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FURTHER OBSERVATIONS ON *PALLISENTIS COLISAI SARKAR*, 1956 RECOVERED FROM THE BODY CAVITY OF *CHANNA PUNCTATUS* (BLOCH, 1793)

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During a survey of freshwater fishes harbouring helminth parasites at Muzaffarnagar, we observed a specimen of *Channa punctatus,* infected with an acanthocephalan species of the genus *Pallisentis* Van Cleave (1928). Present communication deals with re-description of *Pallisentis colisai* Sarkar, 1956, (Acanthocephala : Quadrigyridae) recovered from the body cavity of the host. The description is based on 2 freshly recovered male and female specimens and supported with light microscopic camera lucida sketches and photomicrographs drawn through Motic DMB-1 Microscope. Present observations are in conformity with its original description as well as with the re-descriptions given by Farooqi (1958); Rai (1967); Sahay *et al.* (1967); Tadros (1966); Soota & Bhattacharya (1982) and Duggal & Kaur (1986) except for some minor variations in the measurements. Comparison in various measurements of the present specimens with those described earlier is presented in tabular form.

Key words : Acanthocephalans, Helminths, parasite, freshwater fish, *Channa punctatus.*

INTRODUCTION

Parasitism is one of the most common lifestyles among eukaryotes . Parasites are an essential part of each aquatic community. Their presence becomes evident after a massive development, causing disease and sometimes even leading to the mass mortality of infested hosts. Such events are often combined with biotic or abiotic changes in the environment (Moller, 1987). Parasites belong to many different phylogenetically distinct taxa, and as such, display a variety of life histories and body forms. Virtually every species of free-living organism has parasites. Indeed, there may be more species of parasitic organisms than of free-living ones. Acanthocephalans are obligate endoparasites. The body of adult acanthocephalans is anchored at the intestinal wall of definitive hosts by the presoma (Taraschewski, 1989 a, & b, 2000; Taraschewski, *et al.* 1989). Additionally, in some species the trunk serves as an organ of attachment (Aznar *et al.,* 1999). Acanthocephalans are less important in public health, although they may be highly pathogenic (Neafie & Marty, 2000).

MATERIALS AND METHODS

The host fish, *Channa punctatus* (Bloch) were procured from local fish markets of Muzaffarnagar. A total of 473 host specimens were routinely screened for the survey on recording of helminth parasites present in *C. punctatus* (Bloch) at Muzaffarnagar region. Among all the host specimens, one host was found to harbor two (1 male and 1 female) specimens of *Pallisentis colisai.* Prior to surgical procedures host fish was screened for the presence of ectoparasites. Then an incision was made along the mid-ventral line of the fish. The surfaces of the internal organs and body cavities were examined with the help of a magnifying lens. The organs were carefully removed intact; worms were collected and washed in freshly prepared saline solution. Prior to fixation, the worms

The worms were placed in a petridish containing distilled water and refrigerated overnight so that the proboscis was everted. Later worms were fixed in hot 10% formalin. The trace of fixative was thoroughly removed from specimens, prior to staining, by means of several washings in distilled water. Worms were placed in Lactophenol for five days in order to achieve the visibility of the internal organs and then stained in Semichon's Acetocarmine, dehydrated in ascending concentrations of ethanol, cleared in xylene and whole mounted in Canada balsam. Sketches were made with the help of camera lucida (prism type) mounted just above the eyepiece of Olympus OIC 41231 Light microscope and photographs of parasites taken with the help of Motic DMB1-223ASC-B high resolution digital compound microscope (with Motic images plus 2.0 software). Parasites were identified with the help of Yamaguti (1985).

OBSERVATIONS AND RESULT

Diagnosis : Trunk with a collar of spines arranged in 6-14 closely set rings near anterior extremity. Posterior to this collar of spines is an unspined region followed by 20-40 widely spaced rings of spines, remaining part devoid of spines. Proboscis short, cylindrical to globular, with 4 circles of 6-10 hooks each. Proboscis receptacle cylindrical to saccate, with single-layered muscular walls reaching to second spinose region, when the proboscis is introverted. A nerve ganglion present near base of proboscis receptacle. Lemnisci long, slender, cylindrical. Testes oval to cylindrical, contiguous. Cement gland long, cylindrical, syncytial, containing a number of nuclei. Parasites of freshwater fishes.

Description : Worm small cylindrical, spinose. Proboscis small, globular, armed with four circles of 8-10 hooks each, recurved hooks arranged alternately. Proboscis hooks in four circles. Proboscis receptacle long, single - walled, with nerve ganglion at its base. Lemnisci two, unequal.

Male **(Plates 1)** : Body measures 4.15 mm long and 0.18 mm wide. Proboscis small, globular 0.08 x 0.1 mm armed with four circles of 8-10 hooks each, recurved hooks arranged alternately. Proboscis hook size in 1st, 2nd, 3rd and 4th circle, 0.07 - 0.08, 0.06 - 0.07, 0.059 - 0.064 and 0.05 - 0.061 mm respectively. Neck 0.23 x 0.10 mm, Proboscis receptacile long, single - walled measuring 0.17 x 0.08 mm, with nerve ganglion at its base. Two lemnisci unequal, measuring 1.14 x 0.04 mm and 0.86 x 0.03 mm. Trunk spines widely spaced in 14 - 16 circles, each circle measuring 0.02 x 0.03 mm. Testes two, oval tandem, contiguous, postequatorial; anterior being 0.33 x 0.09 mm and posterior 0.32 x 0.08 mm in size. Cement gland syncytial 0.34 x 0.08 mm in size. Cement reservoir pyriform, 0.24 x 0.09 mm in size. Seminal vesicle 0.35 x 0.08 mm. Copulatory bursa 0.22 x 0.12 mm in size.

Female **(Plates 2 & 3)** : Body 10.9 mm long and 0.69 mm wide. Proboscis small, globular measuring 0.13 x 0.2 mm armed with four circles of 8-10 hooks each, recurved hooks arranged alternately. Proboscis hook size in 1st, 2nd, 3rd and 4th circle 0.09 - 0.11, 0.089-0.09, 0.077 - 0.081 and 0.043 - 0.05 mm respectively. Neck 0.43 x 0.22 mm. Proboscis receptacle long, single - walled measuring 1.5 x 0.18 mm, with nerve ganglion at its base. Lemnisci two, unequal, measuring 2.98 x 0.06 mm and 2.6 x 0.05 mm. Collar spines closely set in 15-16 circles, each of 14-16 spines measuring 0.04 x 0.02 mm. Trunk spines widely spaced in 32-33 circles, each circle with 0.06 x 0.03 mm long spines. Vagina and uterus 0.26 x 0.05 and 0.27 x 0.06 mm in size respectively. Germ balls 0.01-0.16 mm in diameter.

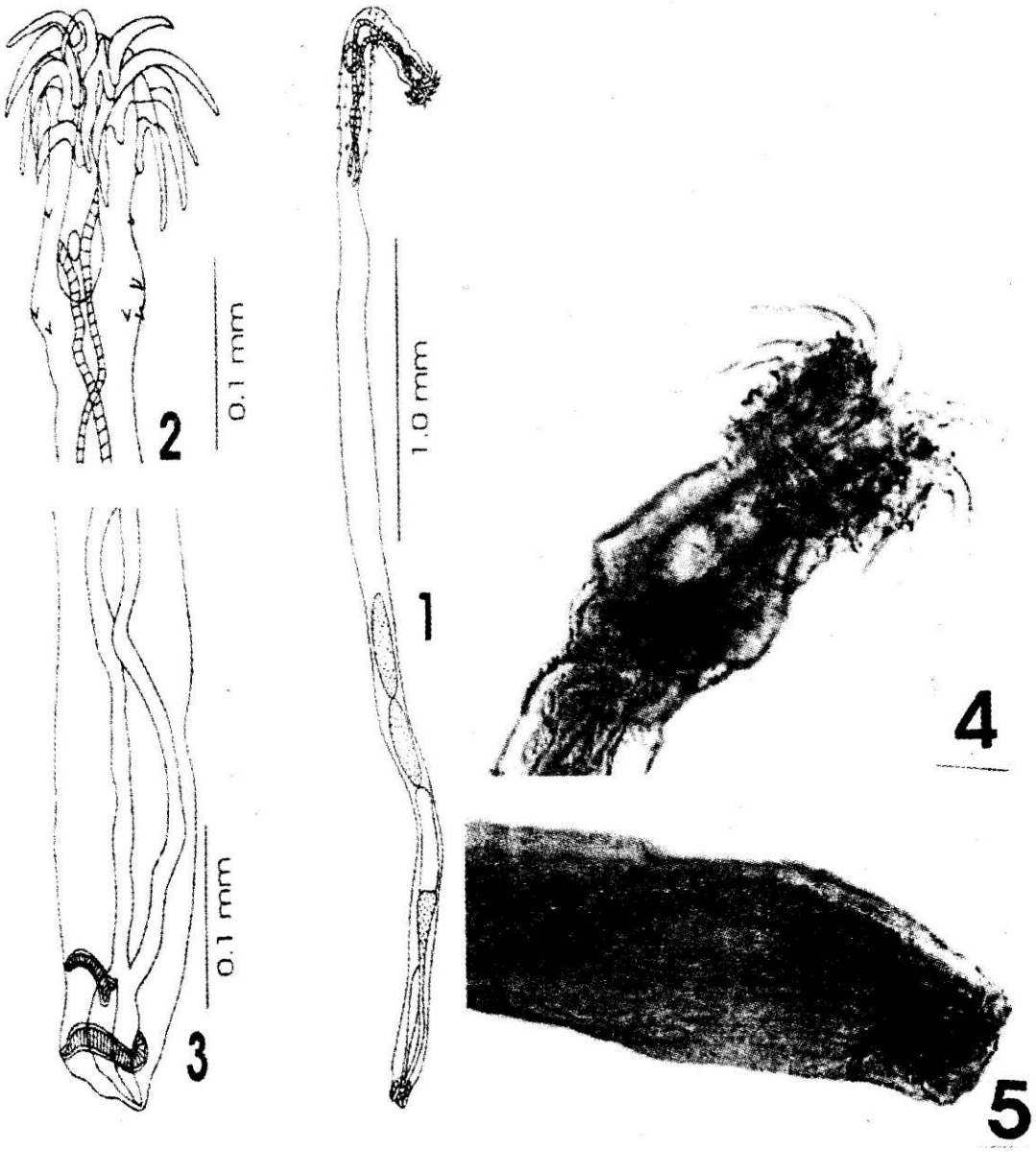

PLATE 1

PLATE 1. Fig. 1-5 : *Pallisentis colisai* (male) **1.** W.M. (50x); **2.** Proboscis region (400x); **3.** Posterior region (400x); **4** Proboscis region showing four rows of hooks (400x), **5.** Posterior region showing bursa (400x).

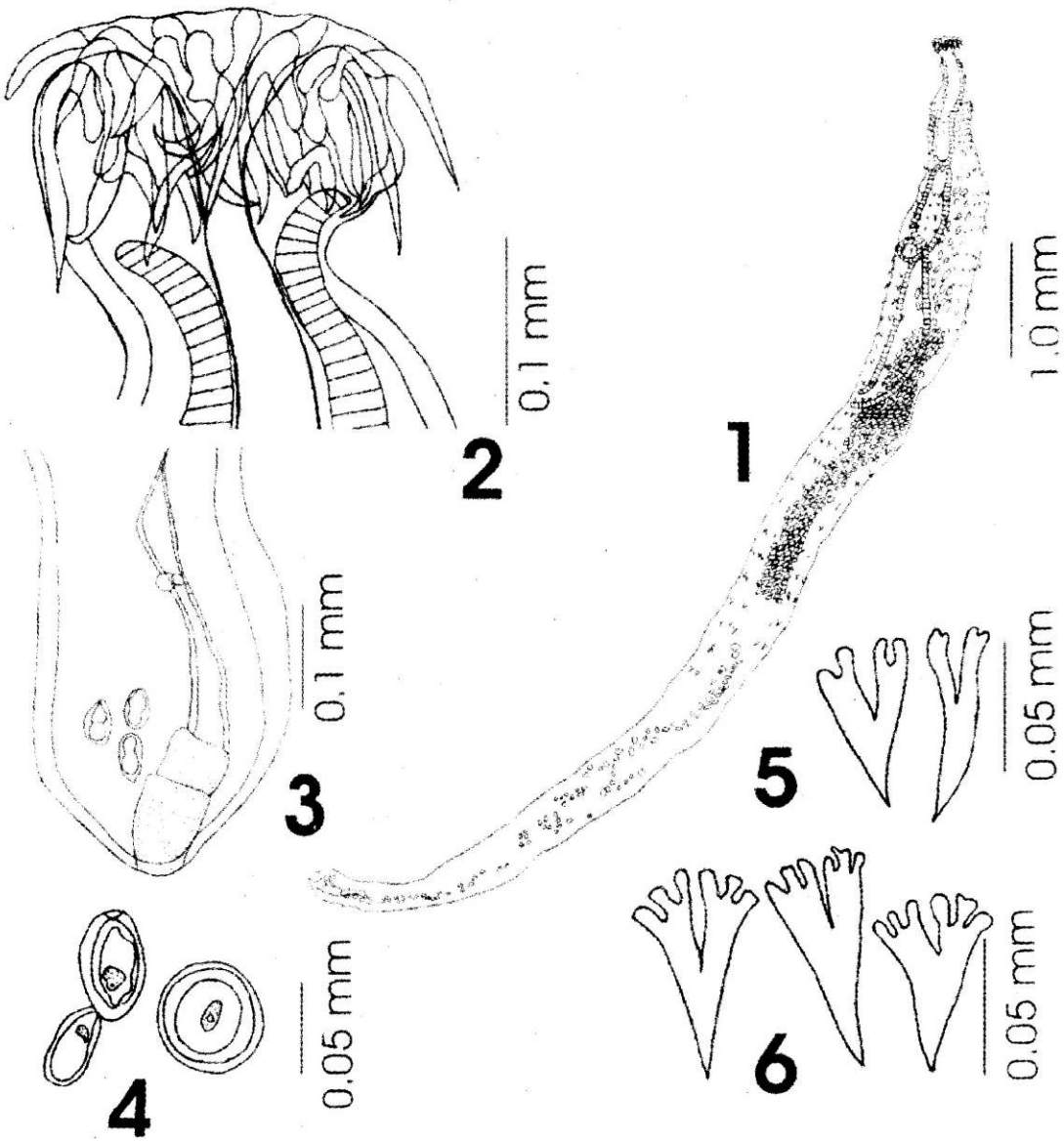

PLATE 2

PLATE 2 . Fig. 1-6 : *Pallisentis colisai* (female) **1.** W. M. (50x); **2.** Proboscis region (400x); **3.** Posterior region (400x), **4.** Eggs (400x); **5.** Trunk spines (400x) 6. Collar spines (400x).

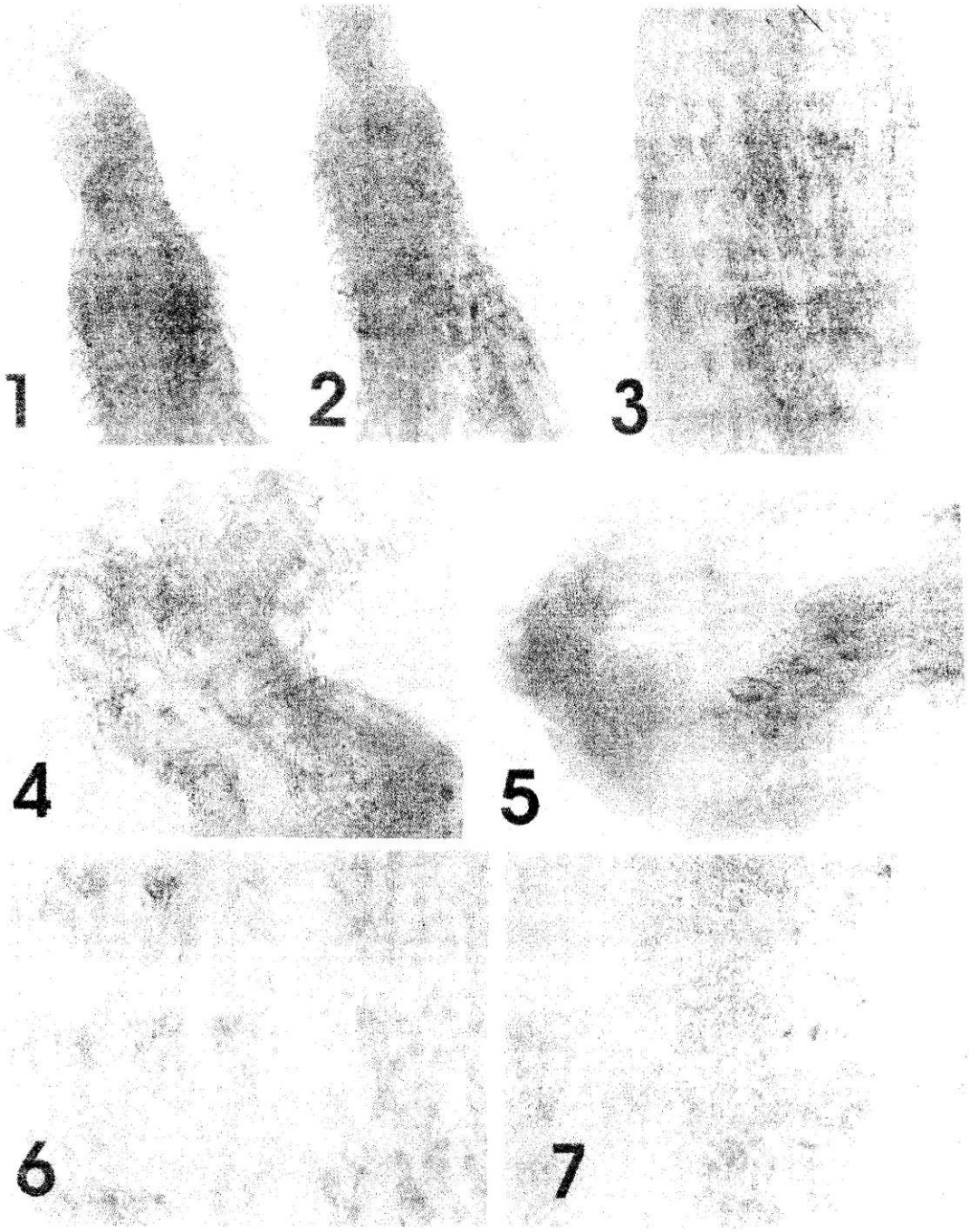

PLATE 3

PLATE 3. Fig. 1-7 : *Pallisentis colisai* (female) **1.** Anterior region showing scolex (100x); **2.** Post scolex region showing pattern of hooks (100x) **3.** Trunk region showing pattern of hooks (100x); **4.** Scolex showing pattern of hooks in 4 rows (400x); **5.** Posterior region (400x); **6.** Hooks (400x); **7.** Eggs (400x)

DISCUSSION

The Phylum Acanthocephala includes approximately 1,150 species of relatively small vermiform endoparasites, the adults of which feed on the intestinal walls of vertebrates, especially in freshwater and marine fishes (Alava & Aguirre, 2005). The genus *Pallisentis* was erected with the type species *P. umbellatus* Van Cleave, 1928. The type species was recorded from *Ophiocephalus argus*, *Siniperca* sp., *Cobitis decemcirrosus* and *Parasiturus arotus*. As per literature available 26 species and a subspecies have so far been described of the genus from different localities of the world as indicated in the history of the genus.

Amin *et al.* (2000) revised the genus *Pallisentis* in their publication stating that the number of hooks in proboscis hook circles, previously used to define the 3 subgenera *Farzandia*, *Neosentis*, and *Pallisentis*, is in fact a variable trait; 3 new subgenera (*Demidueterospinus*, *Brevitritospinus* and *Pallisentis* sensu stricto) are erected based on the relative size of hooks in subsequent circles, the size of cement glands, and the number of their giant nuclei. *P.* (*Brevitritospinus*) *vietnamensis* sp. nov. is described from snakehead mullet, *Ophiocephalus maculatus* [*Channa maculatus*?], caught in Vietnam in 1998; it is distinguished by its large number of trunk spine circles and the presence of giant nuclei in the apical organ of the proboscis. A key to all 26 species of the genus *Pallisentis* accepted as valid and following this classification is included. A new quadrigyrid genus *Pararaosentis* gen. nov. is erected, distinguished by a number of morphological features, and *Pallisentis golvani* is transferred to it as *Pararaosentis golvani* comb. nov.. *Pallisentis tetraodontae*, formerly considered to be a subspecies of this species, is made a synonym of it.

In all there are 20 species reported from India (Bhattacharya, 2007) such as *P. allahabadii* Agrawal, 1958; *P. basiri* Farooqi, 1958; *P. buckleyi* Tadros, 1966; *P. clupei* Gupta and Gupta, 1979; *P. colisai* Sarkar, 1956; *P. guntei* Sahay *et al.* 1967; *P. guptai* Gupta and Fatma, 1985; *P. mehrai* Gupta and Fatma, 1985; *P. ophiocephali* (Thapar, 1930), Baylis, 1933; *P. nagpurensis* Bhalerao, 1931; *P. nandai* Sarkar,1953; *P. pandei* Rai, 1967; *P. fotedari* Gupta and Sinha, 1991; *P. jagani* Koul *et al.* 1991; *P. garuai* (Sahay *et al.* 1971) Jain and Gupta,1979; *P. gomtii* Gupta and Verma,1980; *Pallisentis croftoni* Mithal and Lal, 1981; *P. indica* Mithal and lal, 1981; *P. fasciati* Gupta and Verma, 1980 and *P. cavasii* Gupta and Verma, 1980. *Pallisentis colisai* was first described by Sarkar (1956) in the host *Colisa fasciatus* from Delhi. In the present survey, the observations on *Pallisentis colisai* are in conformity with its original description as well as with the re-description given by Farooqi (1958), Rai (1967), Sahay *et al.* (1967), Tadros (1966), Soota & Bhattacharya (1982) and Duggal & Kaur (1986) except for some minor variations in the measurements. The redescription is based on the fresh material collected by the author. Various comparative measurements of the present study with the earlier reports on this worm are given in table A.

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Table A : Showing comparison of measurements (mm) of various body parts of *Pallisentis colisai* (Sarkar, 1956)

Characters	After Soota and Bhattacharya, 1982 on material of Sarkar, 1956	After Farooqi, 1958	After Rai, 1967	After Sahay, Nath and Sinha, 1967	After Tadros, 1966	After Soota and Bhattacharya, 1982	After Duggal and Harpreet, 1986	Present study
MALE								
Body size	4.125x0.385	8.28x0.24	5.07-6.00x 0.30-0.35	1.75-1.95	3.5-6.4x 0.24-0.38	3.24-4.18x 0.27-0.28	4.275-5.700x 0.210-0.375	4.15x0.18
Proboscis size	0.132x0.154	1.95x0.14	0.14-0.16x 0.14-0.17	0.135-0.15	0.112-0.1274x 0.150-0.163	0.13x0.14	0.120-0.140	0.18x0.1
Proboscis hooks no.	4x10	4x9	4x10	4x8-10	4x10	4x8-10	4x10	4x8-10
Size I	0.076x0.0068	0.1	0.07-0.03	0.085	0.07-0.077	0.076-0.0068	0.076-0.085	0.07-0.08
Size I I	0.068	0.058	0.031-0.039	0.085	0.06-0.064	0.068-0.07	0.054-0.060	0.06-0.07
Size III	0.0306	0.03	0.20-0.031	0.02-0.028	0.02-0.022	0.03-0.034	0.027-0.029	0.059-0.064
Size IV	0.0255	0.02	0.02-0.03	0.01-0.02	0.016-0.02	0.025	0.017-0.018	0.05-0.061
Neck	0.624x0.155	0.27x0.14	-	-	-	0.22x0.11-0.13	0.210-0.235x 0.090-0.105	0.23x0.1
Proboscis receptacle	0.605x0.11-0.165	0.4x01.7	0.35-0.4x 0.13-0.15	-	0.52-0.53x 0.125-0.154	0.495x0.132-0.132	0.52-0.600x 0.190-0.320	0.17x0.08
Lemnisci I	2.2x0.05	0.76	-	-	1.0-1.82	1.738-1.98x 0.044-0.055	0.662-0.992x 0.022-0.031	1.14x0.04
Lemnisci II	-	0.66	-	-	0.85-1.42	-	0.588-0.825x 0.011-0.019	0.86-0.03
Collar spines no.	16x14-16	15x14	14-16x15	16-17	16-18x12-14	15-17x12-14	16-17x14-16	-
Length	-	-	-	-	-	-	0.021-0.023	-
Trunk spines no.	22x12-16	26	20-28	-	26-28x10-12	15-17x14-16	21-22x14-16	15-16x14-16
Length	-	-	-	-	-	-	0.029-0.033	0.02-0.03
Anterior testis	0.385x0.165	0.95x0.35	0.58-0.62x 0.13-0.15	0.2-0.3x 0.10-0.11	0.35-0.64x 0.15-0.18	0.495x0.135	0.660-0.750x 0.150-0.165	0.33x0.09
Posterior testis	0.352x0.165	0.7x0.35	0.51-0.56x 0.13-0.14	0.175-0.25x 0.10-0.11	0.3-0.46x 0.15-0.2	0.405x0.132-0.132	0.570-0.690x 0.150-0.180	0.32x0.08

Cement glands	0.44x0.187	0.9x0.34	0.47-0.83x 0.12-0.14	0.125-0.18	0.3-0.73x 0.088-0.227	0.22-0.505x 0.165	0.570-0.705x 0.120-0.180	0.34x0.08
Number of nuclei in cement glands	8-15	9	8	-	12	8-12	10-12	-
Cement reservoir	0.20-0.42x 0.12-0.13	1.05x0.18	-	-	0.175-0.59x 0085-0.236	0.374x0.066	0.390-0.435x 0.105-0.180	0.24x0.09
Seminal vesicle	0.27-0.38x 11-0.13	-	0.32-0.39	0.35-0.475x 0.075-0.09	-	0.35x0.0165-0.0165	0.429-0.501x 0.081-0.09	0.35x0.08
Bursa	-	-	0.22-0.39x 0.08-0.09	-	-	-	0.300-0.750x 0.195-0.210	0.22-0.12
FEMALE								
Body size	5.4-12.9x 0.610-0.62	10x0.04-0.05	6.1-13.24x 0.61-0.76	4.15-4.5	-	2.86-9.35x 0.650-(juv.)0.715	7.695-11.505x 0.435-0.480	10.9-0.69
Proboscis size	-	1.1x0.3	..	0.17-0.19	-	0.13-0.16x 0.176-0.22	0.195-0.310x 0.240-0.255	0.13x0.2
Proboscis hooks no.	4x10	4x9	4x10	4x8-10	-	4x8-10	4x10	4x8-10
Size I	-	-	-	-	-	0.093-0.102	0.090-0.096	0.09-0.11
Size I I	-	-	-	-	-	0.076-0.093	0.075-0.077	0.089-0.09
Size III	-	-	-	-	-	0.034-0.037	0.045-0.046	0.077-0.081
Size IV	-	-	-	-	-	0.025-0.03	0.028-0.029	0.043-0.05
Neck	-	-	-	0.33-0.35	-	0.38-0.44x 0.22-0.24	0.180-0.255x 0.195-0.210	0.43x0.22
Proboscis receptacle	-	1.28x0.45	-	-	-	0.495-0.77x 0.132-0.22	0.645-0.765x 0.225-0.255	1.5x0.18
Lemnisci I	-	-	-	-	-	-	1.035x0.024-0.042	2.98x0.06
Lemnisci II	-	-	-	-	-	-	0.885-0.925x 0.016-0.020	2.6x0.05
Collar spines-								
Number	-	-	-	-	-	15-17x12-16	14-16x14-16	15-16x14-16
Length	-	-	-	-	-	-	0.021-0.023	0.04x0.02
Trunk spines-								
Number	67	-	-	-	-	33-35x14-18	66-67x14-16	32-33x16-18

Length	-	-	-	-	-	-	0.029-0.033	0.06-0.03
na	-	-	-	-	-	-	0.1275x0.045	0.26-0.05
Uterus	-	-	-	-	-	-	0.135x0.0480	0.27x0.06
Germ balls	-	-	-	-	-	-	0.030x0.032	0.01-0.16x 0.01-0.18
Host	*Colisa fasciatus*	*Rhyncobdella aculeata*	*Channa punctatus*	*Lepidocephalichthys guntea*	*Unidentified fish*	*Channa punctatus*	*Channa punctatus*	*Channa punctatus*
Locality	Delhi	Aligarh (U.P.)	Raya (U.P.)	Ranchi (Bihar)	Aligarh (U.P).	Patna (Bihar) Ankhola (W.B.)	Jalandhar (Punjab)	Muzaffarnagar (U.P.)

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