

A SYSTEMATIC STUDY OF FRESHWATER OLIGOCHAETES FROM SRI LANKA II

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Freshwater Oligochaetes are important as a significant component in the aquatic food webs and as biological indicator organisms. A comprehensive account of aquatic oligochaetes of the world has been given by Brinkhurst and Jamieson (1971). Much work has been done on freshwater oligochaetes in the Indian sub-continent (Stephenson, 1913, 1923, 1925, 1929, 1931; Aiyer, 1925, 1926, 1930; Cernovitov, 1942; Sperber, 1958; Naidu, 1961-63. Naidu (1966) listed 71 valid species of oligochaetes belonging 6 species to Aeolosomatidae, 51 species to Naididae and 14 species to Tubificidae from Indian Sub-continent.

Studies on freshwater oligochaetes in Sri Lanka are however scarce. From a collection of oligochaetes, Stephenson (1913) described 3 valid new species for the first time from Sri Lanka. The first comprehensive systematic study of freshwater oligochaetes in Sri Lanka was however done by Costa (1967) who described 28 species including 17 new records. Previous studies on freshwater oligochaetes indicate that 36 species belonging to five families are present in Sri Lanka.

During a comprehensive study on the ecology of freshwater oligochaetes in some selected inland waterbodies, ten species were recorded for the first time from Sri Lanka. These and another species identified but not described from any habitat in Sri Lanka are briefly described.

Materials and methods

The materials used in this study were obtained from three inland waterbodies namely Beira (Colombo) Lake, Ihalagama reservoir and Lunuwila reservoir during the period, May 1993 to April 1994. Beira Lake and Ihalagama reservoir are located in the Western part and Lunuwila reservoir in the North-Western part of Sri Lanka.

Some physical and chemical conditions of these waterbodies are given in Table 1.

Bottom samples were taken from these waterbodies with an Ekman grab and sieved in the laboratory. Oligochaetes were collected and identified upto species level.

Table 1. Some physical and chemical parameters of water in the inland waterbodies studied.

Parameter	Colombo (Beira) Lake	Ithalagama reservoir	Lunuwila reservoir
Temperature (°C)	26.5-34.2	25.6-30.2	26-35
pH	6.4-9.5	5.2-7.1	4.9-6.6
DO (mg/l)	0.41-21.19	0.41-5.71	1.22-11.37
BOD (mg/l)	9.38-53.14	0.81-9.78	0.81-9.78
Nitrate (mg/l)	0.28-7.06	0.02-1.42	0.01-1.53
Phosphate (mg/l)	0.07-4.00	0.18-1.26	0.14-1.01
Salinity	0.08-1.5	-	-

Systematics

Family Aeolosomatidae

Genus *Aeolosoma* Ehrenberg, 1828

(1) *Aeolosoma travancorensis* Aiyer, 1926, (Fig. 1)

Aeolosoma travancorensis Aiyer, 1926, p. 136; 1930, pp. 16-19, Fig. 1.
Stephenson, 1930, pp. 723, 725. Marcus, 1944, pp. 24-25, fig. 11, 12, 15, 75.

These worms were collected from Beira lake.

Length (living) 0.6-0.8 mm (1.3 with chain); Diameter 0.03-0.06 mm. No. of Segments 13 (17 with fission zone).

Worms are small and whitish in colour. Secretions of skin glands colourless.

Prostomium and anal segments bear sensory hairs. Dorsal setae from II and hair setae unequal or subequal and bayonet-shaped. Needles are half as long as hairs, bayonet-shaped with one row of 10-11 teeth in the concave border distally.

Budding zone 1-3 common.

Habitat : No swimming, shows gliding movement, live in tubes.

Remarks : This species is recorded for the first time from Sri Lanka.

Distribution : Europe and South America. This species has been recorded from Travancore and Cuddapah (South India) in the Indian Sub-continent.

- (2) *Aeolosoma viridae* Stephenson, 1911, (Fig. 2).

Aeolosoma viridae Stephenson, 1911: 205; 1913: 743; 1923: 12; 1930: 525.

These worms were collected from Beira Lake.

Length upto 8 mm; diameter from 0.04-0.06 mm. Number of segments vary and Chains upto 8 zooids.

Large and yellowish green in colour with coloured, globular skin glands.

Rounded prostomium with ciliated fields and wider than following segments; large, oval shaped sensory pits present. Posterior end is two-lobed.

Dorsal setae from II and 2-8 unequal hair setae per bundle. Needle setae absent.

The intestine is dilated from anterior part from segments IV to VI.

Remarks : This species is recorded for the first time from Sri Lanka.

Distribution : Pakistan, India, Yugoslavia, Italy, Belgium and Brazil.

Family Naididae

Genus *Allonais* Sperber, 1948

- (3) *Allonais gwaliorensis* Stephenson, 1920, (Fig. 3).

Allonais Gwaliorensis Stephenson, 1920: 198, Pl. IX, figs, 3-4. 20D-G. Sperber, 1948, pp. 205-206; 1958, p. 50, Fig. 10-12

These worms were collected from Beira Lake, Ihalagama and Lunuwila reservoirs.

Pale white in colour and medium size, delicate and slender.

Bluntly triangular prostomium.

Dorsal setae from VI and with 1-2 smooth, simple hairs and 1-2 sickle shaped bifid needles with weak nodulus per bundle. Ventral setae in II - V 4-5 per bundle, distal prong thinner and slightly longer than proximal.

Pharynx in II-V, ciliated and wide; Stomach in IX-X.

Intestine thin in XI and XII, wide in rest.

Habitat : Swimming present; Live among aquatic vegetation.

Remarks : This species is recorded for the first time from Sri Lanka.

Distribution: Asia, Madagascar?, Africa. It has been recorded from Gwalior (Central India) and Cuddapah (South India) in the Indian Sub-continent.

Genus *Dero* Oken, 1815

(4) *Dero dorsalis* Ferronniere, 1899. (Fig. 4)

Dero dorsalis Ferronniere, 1899, fig. 7: 13A-C; Sperber, 1948, pp. 162-165; 1950, pp. 70-71, fig. 22.

These worms were collected from Beira Lake.

Length 16.24-19.25 mm; diameter 0.30-0.42 mm. Number of segments 82-87.

Worms are yellow in colour and medium in size.

Segmentation is clear.

Dorsal setae from IV, one bayonet shaped hair setae and 1 double-pronged sickle-shaped needles per bundle. Curvature of needles in II-V is less than others with medium nodules. Ventral setae of anterior segments with longer distal teeth and 4 ventral setae anteriorly, 3 ventral setae in middle and 2 ventral setae posteriorly per bundle.

Branchial fossa with 5 pairs of ciliated and foliate gills and two non-ciliated diverging processes from postero-lateral border.

Pharynx in II-III, wide with glands. Thin and wavy oesophagus in IV-VIII. Thin intestine in IX. Stomach is absent.

Chloragogue cells are greenish in colour and blood is red.

Habitat : Live in mud without forming tubes; Swimming absent.

Remarks : This species is recorded for the first time from Sri Lanka. These worms are the largest species among species of *Dero*.

Distribution : Europe, East Asia. It has been recorded from Madras, Trivandrum Cuddapah and Kakinada (South India) in Indian Sub-continent.

(5) *Dero indica* Naidu, 1962. (Fig. 5).

Dero indica Naidu, 1962: 533, Fig. 14a-g.

Length 8.3 mm; diameter 0.38 mm. Number of segments 38-64.

These worms were collected from Beira lake.

Worms are pale red in colour and medium in size. Prostomium bluntly triangular.

Dorsal setae from segment VI. Anteriorly 2 bayonet-shaped hairs and 2 sickle-shaped needles and posteriorly 1 of each per bundle. 4 ventral setae from segment II to V and 3-4 per bundle in other segments.

Funnel-shaped branchial fossa with 4 pair of foliate and ciliated gills.

Yellow coloured Pharynx in II-IV. Oesophagus in V-VIII. Stomach is in IX-1/2X.

Habitat : Live in mud without forming tubes; Swimming with spiral movements.

Remarks : This species is recorded for the first time from Sri Lanka. Worms coil when disturbed.

Distribution : It has been recorded from South India.

Genus *Pristina* Ehrenberg, 1828

(6) *Pristina biserrata* Chen, 1940. (Fig. 6).

Pristina biserrata Chen, 1940: Fig. 7; 1940: Figs. 13-14; Sperber, 1948; Sokolskaya, 1961: 67, Figs. 10, 11; Naidu, 1963: 204.

Length 11.8 mm; diameter 0.36 mm. Number of segments 26-28.

These worms were collected from Ihalagama reservoir and from a pond at Maththegoda.

Prostomium forms a proboscis.

Dorsal setae from II and serrated and notched hair setae 1-3 per bundle. 2-4 simply pointed serrated and non-serrated needles. Ventral setae 4-10 per bundle and increased in numbers posteriorly.

Stomach in VIII, dilated intestine in IX and another swelling in IX. Swimming with horizontal movements.

** Hairs of VIII onward are not very long in the specimens from Sri Lanka compared to these described from other countries.

Remarks : Recorded only from South and East Asia. Recorded for the first time from Sri Lanka.

Distribution : South and East Asia.

(7) *Pristina jenkiniae* (Stephenson, 1931). (Fig. 7).

Pristina jenkiniae. (Stephenson) Sperber, 1948, pp. 224-225; 1958, p. 51, fig. 17.

Worms were collected from Beira lake and Lunuwila reservoir.

Length 23.7-24.2 mm; diameter 0.98-0.16 mm. No. of segments 19-23.

Pale white in colour and small. Prostomium triangular without proboscis.

1-2 non serrated straight hair setae (usually 1 hair setae), about equal to body width and bifid bayonet-shaped 1-2 needle setae per bundle. Dorsal setae begin in 11. Proximal tooth twice as long as distal. Ventral setae 4-5 per bundle and posteriorly decrease to 2 or 3.

Blood yellowish red.

Pharynx in II-IV, thin Oesophagus in V-VI and fusiform stomach in VII-1/2 VIII.

Spherical, granular coelomocytes present, chloragogue cells cover gut. Swimming absent.

Remarks : This worm is described for the first time in Sri Lanka.

Distribution : Europe ?, South America, Africa and Asia. This species has been also recorded from Bellary (South India) in Indian Sub-continent.

(8) *Pristina synclites* Stephenson, 1925. (Fig. 8).

Pristina synclites Stephenson, 1925: 45, Pl. III, Fig. I; Sperber, 1948, p. 225.

Worms were collected from Beira Lake.

Length 3.8-4.4 mm; diameter 0.26-0.35 mm. No of segments 59.

Light red in colour with short proboscis.

Hair setae 1-2 per bundle and Started in II and non serrated. Needle 1-2 in a bundle, stout with a weak nodules. Ventral setae 4 per bundle, decreasing to 2 posteriorly.

Pharynx wide and in II-1/2 IV, Thin oesophagus, fusiform stomach in VIII.

Blood orange red.

Habitat : Live in soft mud. Worms coil when disturbed.

Remarks : This species is recorded for the first time from Sri Lanka.

Distribution : Africa. This species has been also recorded from Mysore, Cuddapah and Bangalore (South India) in the Indian Sub-continent.

Genus *Stephensoniana* (I)

(9). *Stephensoniana trivandran* (Aiyer, 1926). (Fig. 9).

Stephensoniana trivandran (Aiyer). Sperber, 1948, pp. 208 – 209, Fig. 28C.

These worms were collected from Beira Lake and from a pond at the premises of The University of Kelaniya.

Length 1.76 -2.1 mm; diameter 0.12-0.18 mm. Number of segments 26-29.

Worms are small, reddish and adhered foreign matters can be found on the cutaneous body wall. Bluntly triangular prostomium. Eyes absent. The body is covered by mucous sheath consisting of fine sand particles and clay which it gives the papillated appearance.

Dorsal setae from II and bundles contain anteriorly 3-4 hairs and 3-4 needles. The body suddenly taper to the distal end. Posteriorly the dorsal bundles have 1-2 hairs and needles. Ventral setae anteriorly 4 and decrease to 1 posteriorly per bundle.

Swims by brisk wriggling movements.

Remarks : This species is recorded for the first time from Sri Lanka. Very abundant in Beira Lake. The species from Beira Lake have only 3 needles with 3 hairs per bundle.

Distribution : Palestine and Africa. Recorded from Trivandrum, Cuddapah and Bellary (South India) in Indian Sub-continent.

Family Tubificidae

Genus *Aulodrilus* Bretscher, 1899

(10). *Aulodrilus pigueti* kowalewski, 1914. (Fig. 10).

Aulodrilus pigueti Kowalewski, 1914: 25, Fig. 12. Hrabe, 1937: 3. Cekanovskaja, 1962: 227, Fig. 137. Brinkhurst, 1963 a: 69, Fig. 51; 1965: 150, Fig. 9 (P,Q).

Aulodrilus remex Stephenson, 1921, p. 753-754, pl. XXVIII, f. 6-6; 1923, p. 107, f. 42-45. Aiyer, 1925, p. 35; 1930a, p. 81-86, pl. IV, f. 1-9.

These worms were collected from Beira Lake.

Length 26.7 mm; diameter 1.5 mm. Number of segments 73-98.

Pale red in colour and cylindrical. Prostomium is bluntly conical.

Dorsal bundles started in segment II. 4-5 bayonet-shaped hair setae per bundle and absent in the first few bundles. Needles are simple-pointed or bifid but oar-shaped beyond segment VII. Ventral bundles have 6-8 bifid setae. Two hollow spoon-shaped, modified genital setae per bundle.

Wide and evertible pharynx in II-III. Narrow and wavy oesophagus in IV-VII. No stomach.

Nephridium is in IX. Clitellum in 1/2 VI - 1/2 VIII.

Habitat : They live in soft tubes with their anterior end buried and protrude their hind parts out of the tubes and wave them.

Remarks : This species is recorded for the first time from Sri Lanka.

*** This species was mentioned by Mendis and Fernando (1962) but no localities or authors were given.

Distribution : Cosmopolitan. It has been recorded from North India, South India, Pakistan and Burma.

(11). *Aulodrilus pluriseta* (Piquet, 1906)

Naidium pluriseta Piquet, 1906, p. 218-219.

Aulodrilus pluriseta (Piquet), 1913, p. 118-122, f. 1-2. Kowalewski, 1914, p. 600. Lastockin, 1927, P. 67. Cernosvitov, 1928, p. 4. Brinkhurst, 1963, p. 66, f. 50.

Orange red in colour and cylindrical. Prostomium is bluntly conical.

Length 23.4 mm; diameter 0.4 mm. Number of segments 62-97.

Dorsal setae begin in II and 4-8 bayonet-shaped hairs and 6-8 needles per bundle. 6-10 ventral setae per bundle.

Pharynx in segment II-III. Narrow oesophagus in IV-VI. No stomach. Intestine starts in VII.

Chloragogue cells present and coelomocytes absent.

Nephridia start in IX. Clitellum in 1/2 VI - 1/2 VIII.

Habitat : Worms live in tubes with their anterior region buried in the mud and protrude hind parts out from the tubes and wave them.

Remarks : This species is recorded for the first time from Sri Lanka.

*** This species was mentioned by Mendis & Fernando (1962) but no localities or authors were given.

Distribution : Cosmopolitan. It has been recorded from North India and South India.

General Comments

In this study ten species of freshwater oligochaetes are described for the first time in Sri Lanka.

The new records of freshwater oligochaetes are *Aeolosoma travancorense*, *Aeolosoma viridae*, *Allonais gwaliorensis*, *Dero dorsalis*, *Dero indica*, *Pristina biserrata*, *Pristina synclytes*, *Stephensoniana trivandranana*, *Aulodrilus pigueti* and *Aulodrilus pluriseti*. Of these, *Aeolosoma travancorense*, *A. viridae*, *Dero dorsalis*, *D. indica*, *Aulodrilus pigueti* and *A. pluriseti* were found at the muddy bottom of Beira Lake. This reservoir is an eutrophic alkaline waterbody, slightly saline in some parts and with high BODs values. *Pristina biserrata* was collected from Ihalagama reservoir and from a pond at Maththegoda where BODs values have intermediate ranges. Since most species are found in all three waterbodies with varying physico-chemical characteristics, they could perhaps be considered to be able to colonize a wide range of aquatic habitats.

Dero dorsalis, *D. indica*, *Aulodrilus pigueti* and *A. pluriseti* are found in muddy habitats so that their living environment can be considered similar. *Allonais gwaliorensis* live among algae and aquatic vegetation.

A total number of 46 valid oligochaete species have now been recorded from Sri Lanka. These belong to Aeolosomatidae (5 species), Naididae (34 species), Tubificidae (5 species), Phreodrilidae (1 species) and Glossoscolecidae (1 species) (Table II).

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