*, *R. smythi*, *R. charsaddiensis* and *R. schizothoracis*.

Species Group II: Includes those species in which the females produce eggs which are non-filamentous but possess cuticular ornamentation on their surface in the form of thickenings or floats. Into this group, fall the species like *R. singhi*, *R. barusi*, *R. alii* and *R. bariliusi*.

Species Group III: Worms belonging to this group are the ones in which the females produce eggs that have neither filament nor provided with any other type of surface ornamentation. This group comprises of *R. sarana*, *R. garuai*, *R. mazeedi*, *R. dasi*, *R. bosei*, *R. baylisi*, *R. magna*, *R. ghaggari*, *R. labeonis*, *R. yarelli*, *R. cavasius*, *R. oligopapillate*, *R. parastomatei*, *R. unispinate*, *R. bagarii*, *R. chhaprai*, *R. chitalai*, *R. nemacheli*, *R. tori* and *R. moraveci*.

The form under discussion thus can be assigned to the species belonging to group III of the above generalization. The present form however differs from all these compatriot species in many features. It differs from *R. sarana*, *R. garuai*, *R. mazeedi*, *R. dasi*, *R. bosei*, *R. baylisi*, *R. magna*, *R. ghaggari*, *R. labeonis*, *R. yarelli*, *R. cavasius*, *R. oligopapillate*, *R. unispinate* and *R. moraveci* in all of which eggs are thick shelled, but are thin shelled in present form. To rest of the species of the group viz., *R. parastromaeti*, *R. bagarii*, *R. chhaprai*, *R. chitalai*, *R. nemacheli* and *R. tori* the present form shares membership because in all of these eggs are thin shelled.

Perusal of table- 2 evidently reveals that the present form differs from *R. parastromaeti*, *R. bagarii*, and *R. tori* with respect to position of vulva besides differences of measurements. In these entire three cases vulva is either pre-equatorial or equatorial while in present form vulva is specifically post-equatorial. The table also highlights that the present form differs from other species *R. chhaprai*, *R. chitalai* and *R. nemacheli* in respect of overall morphometric data including body size, size of muscular and glandular oesophagus, especially size of eggs which very notably are smaller in size but very high numerically

and exhibit a specific pattern of placement, giving beaded appearance, along the alimentary canal in the present form. Moreover host and locality are also different. A new name to the present form hence is being proposed as *Rhabdochona putitori*. Recovery of *Rhabdochona* species from fish host *Tor putitora* is the first host record of the genus from India (Table-1).

Acknowledgements

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REFERENCES

Anderson, R. C. (1958) Methods pour l' examen des nematodes en vue apicale. *Ann. Parasit. Hum. Comp.* 33: 171-172.

Moravec, F. and Arai, H. P. (1971) The north and central America species of *Rhabdochona* Ralliet, 1916 (Nematoda: Rhabdochonidae) of fishes, including *Rhabdochona canadensis* sp. nov. *J. Fish. Res. Bd. Can.* 28: 1645- 1662.

Moravec, F. (1972) General characterization of the nematodes genus *Rhabdochona* with a revision of the South American species. *Vestern. Cesk. Spol. Zool.* 38: 32-51.

Moravec, F. (1975) Reconstruction of the nematode genus, *Rhabdochona* Ralliet, 1916 with a review of the species parasitic in fishes of Europe and Asia, Paragone. *Ceskoslovenske Academi Ved Studie, CASAV* 8: 104.

Moravec, F. (1978) Species of the genus *Rhabdochona* Ralliet, 1916 from fishes of Czechoslovakia. *Folia. Parasit.* Paraha, 15: 29-40.

Moravec, F.; Urava, S. and Coria, C. O. (1997) *Philonema percichthydis* sp. n. (nematoda: Philometridae) from Patagonian small mouth perch *Percichthys trucha* (Pisces) from Argentina, *Helminthologia* 34: 215-219.

Railliet, A. (1916). La famille des Thelaziidae. *J. Parasitol.*, 2: 99-105.

Sahay, U. (1971) On the revision of the genus *Rhabdochona* Ralliet, 1916 with a new key to the Indian species. *Res. Jl. Ranchi Univ.* 6-7: 177-189.

Sood, M. L. (1989) Fish nematodes from south Asia. Kalyani Publishers: 1-389.

Yamaguti, S. (1961) *Systema Helminthum* Vol. III. Parts I & II: *Interscience Publishers Inc.* New York.