

“Parasitic Species of Some Aquatic Microdrile Worms Belonging to Naididae and Enchytraeidae Families”.

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Abstract

Some species of aquatic microdrile worms passes their life as commensal animal in the cavities of other animals like on the surface of a fresh water bryozoan, *Plumatella repens* var. *emarginata* and some are parasitic on several fresh water snails and sponges. In the present review article, fifteen species of aquatic worms belonging to two families i.e. Naididae and Enchytraeidae have been described.

Keywords: Parasitic species, Aquatic Microdrile, Worms, Naididae, Enchytraeidae, families.

Date of Submission: 13-11-2025

Date of acceptance: 27-11-2025

I. Introduction

Generally , worms are divided into three main categories viz., flatworm, roundworm and segmented worms. Flatworms including tapeworms, flukes & planarians etc. belongs to phylum - Platyhelminthes; while roundworms i.e. hookworms, pinworms, whipworms & filarial worms etc. belongs to phylum -Nematoda and segmented worms i.e. earthworms, leeches & ragworms etc. from phylum-Annelida. Few worms of the above mentioned categories are living as a parasites in human beings and other animals and causes several kinds of diseases such as *Taeniasis* caused by Tapeworm; *Schistosomiasis* & *Fascioliasis* by flukes (Blood flukes & liver flukes); *Ancylostomiasis* by *Ancylostoma*; *Enterobiasis* by pinworms; and *Elephantiasis* caused by filarial worms. In addition, aquatic worms may be an another category of the worms. However , Christoffersen (2007c) has produced the first update of aquatic microdrile oligochaetes of South America since the works of Gavrilov (1979, 1981) and Brinkhurst & Marchese (1989). Some species of these microdrile aquatic worms living as a parasites into the body of other animals. The concerning host animal may face various kinds of physiological problems. Due to their presence, various types of deformities and diseases occur in the host body which are sometimes may become the cause of their death. Therefore , keeping this in mind, the current review report on parasitic species of aquatic microdrile worms in India was evaluated and presented.

II. Results & Discussion

Spongilla carteri sp. noticed as a very suitable host sp. for most of the worm's species. Because most of the parasitic species of aquatic worms viz., *Caetogaster spongillae*, *Nais communis* var. *punjabensis*, *Nais communis* var. *caeca*, *Nais elinguis*, *Nais pectinata*, *Pristina longiseta*, *Pristina aequiseta* and *Pristina proboscidea*, prefer to live as a parasite on *Spongilla carteri* (a fresh water sponge). Second suitable host species was recorded *Plumatella emarginata* (a fresh water bryozoan , which is also known as 'fresh water moss animal') on which few parasitic species of worms prefer to live them. Because many worm's species like - *Caetogaster spongillae*, *Caetogaster* sp., *Nais elinguis*, *Pristina longiseta*, *Pristina proboscidea* and *Salvina appendiculata*, living as a parasite on *Plumatella emarginata*. Although, few species of worms viz., *Pristina longiseta*, *Pristina proboscidea*, and *Caetogaster spongillae* living along with *Spongilla crassissima* and some (*Pristina longiseta*, *Pristina proboscidea* var. *paraguayensis*) with *Plumatella fruticosa* (a fresh water bryozoan). However, Genus *Caetogaster*, *Caetogaster limnaei* and *Enchytraeus indicus* are living in few species of snails. In addition, *Caetogaster spongillae* sp. of worms feeds on the organic debris of the decaying parts of several sponges and bryozoans like - *Spongilla carteri*, *Spongilla decipiens*, *Plumatella repens* var. *emarginata* and *Spongilla carteriformis* (see Table -1).

Table -1: Showing Name of the hosts for aquatic microdrile worms.

Sl. No	Name of worm's species	Distribution	Name of the host
1.	Genus <i>Chaetogaster</i> (K. Baer.)	India	Fresh water snails & sponges
2.	<i>Chaetogaster annadalei</i> (Steph.)	India, Japan	Sponges, <i>Ephydatia fluviatilis</i>
3.	<i>Chaetogaster limnaei</i> (K. Baer.)	India	Fresh water snails, <i>Ephydatia fluviatilis</i>
4.	<i>Chaetogaster spongillae</i> (Annand.)	India	<i>Spongilla carteri</i> , <i>Spongilla decipiens</i> , <i>Plumatella repens</i> var. <i>emarginata</i> & <i>Spongilla carteriformis</i> .
5.	<i>Chaetogaster</i> sp.	India	<i>Plumatella repens</i> var. <i>emarginata</i> .
6.	<i>Nais communis</i> (Piguet.) var. <i>punjabensis</i> (Steph.)	India, Pakistan, E. Persia, Switzerland	<i>Spongilla carteri</i>
7.	<i>Nais communis</i> (Piguet) var. <i>caeca</i> (Steph.)	India	<i>Spongilla carteri</i>
8.	<i>Nais elinguis</i> (Mill., Orst.)	India, widely spread in Europe	<i>Spongilla carteri</i> , <i>Plumatella emarginata</i> .
9.	<i>Nais pectinata</i> (Steph.) var. <i>inaequalis</i> (Steph.)	India	<i>Spongilla carteri</i>
10.	<i>Pristina longiseta</i> (Ehrbg., of. typica)	India, Pakistan, N. America, widely distributed in Europe	<i>Spongilla carteri</i> , <i>Plumatella emarginata</i> , <i>Plumatella fruticosa</i> , <i>Spongilla crassissima</i> .
11.	<i>Pristina aequiseta</i> (A.G.Bourne)	India and also distributed in Europe	<i>Spongilla carteri</i>
12.	<i>Pristina proboscidea</i> (Bedd.f.typica)	India, Zanzibar, Paraguay and Java.	<i>Spongilla carteri</i> , <i>Spongilla crassissima</i> .
13.	<i>Pristina proboscidea</i> var <i>paraguayensis</i> (Mich.)	India, also in Paraguay.	<i>Plumatella fruticosa</i> , <i>Plumatella emarginata</i> .
14.	<i>Salvina appendiculata</i> (Udek.)	India, Pakistan. It is a common European sp.	<i>Plumatella emarginata</i> .
15.	<i>Enchytraeus indicus</i> (Steph.)	India only	Pond snails.

All the parasitic worm's species described in the present paper are found in India. Although, *Chaetogaster annadalei* is found in India as well as Japan. While *Nais communis*, *Pristina longiseta*, and *Salvina appendiculata* are found in India as well as Pakistan and Europe. Among these, *Nais elinguis*, *Pristina longiseta*, *Salvina appendiculata* are widely distributed species in Europe. *Nais communis* is found in E. Persia while *Pristina aequiseta* has also been reported in Europe and *Pristina proboscidea* has been reported from Zanzibar, Paraguay and Java besides India. The remaining worm's species including *Pristina proboscidea* var *paraguayensis*, distributed in Paraguay apart from India and *Enchytraeus indicus*, *Nais pectinata*, *Nais communis* var. *caeca*, *Chaetogaster* sp. *Chaetogaster spongillae*, *Chaetogaster limnaei* & Genus *Chaetogaster* found only in India (see Table -1).

The details of the parasitic species of aquatic microdrile worms, their distribution, their habitats and different host species for these worms are as follows -

1. Genus *Chaetogaster* (K. Baer.)

Habitat and Distribution: This genus is carnivorous, sometimes vegetable feeder. The majority of Indian species are parasitic on and in fresh water snails and sponges (Stephenson, 1923). This genus is world wide in distribution. It distributed in Punjab (Lahore; Gurdaspur district); Bengal (Calcutta); United provinces (Agra); Burma (L. Inle.); N. W. frontier province; Western Ghats; W. Himalayas (Nainital).

2. *Chaetogaster annadalei* (Steph.)

1918. *Chaetogaster annadalei*, Stephenson, Rec. Ind. Mus. xiv, p.9.

1917. *Chaetogaster annadalei*, Stephenson, Mem. As. Soc. Bengal, vi, pp. 85-88.

1923. *Chaetogaster annadalei*, Stephenson, Fauna of British India (Oligochaeta), pp.49-50.

Habitat and Distribution: The species was originally described from Japan, where it was found in a sponge. It distributed in Lake Inle, S. Shan States, Burma; in a sponge, *Ephydatia fluviatilis*.

3. *Chaetogaster limnaei* (K. Baer.)

1909. *Chaetogaster limnaei*, Michaelsen, Mem. Ind. Mus. i, p.131.

1918. *Chaetogaster limnaei*, Stephenson, Rec. Ind. Mus. xiv, p.9.

1920. *Chaetogaster limnaei*, Stephenson, Mem. Ind. Mus. vii, p.195.

1923. *Chaetogaster limnaei*, Stephenson, Fauna of British India (Oligochaeta), pp. 50-51.

Habitat and Distribution: Parasitic in fresh water snails. It distributed in Nainital, W. Himalayas (Dr. Annandale informs to Stephenson (1923) that these specimens were found on a *Limnaea*; ? Inle lake, Burma (on *Ephydatia fluviatilis*). This is a widely distributed European species, commensal on or parasitic in fresh water snails.

4. *Chaetogaster spongillae* (Annand.)

1906. *Chaetogaster spongillae*, Annandale, Journ. & Proc. As. Soc. Bengal, ii, p.188, text -fig. I A.

1907. *Chaetogaster spongillae*, Stephenson, Rec. Ind. Mus. i, p. 248.

1911. *Chaetogaster spongillae*, Stephenson, Rec. Ind. Mus. vi, p.205. text -fig.1.

1920. *Chaetogaster spongillae*, Stephenson, Mem. Ind. Mus. vii, p.195.

1923. *Chaetogaster spongillae*, Stephenson, Fauna of British India (Oligochaeta), pp. 52-53.

Habitat and Distribution: The animal feeds on the organic debris of the decaying parts of sponges, and is not found in the healthy growing parts. It distributed in Calcutta, in *Spongilla carteri* and *Spongilla decipiens*, and on *Plumatella repens* var *emarginata*; Khandala, W. Ghats, in *Spongilla carteriformis*.

5. *Chaetogaster* sp.

1906. *Chaetogaster* sp., Annandale, Journ. & Proc. As. Soc. Bengal, ii, p.189, text -fig. 1 B.

1907. *Chaetogaster* sp., Stephenson, Rec. Ind. Mus. i, p.248.

1923. *Chaetogaster* sp., Stephenson, Fauna of British India (Oligochaeta), pp.53.

Habitat and Distribution: As a parasitic or commensal life in the cavities of other animals. The food consists, in part at least of Protozoa which are abundant on the water surface. It distributed in Calcutta; on the surface of *Plumatella repens* var *emarginata*.

6. *Nais communis* (Piguet.) var. *punjabensis* (Steph.)

1909. *Nais communis* var. *punjabensis*, Stephenson, Mem. Ind. Mus. i, p. 255, text -figs. 1-3, pls. xv-xxii, figs. 1-21.

1909. *Nais communis* var. *punjabensis*, Piguet, Rev. Suisse Zool. xvii, p.198, text -fig.

1910. *Nais communis* var. *punjabensis*, Stephenson, Mem. Ind. Mus. v, p.66, pl. viii, figs. 1-2.

1910. *Nais communis* var. *punjabensis*, Stephenson, Rec. Ind. Mus. v, pp.237, 239, 240, pl. xi, figs. 2,4.

1913. *Nais communis* var. *punjabensis*, Stephenson, Tr. Roy. Soc. Edin. xlix, pp. 737, 744, 758.

1915. *Nais communis* var. *punjabensis*, Stephenson, Tr. Roy. Soc. Edin. l, p.786.

1918. *Nais communis* var. *punjabensis*, Stephenson, Rec. Ind. Mus. xiv, p.12.

1920. *Nais communis* var. *punjabensis*, Stephenson, Mem. Ind. Mus. vii, p.196.

1920. *Nais communis* var. *punjabensis*, Mehra, P. Z. S. p. 457.

1923. *Nais communis* var. *punjabensis*, Stephenson, Fauna of British India (Oligochaeta), pp.55-57.

Habitat and Distribution: The worm has been found inhabiting tubes, probably abandoned by insect larvae; specimens found by Annandale in Seistan were living in relatively long mucilaginous tubes, to which colonies of the polyzoon *Lophopodella* had attached themselves. It distributed in Lahore; Peshawar; Kasauli, W. Himalayas; Agra; Khandala, W. Ghats; Bheemanagar, Travancore (in *Spongilla carteri*). Also in Seistan, E. Persia. The type form of the species has been found as far apart as Patagonia and Switzerland.

7. *Nais communis* (Piguet) var. *caeca* (Steph.)

1910. *Nais communis* var. *caeca*, Stephenson, Rec. Ind. Mus. v, pp. 235, 238, pl. xi, fig. 3.

1918. *Nais communis* var. *caeca*, Stephenson, Rec. Ind. Mus. xiv, p. 12.

1923. *Nais communis* var. *caeca*, Stephenson, Fauna of British India (Oligochaeta), pp. 57-58.

Habitat and Distribution: It is living as a parasite in *Spongilla carteri*. Body length about 02 mm . It distributed in Bheemanagar, Travancore (in *Spongilla carteri*); Kasauli, W. Himalayas.

8. *Nais elinguis* (Mill., Orst.)

1909. *Nais elinguis*, Michaelsen, Mem. Ind. Mus. i, p. 131.

1903. *Nais elinguis*, Michaelsen, Jahrb. Hamb. wiss. Anst. xix, p. 175, fig. 4.

1906. *Nais elinguis*, Piguet, Rev. Suisse Zool. xiv, p. 241, pl. x, fig. 8, pl. xi, figs. 8-13, pl. xii, fig. 10.

1923. *Nais communis* var. *elinguis*, Stephenson, Fauna of British India (Oligochaeta), pp. 58-59.

Habitat and Distribution: It is small species, body length upto 1.2-10 mm. Distributed in Calcutta, in *Spongilla carteri*; ? Alipur, near Calcutta, from colonies of *Plumatella emarginata*. Widely spread in Europe.

9. *Nais pectinata* (Steph.) var. *inaequalis* (Steph.)

1911. *Nais pectinata* var. *inaequalis*, Stephenson, Rec. Ind. Mus. vi, p. 208, text -fig. 2.

1920. *Nais pectinata* var. *inaequalis*, Mehra, P. Z. S. pp. 457, 458, text -figs, 1 A, 2.

1923. *Nais communis* var. *inaequalis* Stephenson, Fauna of British India (Oligochaeta), pp. 64-65.

Habitat and Distribution: It is distributed in Agra, Bheemanagar, Travancore (in *Spongilla carteri*), along with the type form of the species. It about 15-18 mm in length.

10. *Pristina longiseta* (Ehrbg., f. typica)

1909. *Pristina longiseta*, Michaelsen, Mem. Ind. Mus. i, p. 135.

1909. *Pristina longiseta*, Stephenson, Mem. Ind. Mus. i, p. 264, text -figs. 4, pl. xvii, fig. 25, pl. xviii, figs. 26-33, 38.

1909. *Pristina longiseta*, Piguet, Rev. Suisse, Zool. xvii, pp. 212, 216.

1910. *Pristina longiseta*, Stephenson, Rec. Ind. Mus. v, p. 325.

1913. *Pristina longiseta*, Stephenson, Tr. Roy. Soc. Edin. xlix, pp. 739, 744.

1916. *Pristina longiseta*, Stephenson, Rec. Ind. Mus. xii, p. 304.

1920. *Pristina longiseta*, Stephenson, Mem. Ind. Mus. vii, p. 199.

1920. *Pristina longiseta*, Mehra, P. Z. S. p. 457.

1884. *Pristina longiseta*, Vejdovsky, Monog. p. 31, pl. ii, figs. 13-15.

1895. *Pristina longiseta*, Beddard, Monog. p. 290.

1906. *Pristina longiseta*, Piguet, Rev. Suisse, Zool. xiv, p. 290, pl. x, figs. 22-23, pl. xii, figs. 21-25.

1913. *Pristina longiseta*, Piguet, Olig. Suisse, p. 50.

1923. *Pristina longiseta*, Stephenson, Fauna of British India (Oligochaeta), pp. 70-71.

Habitat and Distribution: It is a another parasitic Species distributed in Calcutta, in *Spongilla crassissima* and from colonies of *Plumatella fruticosa* and *Plumatella emarginata* (oral communication from Dr. Annandale, emending the original statement); Lahore; Bheemanagar, Travancore (on or in *Spongilla carteri*); Bombay; Gwalior, central India. Widely distributed in Europe; found also in N. America.

11. *Pristina aequiseta* (A.G.Bourne)

1909. *Pristina aequiseta*, Michaelsen, Mem. Ind. Mus. i, p. 134.

1909. *Pristina aequiseta*, Stephenson, Mem. Ind. Mus. i, p. 269, text -fig. 5, pl. xviii, fig. 34.

1909. *Pristina aequiseta*, Piguet, Rev. Suisse, Zool. xvii, pp. 212, 216.

1915. *Pristina aequiseta*, Stephenson, Tr. Roy. Soc. Edin. 1, p. 786.

1916. *Pristina aequiseta*, Stephenson, Rec. Ind. Mus. xii, p. 304.

1891. *Pristina aequiseta*, Bourne, Quart. J. Mic. Science. xxxii, p. 352.

1895. *Pristina aequiseta*, Beddard, Monog. p. 291.

1906. *Naidium tentaculatum*, Piguet, Rev. Suisse, Zool. xiv, p. 219, pl. ix, figs. 18-20 & 26.

1913. *Pristina aequiseta*, Piguet, Olig. Suisse, p. 52.

1923. *Pristina aequiseta*, Stephenson, Fauna of British India (Oligochaeta), pp. 71-73.

Habitat and Distribution: It is distributed in Calcutta (in *Spongilla carteri*); Lahore; Allahabad. Also found in Europe. It is upto 2-3 mm in length.

12. *Pristina proboscidea* (Bedd. f. typica)

1909. *Pristina proboscidea* f. *typica*, Michaelsen, Mem. Ind. Mus. i, p. 133.

1911. *Pristina proboscidea* f. *typica*, Stephenson, Rec. Ind. Mus. vi, p. 211.

1896. *Pristina proboscidea*, Beddard, Ergeb. Magalh. p. 4, fig. 18.

1905. *Pristina proboscidea* f. *typica*, Michaelsen, Zoologica, xlv, p. 359.

1923. *Pristina proboscidea*, Stephenson, Fauna of British India (Oligochaeta), pp. 73.

Habitat and Distribution: Calcutta (in *Spongilla crassissima* and *S. carteri*, also living freely). Recorded also from Zanzibar, Chile (Valparaiso), Paraguay, and Java.

13. *Pristina proboscidea* var. *paraguayensis* (Mich.)

1909. *Pristina proboscidea* var. *paraguayensis*, Michaelsen, Mem. Ind. Mus. i, p. 134.

1905. *Pristina proboscidea* var. *paraguayensis*, Michaelsen, Zoologica, xlv, p. 360.

1923. *Pristina proboscidea* var. *paraguayensis*, Stephenson, Fauna of British India (Oligochaeta), pp. 73-74.

Habitat and Distribution: Calcutta (from colonies of *Plumatella fruticosa* and *Plumatella emarginata*). Also in Paraguay. Length upto 0.55 mm.

14. *Salvina appendiculata* (Udek.)

1909. *Salvina appendiculata*, Michaelsen, Mem. Ind. Mus. i, p. 132.

1909. *Salvina punjabensis*, Stephenson, Mem. Ind. Mus. i, p. 272, pl. xviii, figs. 35-37, pl. xix, figs. 41-45, pl. xx, figs. 50-52.

1913. *Salvina punjabensis*, Stephenson, Tr. Roy. Soc. Edin. xlix, pp. 737, 744, 757.

1913. *Salvina appendiculata*, Michaelsen, Mem. Soc. Neuchatel. v, p. 207.
1915. *Salvina punjabensis*, Stephenson, Tr. Roy. Soc. Edin. 1, p. 793, please. lxxx, figs. 4, 5.
1916. *Salvina punjabensis*, Stephenson, Rec. Ind. Mus. xii, p.302.
1855. *Nais appendiculata*, d'Udekem, Bull. Ac. Belgique, xxii, p. 552, fig. 3.
1884. *Salvina appendiculata*, Vejdovsky, Monog. p. 30, pl. iii, figs. 17-26.
1895. *Nais appendiculata*, Beddard, Monog. p. 287.
1903. *Salvina appendiculata*, Michaelsen, Jahrb. Hamb. wiss. Anst. xix, p. 185.
1906. *Salvina appendiculata*, Piguet, Rev. Suisse Zool. xiv, p. 282, pl. xii, fig.20.
1923. *Salvina appendiculata*, Stephenson, Fauna of British India (Oligochaeta), pp. 82-83.
Habitat and Distribution: Alipur, near Calcutta, from colonies of *Plumatella emarginata*; Lahore, free - living. A common European species. Length upto 2-8 mm.
15. Enchytraeus indicus (Steph.)
1912. *Enchytraeus indicus*, Stephenson, Rec. Ind. Mus. vii, p. 238, pl. xii, fig. 6.
1923. *Enchytraeus indicus*, Stephenson, Fauna of British India (Oligochaeta), pp. 115.
Habitat and Distribution: The worms were found in the egg-membranes of the pond-snails *Ampullaria*. The species reported by Stephenson (1923) in and around Bombay region only. Length upto 4 mm.

III. Conclusion

Some species of aquatic microdrile worms living symbiotically in the cavities of other animals like several species of aquatic snails ; while some species have also been reported which are carnivorous (Stephenson,1923). Among these, *Chaetogaster orientalis* (Steph) and *Chaetogaster* genus (K. Baer.) are especially well known examples of these species. These species devouring small crustacea, rotifers, small nematodes, ciliates such as *Paramecium* and other small worms. Some species of the *Chaetogaster* genus have also been reported to be vegetable feeders. Therefore, it is very necessary to do research work on the usefulness as well as the harm caused by these aquatic microdrile worms in detail. I not only hope but have full confidence that some good results will definitely emerge in the future and it will help in understanding to these aquatic worms in well manners.

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