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# *Pleurogenoides neelimae* n. sp. (Trematoda: Pleurogenidae) from the intestine of a freshwater fish *Wallago attu* (Bloch)

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***Abstract:*** *Pleurogenoides neelimae n. sp. from a fresh water siluroid fish, Wallago attu (Bloch) is described. It is distinguished from other species in having an oral sucker more or less equal to the ventral sucker, genital pore in the middle region of oral sucker, vitelline follicles from anterior end of ventral sucker up to mid oral sucker. A key to the species of the genus Pleurogenoides Travassos, 1921 is provided.*
***Keywords****: Microphalloidea, Pleurogenoides, Trematode, Wallago attu*

## I. Introduction

Attention has been focused on incidence of infestation of trematode parasites (Siddiqi and Nizami 1978, Glenn 1980, Bhaduria and Dandotia (1984) but detailed descriptions of trematode parasites from fish have been ignored. Pleurogenidae (Superfamily Microphalloidea) is a family of digenetic trematodes occurring as small to medium sized worms. Sixty of the digenean families include fish parasites, of which 38 families are exclusively fish parasites. The genus *Pleurogenoides* Travassos, 1921 has been recorded from amphibians (Madhavi and Ratna Kumari, 1989) as well as fishes, the first record from fishes was by Pigulewsky (1931). During a survey on trematode fauna of fresh water fishes of Bareilly, Uttar Pradesh, India, the authors collected a new trematode species from the intestine of *Wallago attu* (Bloch) obtained from Ram Ganga at Bareilly. In all 120 fishes were examined, out of which 39 were found infected with this species.

## II. Materials and Methods

### 2.1 Collection and maintenance of host

Live specimens of *Wallago attu* (n= 120) were collected from river Ramganga, Bareilly and were transported alive to the laboratory in large sized containers. They were maintained in aquaria under proper aeration and fed on commercial pellets till sacrificed.

### 2.2 Light microscopy studies

Prior to experimentation, fishes were anesthetized and thoroughly examined for presence of parasites by observing under the microscope. The trematodes collected from the stomach were fixed in alcohol-formal acetic (A.F.A.) acid, routinely stained in Borax carmine and mounted in DPX according to Gupta *et al*. (2016). Drawings were made with the aid of a camera lucida and measurements with a measuring ocular micrometer.

## III. Results

***Pleurogenoides neelimae n. sp.*** (Fig. 1, A,B)

### 3.1 Description

Body elliptical, with rounded anterior and posterior ends. Oral sucker sub-terminal and sub-spherical. Ventral sucker equatorial, sub-spherical, larger than oral sucker. Prepharynx absent. Pharynx oval and muscular. Oesophagus very short and almost negligible. Intestinal caecae extending up to testes. Testes sub-spherical, para-acetabular, both more or less equal. Cirrus sac lying on left side of body, extending from middle of ventral sucker up to middle of oral sucker, encloses a saccular vesicular seminalis, tubular para prostatica surrounded with prostate gland cells and a long narrow ejaculatory duct. Ovary sub-spherical, pre-equatorial. Uterus arises from ootype, occupying whole post-acetabular and post-testicular area, up to hind region of body forming numerous coils in ascending and descending limbs. Shell glands numerous, surround the ootype. Eggs ovoid, yellow and operculated. Genital pore situated on left side of oral sucker. Excretory bladder V-shaped. Vitelline follicles extend from posterior end of oral sucker to middle of ovary and scattered in extra-caecal area.

**3.2 Measurements (All measurements are in mm)**

Body length 02.32-2.34; width 1.50-1.52; oral sucker, 0.32-0.34 x 0.34-0.35; ventral sucker, 0.35-0.36 x 0.34-0.35; pharynx 0.095-0.137 x 0.037-0.109; oesophagus, 0.068-0.082 x 0.068-0.082; right testis, 0.47-0.49 x 0.50-0.52; left testis, 0.46-0.46 x 0.47-0.49; vesicular seminalis, 0.219-0.493 x 0.205-0.470; pars prostatica, 0.027-0.068 x 0.041-0.082; ejaculatory duct, 0.068-0.479 x 0.054-0.054; ovary, 0.287-0.315 x 0.301-0.328; egg, 0.027-0.082 x 0.041-0.095.

**3.3 Taxonomic position**

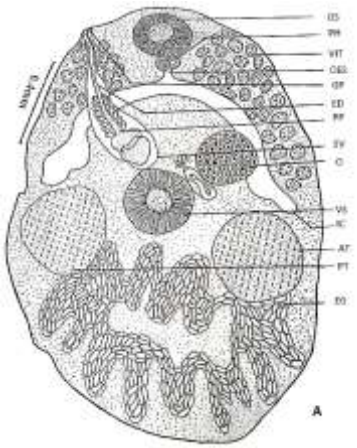
Phylum: Platyhelminthes Claus, 1887
Class: Trematoda Rudolphi, 1808
Subclass: Digenea van Beneden, 1858
Order: Plagiorchiida La Rue, 1957
Superfamily: Microphalloidea Ward, 1901
Family: Pleurogenidae Looss, 1899
Genus: *Pleurogenoides* Travassos, 1921
Species: *neelimae* n. sp.

## IV. Discussion

Digenea represents the largest group of internal metazoan parasites (Cribb *et al*., 2001). They are an extraordinary ubiquitous group, parasitizing all major vertebrate groups as definitive hosts (Olson *et al*. (2003). However, the understanding of digenean biodiversity and evolution has received considerably less attention and few hypotheses put forth during the last century have been subject to rigorous scrutiny. Yamaguti (1958) divided the Order Digenea into the sub orders Prosostomata (mouth terminal or subterminal) and Gasterostomata (mouth ventral). The order Prosostomata Odhner, 1905 from fishes was subdivided into 39 families. Olson *et al*. (2003) emended the membership of higher taxa, erected new taxa and proposed a revised, phylogenetically based classification and discussed it in the light of ontogeny, morphology and taxonomic history. Bray (2008) included 25 superfamilies, 148 families and nearly 2800 nominal genera in Digenea. He placed the genus *Pleurogenoides* in the family Pleurogenidae, superfamily Microphalloidea and order Plagiorchiida whereas Olson et al. (2003) had placed the family Pleurogenidae in the Superfamily Plagiorchioidea. The classification of Bray (2008) is followed.

Looss (1896) established the genus *Pleurogenes* and Travassos (1921) created a new genus *Pleurogenoides* for those species of the genus *Pleurogenes* in which intestinal caeca are short and never extend behind the ventral sucker and maintained the two genera, *Pleurogenes* and *Pleurogenoides*. Srivastava (1934) merged the two genera. However, Macy (1936) retained the two genera in question as separate genera in his keys on Pleurogenetinae. Kaw (1943) was of the same opinion and pointed out that it does not differ only in the length of intestinal caeca but also in the position of testes which are always acetabular or preacetabular in *Pleurogenoides* and disctinctly post-acetabular in *Pleurogenes*. Gupta and Agarwal (1966) regarded *Pleurogenoides* as a synonym of *Pleurogenes* as the distinguishing characters are variable characters.

The species of the genus *Pleurogenoides* Travasoss, 1921 reported from piscine hosts are *P. pabdai* Pande, 1937 (Kaw, 1943) from *Callichrous pabda*; *P. minus* Pigulewsky, 1931 (Kaw, 1943) from *Esox lucius*; *P. attui* Kakaji, 1968 (Yamaguti, 1971) from *Wallago attu*, *P. gastroporus* Luhe, 1901 (Pandey, 1973), *P. notopteri* Bashirullah and Hafizuddin, 1976 from *Notopterus notopterus*, *P. anabasi* Agarwal and Kumar, 1983 from *Anabas testudineus* and *P. garhwalensis* Tripathi, 1991 from *Barilius bendelisis*. Bhaduria and Dandotia (1984) reported the occurrence of *P. pabdai*, *P. caudalspinutum* and *P. gwaliorensis* from *Ompok bimaculatus* and *P. ritai* from *Rita rita*.



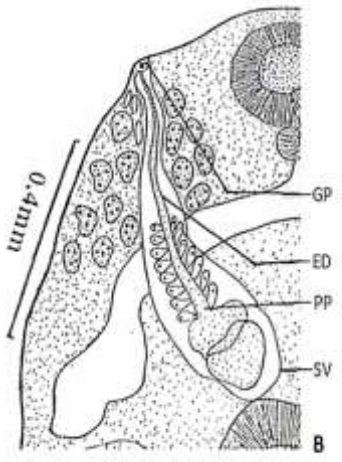



**Fig.1:** Camera lucida diagram of *Pleurogenoides neelimae* n. sp. A: Full worm; B: Antereolateral end magnified to show genital pore. Abbreviations: AT: Anterior testis, ED: Ejaculatory duct, EG: Egg, GP: Genital pore, IC: Intestinal caeca, O: Ovary, Oes: Oesophagus, OS: Oral sucker, PH: Pharynx, PP: Pars prostatica, PT: Posterior testis, SV: Seminalis vesicula, VIT: Vitelline follicles, VS: Ventral sucker

The present form comes close to *P. minor* and *P. anabasi* in the presence of blunt posterior end of the body but differs from them in the ratio of oral sucker and ventral sucker, location of genital pore and in the extension of vitelline follicles, it further differs from *P. anabasi* in having cirrus sac from anterior lobe of ventral sucker up to the middle of oral sucker. The present form also differs from *P. pabdai, P. attui* and *P. garhwalensis* in not having a bifid posterior end of the body.Therefore, on the basis of the ratio of ventral sucker and oral sucker, extension of intestinal caecae and vitelline follicles, location of cirrus sac and genital pore, the present form has been found to be quite different from the known species and hence designated as a new species, *Pleurogenoides neelimae* n. sp.

## V. Key to the species of the genus *Pleurogenoides* Travassos, 1921 reported from fish host

1. Bifid posterior end of the body……...2
   Blunt posterior end of the body……..3
2. Vitelline follicles 18-22, present infront of intestinal caeca up to middle of oral sucker……..…….*P. pabdai* Pande, 1937
   Vitelline follicles 14-19, extend from middle of ovary to pharynx ……*P. attui* Kakaji, 1969
   Vitelline follicles 6-7 on either side, extend from posterior end of oral sucker to middle of ovary ……..…….....*P. garhwalensis* Tripathi, 1991
   Oral sucker smaller than ventral sucker, genital pore at the posterior level of pharynx, vitelline follicles from pharynx to anterior margin of ovary……...*P. minor* Pigulewsky, 1931, Kaw, 1943
   Oral sucker larger than ventral sucker, genital pore in oral sucker zone, vitelline follicles from middle of testes to middle of oral sucker ……*P. anabasi* Agarwal and Kumar, 1983
3. Oral sucker more or less equal to ventral sucker, genital pore in the middle region of oral sucker, vitelline follicles from anterior end of ventral sucker upto mid sucker……..... *P. neelimae* sp.nov

## VI. Conclusion

The intestine of a freshwater fish *Wallago attu* (Bloch) was infected with a trematode parasite. Light microscopy studies were conducted, taxo-morphological features of the parasite, when compared to the earlier reported related species infer that the parasite is new, hitherto not reported and the name *Pleurogenoides neelimae* n. sp. is designated for the said species with species characters as mentioned in this account.

## References


[1]. A.H. Siddiqi, and W.A. Nizami, Incidence of *Isoparorchis hypselobagri* Billet, 1898 (Trematoda: Isoparorchiidae) in *Wallgo attu* with remarks on its life cycle. *Acta Parasitologica Polonica 25 (21/35),* 1978, 223-227.

[2]. C.L. Glenn, Seasonal parasitic infection in Mooneye (*Hiodon tergisus*) (Le Suem) from Assiniboine river. *Can J Zool 58(2),* 1980, 252-257.

[3]. S. Bhaduria and M.R. Dandotia, Studies on the Digenetic trematodes of freshwater fishes with special reference to Gwalior region, Part III. Seasonal incidence of some trematode parasites of food fishes of Gwalior region. *Riv di Parassitol, 45,* 1984, 419-429.

[4] Madhavi R and Ratna Kumari TB (1989) Growth and development of *Pleurogenoides orientalis* (Srivastava, 1934) (Trematoda: Lecithodendriidae) in the intermediate and definitive hosts. Syst. Parasitol. 13: 25-34

[5] S.W. Pigulewsky, Neue Arten von trematoden aus Fischen des Dnjeprbassins. *Zoology,* 1931.

[6] Neelima Gupta, D.K. Gupta, and M. Urabe, Taxonomic tools for the identification of *Allogenorchopsis bareilliensis* n. sp. (Digenea: Hemiuridae: Derogenidae) from *Channa striata* of Rohilkhand, India. *J. Par. Dis.* 2016, DOI 10.1007/s12639-015-0745-2.

[7] T.H. Cribb, R.A. Bray, D.T.J. Littlewood, S.P. Pichelin, and E.A. Herniou, The Digenea, in D.T.J. Littlewood, R.A. Bray (Eds*). Interrelationships of the Platyhelminthes*, Taylor and Francis, London. 2001, 168-185.

[8] P.D. Olson, T.H. Cribb, V.V. Tkach, R.A. Bray, and D.T.J. Littlewood, Phylogeny and classification of the Digenea (Platyhelminthes: Trematoda). *Intl J Parasitol, 33,* 2003, 733-755.

[9] S. Yamaguti, *Systema Helminthum* (Inter Science Publication Inc NY) 1958, 973 pp.

[10] R.A Bray, Introduction and keys to superfamilies, in R.A. Bray, D.I. Gibson, and A. Jones (Eds), *Keys to the Trematoda* Vol. III (CAB International and Natural History Museum. London, 2008) 1-4.

[11] A. Looss, Recherche sur la faune parasitaire de L' Egypte. Ier Partie. *Memoires de L' Institut Egyptien 3*, 1896, 252.

[12] L. Travassos, Contribuicoes para o conhecimento da fauna helminthological brasileira XV. Sobre as species brasileiras da familia Lecithodendriidae Odhner, 1911. *Arch da Esc Sup de Agr e Med Vet Nichtheroy 5,* 1921, 73-79.

[13] H.D. Srivastava, On new trematodes of frogs and fishes of the United Provinces, India. Part III. On a new genus *Mehraorchis* and two new species of *Pleurogenes* (Pleurogenetinae) with a systematic discussion and revision of the family Lecithodendridae. *Bull Acad Sci Alld 3*, 1934, 236-256.

[14] R.W. Macy, A new genus and species of trematodes from the little brown bat and a key to the genera of Pleurogenetinae. *Proc US Nat Mus 83*, 1936, 321-324.

[15] B.L. Kaw, Studies on the helminth parasites of Kashmir a review of the genus *Pleurogenes* Looss. *Proc. Indian Acad. Sci., Sec. B., 18,* 1943, 97-108.

[16] S.P. Gupta, and V. Agarwal, Two trematode parasites of *Rana cyanophlytis* from Udaipur, (Rajasthan). *Proc Natl Acad Aci 36*, 1966, 530-536.

[17] S. Yamaguti, *Synopsis of Digenetic trematodes of vertebrates* Vols 1 and 2. (Keigaku Publishing Co. Tokyo 1971).

[18] K.C. Pandey, Studies on some known and unknown trematode parasites. *Indian J Zoot 14(3),* 1973, 197-219.