



Preliminary survey of aquatic oligochaetes in Eastern Tamil Nadu, India

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Abstract

A random survey of aquatic Oligochaeta was conducted in Chennai, Villupuram, Dindugal, Thiruvallur, and Sivagangai districts of Tamil Nadu from November 2010 to March 2012. Thirteen taxa were identified from a total of 644 aquatic oligochaetes examined from various qualitative samples of aquatic vegetation and sediments. Chennai district had 3 families: Naididae, Pristinidae and Tubificidae along with a polychaete. The naidids were most diverse with 5 species: *Branchiodrilus semperi*, *Aulophorus furcatus*, *Dero digitata*, *Dero indica* and *Dero zeylanica*, the pristinids were represented by *Pristina brevichaeta* and *Pristina jenkinsae* and the tubificids by 2 species, *Branchiura sowerbyi* and *Limnodrilus hoffmeisteri*. The nine aquatic oligochaetes collected from Chennai were already reported from this region. Two naidids, *Branchiodrilus semperi* and *D. indica*, along with the tubificid *Branchiura sowerbyi*, were collected from Villupuram district and they constitute the first reports for that district. *Limnodrilus udekemianus* from Kodaikanal, Dindugal district constitutes the first report for that region of Tamil Nadu. Megadriles belonging to the family Octochaetidae (*Dichogaster bolau?*) and unidentified Megascolecidae collected from Thiruvallur and Sivaganga districts respectively were found to occur in aquatic habitats.

Key words: Aquatic Oligochaeta, Naididae, Pristinidae, Tubificidae, Octochaetidae, Megascolecidae, Polychaeta

Introduction

The monograph by Naidu (2005) was an effort to bring together all the information available in the literature on aquatic oligochaetes known from the Indian subcontinent. It describes a total of 102 taxa belonging to the various families of aquatic Oligochaeta from the Indian subcontinent. A recent review of freshwater oligochaetes of India suggests that a thorough survey of various states is needed to understand the distribution of oligochaetes systematically (Singh et al, 2009). Hence the present work is a preliminary attempt to explore the fauna of aquatic Oligochaeta from a few districts of the state of Tamil Nadu, South India as the studies on this group from Tamil Nadu are scanty, except for some reports by Naidu (2005), Naveed *et al.* (2011) and Naveed (2012).

Sampling sites

A random survey of aquatic Oligochaeta was conducted at Chennai, Villupuram, Dindugal, Thiruvallur and Sivagangai districts of Tamil Nadu (Fig. 1) from November 2010 to March 2012. Qualitative samples of aquatic vegetation and bottom sediments were collected from Adyar River near Saidapet (13°01'00"N, 80°13'03"E), Adyar River near Besant Nagar (13°00'19"N, 80°16'06"E), Adyar River near Kotturpuram (13°00'58"N, 80°14'05"E), Porur Lake (13°02'09"N, 80°09'08"E), by the second and fourth author and from Red Hills Lake (13°11'32"N, 80°10'26"E), Maduravoyal Pond, (13°03'47"N, 80°09'32"E), Nandampakkam River (13°00'59"N, 80°11'15"E), Pallikaranai Pond (12°56'48"N, 80°13'34"E), Tharamani Pond (12°59'36"N, 80°14'22"E), Madhavaram Lake (13°09'53"N, 80°14'57"E), Rettari Lake (13°08'33"N, 80°12'46"E) by the second author and from Chetpet Pond (13°04'30"N, 80°14'31"E) by the second and fifth authors and from Vandalur Lake (12°53'04"N, 80°05'03"E) by the fifth author, all in Chennai. Samples were collected from Alampalam Lake (11°46'26"N, 78°55'30"E) in Villupuram by the fourth author and from

Kodaikanal Boat House Lake ($10^{\circ}14'19''\text{N}$, $77^{\circ}30'12''\text{E}$) by the second author, this Lake is located at an elevation of 2,133m (6,998ft) in Dindugal district (with cool climate throughout the year), and the first four authors had collected the samples from Satharai Lake ($13^{\circ}17'55''\text{N}$, $80^{\circ}03'21''\text{E}$) in Thiruvallur and the second author had collected samples from Sivaganga Pond ($9^{\circ}50'43''\text{N}$, $78^{\circ}29'20''\text{E}$) in Sivaganga district.

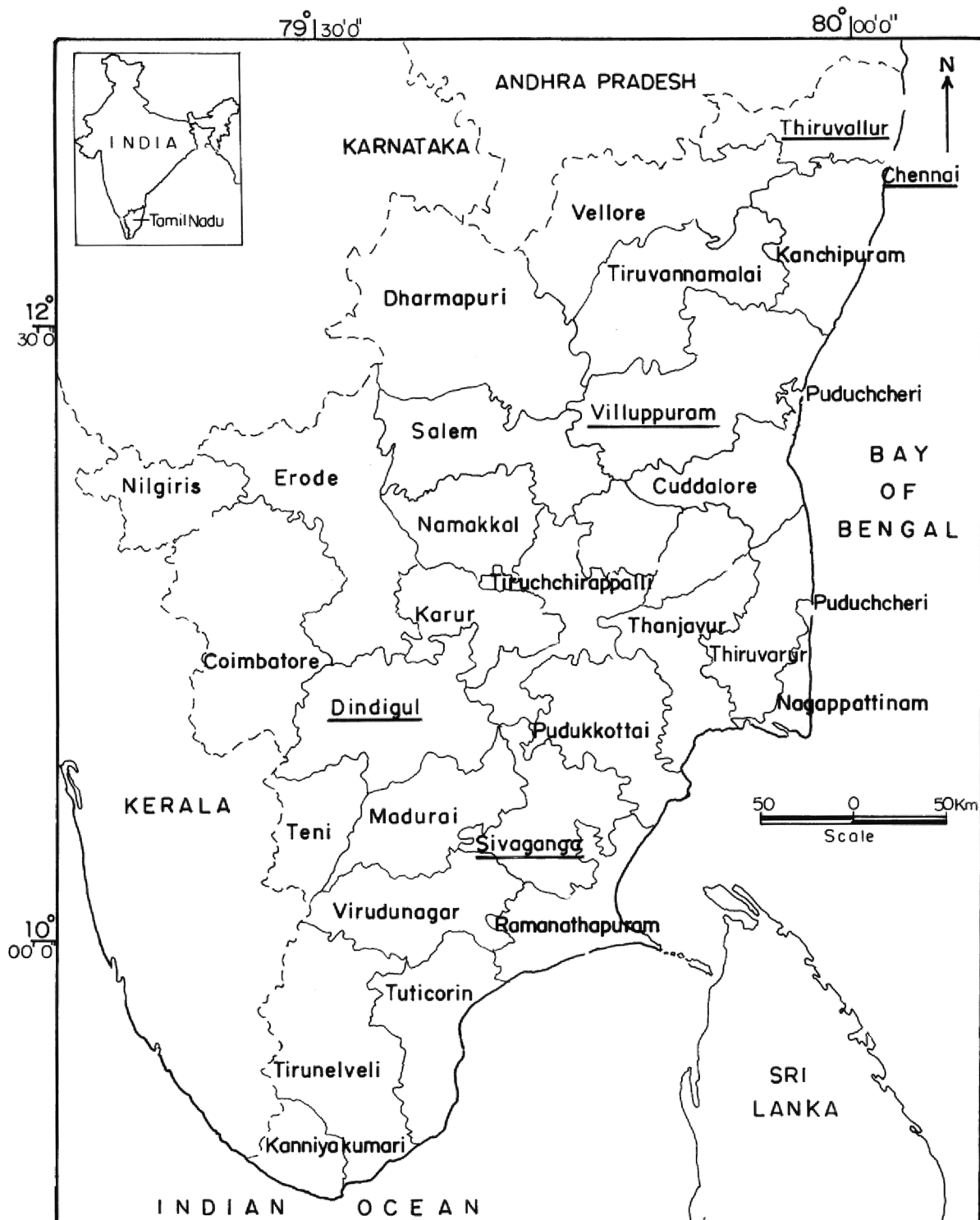


FIGURE 1. Map of Tamil Nadu (the districts surveyed are underlined).

Materials and methods

Hand net and tea strainers were used to collect qualitative random samples of bottom mud while aquatic vegetation was handpicked. Aquatic vegetation was transferred into trays containing water and gently shaken, the Oligochaeta specimens were collected with the help of droppers using magnifying lens and sufficient illumination. The sediment samples were washed through a 200 µm mesh sieve and the worms were sorted manually by diluting a small portion of the sediment residue in a white porcelain dish. Live oligochaetes were also extracted from some sediment samples by wet funnel method (O'Connor, 1995) with minor modifications. The collected worms were transferred into vials containing 10% formaldehyde and were preserved for identification. Live worms were examined under a cover slip in a drop of water. The preserved worms were examined on a slide in a few drops of glycerin under a cover slip. Brinkhurst and Jamieson (1971), Naidu (2005) and Timm (2009) were used for the identification of the worms. A total of 644 individuals were examined and identified by the first author. The drawings were made using a camera lucida. The classification of aquatic Oligochaeta by Timm (2009) is followed in the present work.

Results

Faunistic results

Thirteen taxa were identified (Table 1) from a total of 644 aquatic Oligochaeta examined. Chennai District had by 3 families: Naididae, Pristinidae and Tubificidae along with an unidentified polychaete. The naidids were most diverse with 5 species: *Branchiodrilus semperi*, *Aulophorus furcatus*, *Dero digitata*, *Dero indica* and *Dero zeylanica*, the pristinids were represented by *Pristina brevichaeta* and *Pristina jenkiniae* and the tubificids by 2 species: *Branchiura sowerbyi*, *Limnodrilus hoffmeisteri*. Two naidids, namely *Branchiodrilus semperi* and *D. indica* along with one tubificid, *Branchiura sowerbyi* were collected from Villupuram district and they constitute the first reports for Villupuram district. *Limnodrilus udekemianus* collected from Kodaikanal, Dindugal district constitutes the first report for that region of Tamil Nadu. Megadriles belonging to the family Octochaetidae (*Dichogaster bolau?*) collected from Thiruvallur district and unidentified Megascolecidae collected from Sivagangai districts were found to occur in aquatic habitats.

Systematic account

Family Naididae

Branchiodrilus semperi (Bourne, 1890)

Material examined: Alampalam Lake (Villupuram) on 02.01.2011 (n=1); Porur Lake (Chennai) on 02.05.2011 (n=1).

Morphological observations: Length about 7–20 mm. Worms brownish. Prostomium blunt and conical. A pair of finger-like dorso-lateral gills per segment in the anterior region. Dorsal chaetae from VI consisting of 1–3 hair chaetae and 1–2 needle chaetae entering the lumen of the gills and the hair chaetae protruding out of the lumen of the gills in the anterior region. Hair chaetae smooth. Needle chaetae without a nodulus, simple-pointed in the anterior region and in the posterior region the needle chaetae are peculiarly bayonet-shaped (Fig. 2A). Ventral chaetae 2–3 per bundle with distal tooth longer and thinner than proximal (Fig. 2B) with nodulus in the middle of the chaetae.

Distribution in Tamil Nadu: Chidambaram, Chennai (Naidu, 2005), Tiruvallur (Naveed, 2012).

Remarks: First report from Villupuram. This species is characterized by the presence of dorsolateral gills in the anterior half of the body (Timm, 2009).

It is reported from East and South Asia only (Naidu, 2005).

TABLE 1. Systematic list of aquatic Oligochaeta so far reported from Tamil Nadu. Species recorded during the present study are highlighted in bold.

Taxa	Records in this paper	Total distribution in Tamil Nadu
ORDER TUBIFICIDA		
FAMILY NAIDIDAE		
<i>Allonais gwaliorensis</i> (Stephenson, 1920)		Tanjavur.
<i>Aulophorus furcatus</i> (Müller, 1773)	Porur Lake, Chennai	Chennai, Coimbatore, Tandikoudi, Ouralpatti, Thanjavur, Udakamandalam (Ooty).
<i>Aulophorus graveleyi</i> Stephenson, 1925		Ennur near Chennai.
<i>Aulophorus hymanae</i> Naidu, 1962		Coimbatore.
<i>Aulophorus michaelsoni</i> Stephenson, 1923		Chennai, Udhakamandalam.
<i>Aulophorus tonkinensis</i> (Vejdovský, 1894)		Coimbatore.
<i>Branchiodrilus semperi</i> (Bourne, 1890)	Porur Lake, Chennai	Chidambaram, Chennai.
<i>Chaetogaster cristallinus</i> Vejdovský, 1883		Udhakamandalam.
<i>Dero digitata</i> (Müller, 1773)	Redhills Lake, Chennai	Coimbatore, Chennai.
<i>Dero dorsalis</i> Ferronière, 1899		Chennai.
<i>Dero indica</i> Naidu, 1962	Tharamani Pond, Chennai, Madavaram Pond, Chennai, Chetpet Pond, Chennai	Chennai.
<i>Dero nivea</i> Aiyer, 1929		Tandikoudi, Ouralpatti, Palni.
<i>Dero zeylanica</i> Stephenson, 1913	Porur Lake, Chennai	Chidambaram, Chennai.
<i>Nais andhrensensis</i> (Naidu and Naidu, 1981)		Udhakamandalam.
<i>Nais communis</i> Piguët, 1906		Chennai, Udakamandalam.
<i>Nais variabilis</i> Piguët, 1906		Yercaud.
<i>Slavina appendiculata</i> (d'Udekem, 1855)		Udhakamandalam.
<i>Stylaria fossularis</i> (Leidy, 1852)		Udhakamandalam.
FAMILY PRISTINIDAE		
<i>Pristina aequiseta</i> Bourne, 1891		Udhakamandalam.
<i>Pristina breviseta</i> Bourne, 1891	Porur Lake, Chennai	Chennai
<i>Pristina jenkiniae</i> (Stephenson, 1931)	Redhills Lake, Chennai	Chennai
<i>Pristina longiseta longiseta</i> Ehrenberg, 1828		Udhakamandalam, Thanjavur, Tandikoudi, Ouralpatti.
<i>Pristina menoni</i> (Aiyer, 1929)		Yercaud.
FAMILY TUBIFICIDAE		
Subfamily Rhyacodrilinae		
<i>Bothrioneurum iris</i> Beddard, 1901		Palani, Kodaikanal.
<i>Branchiura sowerbyi</i> Beddard, 1892	Porur Lake, Chennai, Nandampakam Lake, Chennai	Chennai, Annamalainagar, Coimbatore, Coonoor, Udhakamandalam.
SUBFAMILY TUBIFICINAE		
<i>Aulodrilus pluriseta</i> (Piguët, 1906)		Annamalainagar.
<i>Limnodrilus hoffmeisteri</i> Claparède, 1862	Porur Lake, Chennai, Nandampakam Lake, Chennai, Pallikaranai Marsh, Chennai	Chennai, Coimbatore, Udhakamandalam, Coonoor.
<i>Limnodrilus udekemianus</i> Claparède, 1862	Kodaikanal Boat House Lake, Dindugal	Udhakamandalam.
<i>Tubifex tubifex</i> (Müller, 1774)		Udhakamandalam, Coonoor, Kanyakumari.
ORDER ENCHYTRAEIDA		
FAMILY ENCHYTRAEIDAE		
<i>Stephensiella marina</i> (Moore, 1902)		Ennur near Chennai.
ORDER CRASSICLITELLATA		
FAMILY ALMIDAE		
<i>Glyphidrilus annandalei</i> Michaelsen, 1910		Mettupalyam, Tiruvallur.
FAMILY OCTOCHAETIDAE		
<i>Dichogaster bolau</i> (Michaelsen, 1891)?	Satharai Lake, Thiruvallur	
FAMILY MEGASCOLECIDAE		
Megascolecidae gen. sp.	Sivaganga Pond, Sivaganga	
CLASS POLYCHAETA		
Polychaeta gen. sp.	Porur Lake, Chennai	

Aulophorus furcatus (Müller, 1773)

Material examined: Porur Lake (Chennai) on 02.12.2010 (n=1).

Morphological observations: Length about 6–7 mm. About 50 segments. Prostomium bluntly conical. Dorsal chaetae begin from V with 1 hair and 1 needle chaetae (Fig. 2C). Ventral chaetae 3–4 per bundle with upper tooth slightly longer (Fig. 2D) in the anterior region and reducing to 2 in the posterior segments with almost equal teeth (Fig. 2E). Branchial fossa with a pair of non-contractile palps and 3 pair of gills.

Distribution in Tamil Nadu: Chennai, Coimbatore, Tandikoudi, Ouralpatti, Thanjavur, Udhakamandalam (Naidu, 2005).

Remarks: *Aulophorus furcatus* is cosmopolitan in distribution. It occurs in the detritus of muddy sediments near submerged vegetation and is always accompanied by a diverse benthic fauna (Nesemann *et al.*, 2004). Presence of a pair of palps with 3 pairs of gills in the branchial fossa is a striking character of this species.

Dero digitata (Müller, 1774)

Material examined: Redhills Lake on 16.02.2011 (n=1) and 28.04.2011 (n=2).

Morphological observations: Length 5–7 mm. Prostomium triangular. Dorsal chaetae from VI, each bundle with 1 hair and 1 needle chaeta. Needle chaetae sigmoid, bifid, with distal tooth longer and thinner than proximal (Fig. 2F). Ventral chaetae 4–5 in II–V with distal tooth longer and thinner than proximal (Fig. 2G). Ventral chaetae decreasing to 2–4 in number from the VI segment with almost equal teeth (Fig. 2H). Branchial fossa with 4 pairs of gills. Live worms reddish in colour.

Distribution in Tamil Nadu: Coimbatore (Naidu, 2005), Chennai (Naveed, 2012).

Remarks: Previously reported from Chennai. Cosmopolitan in distribution.

Dero indica Naidu, 1962

Material examined: Alampalam Lake (Villupuram) on 02.01.2011 (n=1); Chetpet Pond on 07.08.2011 (n=40); Tharamani Pond on 08.08.2011 (n=60) and Madavaram Pond on 11.08.2011 (n=35); all in Chennai.

Morphological observations: Worms red in colour. 5–8 mm in length. 30–70 segments with undifferentiated hind regions. Prostomium bluntly triangular. Dorsal bundles of chaetae begin in VI, ventral bundles in segment II. The dorsal bundles consist of 2 hair and 2 needle chaetae in the anterior segments while in the posterior segments the number is reduced to 1 hair and 1 needle. Hair chaetae long and not serrated. Needle chaetae bifid, sickle-shaped with distal nodulus. Distal tooth of the needle chaetae slightly thinner and longer than the proximal (Fig. 2I). Ventral bundles in the foremost segments from II–V consist of 4 long, thin and slightly curved chaetae per bundle with upper tooth longer than the lower (Fig. 2J). In other segments 3–4 ventral chaetae per bundle, shorter than in II–V with upper tooth almost equal to lower (Fig. 2K). Branchial fossa with 4 pairs of gills.

Distribution in Tamil Nadu: Chennai (Naveed, 2012)

Remarks: First report from Villupuram. Dorsal bundles with 2 hair and 2 needles beginning in segment VI, and 4 pairs of gills in the branchial fossa are the conspicuous characters of this species.

Dero zeylanica Stephenson, 1913

Material examined: Porur Lake (Chennai) on 24.04.2011 (n=3).

Morphological observations Length 4–7 mm, segments 40–70. Prostomium triangular. Dorsal chaetae begin in VI, each bundle with 3 hair and 3 needle chaetae. Needle chaetae bifid, sigmoid with distal tooth longer than proximal (Fig. 2L). Ventral chaetae in II–V 4–6 per bundle, longer and thinner than those in more posterior segments and with distal teeth twice as long as proximal (Fig. 2M). In the remaining segments ventral chaetae with almost equal teeth (Fig. 2N).

Distribution in Tamil Nadu: Chidambaram (Naidu, 2005), Chennai (Naveed, 2012).

Remarks: Present only in the samples collected from Chennai. It is reported from Asia and Brazil (Naidu, 2005).

Family Pristinidae

Pristina brevichaeta Bourne, 1891

Material examined: Porur Lake Chennai on 02.01.2011 (n=1).

Morphological observations: Length >2mm and number of segments >17 (posterior missing). Prostomium with short proboscis. Dorsal chaetae begin in II, 1 hair and 1 bifid needle per bundle with weak nodulus and equal teeth (Fig. 2O). Ventral chaetae 3–5 per bundle, with distal tooth equal to the proximal (Fig. 2P).

Distribution in Tamil Nadu: Chennai (Naidu, 2005).

Remarks: Immature worm (spermathecal chaetae not observed). Previously reported from Chennai. Presence of proboscis, the non-serrated hair chaetae and needle chaetae with equal teeth are some of the prominent characters of this species. It is generally distributed in south-east Asia, Europe and North and South America (Naidu, 2005).

Pristina jenkiniae (Stephenson, 1931)

Material examined: Red Hills (Chennai) on 16.02.2011 (n=1).

Morphological observations Length 2.5–3 mm and 30–36 segments. Prostomium conical, proboscis absent. Dorsal and ventral chaetae from segment II. Dorsal bundles consists of 1 hair and 1 needle chaetae per segment. Distal teeth of the needles shorter than the proximal (Fig. 2Q). Ventral chaetae 3–4 per bundle in the anterior segments and 2–3 in the posterior segments. Ventral chaetae all with equally long teeth (Fig. 2R).

Distribution in Tamil Nadu: Chennai (Naveed, 2012).

Remarks: Previously reported from Chennai. This species differs from *P. brevichaeta* in the absence of a proboscis and by the upper tooth of the needle chaeta being much shorter and thinner than the lower. Cosmopolitan (Timm, 2009).

Family Tubificidae

Subfamily Rhyacodrilinae

Branchiura sowerbyi Beddard, 1892

Material examined: Alampalam Lake in Villupuram on 02.01.2011 (n=1); Porur Lake on 09.04.2011 (n=12), 02.05.2011 (n=7); Nandampakam on 04.06.2011 (n=14).

Morphological observations: Length 65–170 mm. Prostomium conical. Posterior third of body with a pair of hollow finger like gills per segment. Dorsal chaetae from II with 1–6 hair and sigmoid bifid chaetae with proximal tooth longer than distal. Hair chaetae bayonet-shaped. Ventral chaetae simple pointed, 5–6 anteriorly, gradually decreasing to 1–2 posteriorly. Sex organs not clearly visible.

Distribution in Tamil Nadu: Chennai, Annamalainagar, Coimbatore, Coonoor, Udhakamanalah.

Remarks: First report for Villupuram district. Presence of gills in the posterior third of the body is a characteristic feature which enables easy identification of this species. It is cosmopolitan in distribution.

Subfamily Tubificidae

Limnodrilus hoffmeisteri Claparède, 1862

Material examined: Porur Lake on 02.01.2011 (n=20), 08.01.2011 (n=25), 08.02.2011 (16 specimens), 12.02.2011 (n=12), 02.03.2011 (n=12), 08.03.2011 (n=13), 23.03.2011 (11 specimens), 03.04.2011 (n=7), 09.04.2011 (n=6), 15.04.2011 (n=32), 24.04.2011 (n=19), 26.04.2011 (n=10), 02.05.2011 (n=3), 25.05.2011 (n=16), 04.06.2011 (n=33), 08.06.2011 (n=25), 12.06.2011 (n=28); Nandampakam on 12.05.2011 (n=7), 04.06.2011 (n=7); Pallikaranai Pond 21.05.2011 (n=14); Vandalur Lake on 03.11.2011 (n=4), 07.11.2011

(n=5), 23.11.2011 (n=3), 02.12.2011 (n=4), 20.12.2011 (n=5), 26.12.2011 (n=3), 07.01.2012 (n=26), 04.02.2012 (n=28), 03.03.2012 (n=24); Chetpet Pond on 13.11.2011 (n=3), 14.12.2011 (n=4), 21.01.2012 (n=2), 18.02.2012 n=(9) and 10.03.2012 n=(8). Many specimens were sexually mature.

Morphological observations: Penis sheaths are conspicuously visible in mature worms, constituting a vital character in the identification of this species. It is much longer than broad (8–10 times longer than its maximum width). Two types of penis sheath, namely the “plate-topped” type (Fig. 2U1) and the “typical” type (Fig. 2U2), were observed. Live worms red in colour. Length 30–60 mm. Segments 40–150. Prostomium bluntly conical. Dorsal and ventral chaetae begin from segment II, all bifid and similar, with distal tooth equal in length to the proximal. Anterior segments bearing 4–8 chaetae per bundle. The number of chaetae per bundle gradually decreases in the succeeding segments, with 1–2 in the most posterior segments.

Distribution in Tamil Nadu: Chennai, Coimbatore, Udhakamandalam, Coonoor.

Remarks: “Plate-topped” penial sheaths along with the “typical” type were observed in the present study. The sheaths of *L. hoffmeisteri* may be straight or curved, the walls are of even thickness and the distal ends are expanded to form a trumpet-shaped head, with a lateral opening. Some of the variation appears to be due to natural causes, but some apparent variation is due to such factors as the degree of pressure exerted upon the sheath when mounting, the position of the sheath and the angle from which it has been viewed. Even taking the variation into account, the shape of the sheath is still quite distinct from that of any other species (Kennedy, 1969). Cosmopolitan in distribution.

Limnodrilus udekemianus Claparède, 1862

Material examined: Kodaikanal Boat House Lake, Dindugal District 14.01.2011 (n=1 immature).

Morphological observations: Length about 48–50 mm. Segments about 90 in number with the posterior-most tail region missing. Prostomium bluntly conical. Both dorsal and ventral chaetae similar and begin from the II segment. Anterior chaetae 3–9 per bundle, with distal tooth thicker and much longer than the proximal tooth and more curved (Fig. 2V). Chaetae in the posterior segments gradually decrease in number. Beginning of the chloragogen tissue from VI.

Distribution in Tamil Nadu: Ooty (Naveed, 2012).

Remarks: First report from Kodaikanal, a cool mountainous region of Dindugal district of Tamil Nadu. *L. udekemianus* differs from *L. hoffmeisteri* by the relative size and shape of the two teeth of the chaetae (Kennedy, 1969). The chaetae in *L. hoffmeisteri* are all similar, with distal tooth thinner and equal in length to the proximal, while in *L. udekemianus* the distal tooth is thicker, much longer and more curved than the proximal tooth in the foremost bundles. It was first reported in India by Naveed (2012) but is cosmopolitan in distribution.

Family Octochaetidae

(*Dichogaster bolau* (Michaelen, 1891)?)

Material examined: Satharai Lake, Thiruvallur district on 10.11.2010 (n=1).

Morphological observations: Length 4 cm (posterior portion missing), breadth 1.0–1.2 mm. Segment number >99. Shape of prostomium conical. Dorsal chaetae start from II, sigmoid, simple-pointed, 2 per bundle. Ventral chaetae almost straight and pointed. Clitellum from XII. Spermathecal pores in 8/9.

Remarks: The identification is provisory. The species is basically terrestrial found in tropical countries.

Family Megascolecidae

Material examined: Sivaganga Pond, Sivaganga District, 13.05.2011 (n=1).

Morphological observations: Simple pointed sigmoid chaetae and clitellum beginning with or in front of segment xv.

Remarks: Live worm crawls out of the petri dish. Its presence in the aquatic habitat may be accidental.

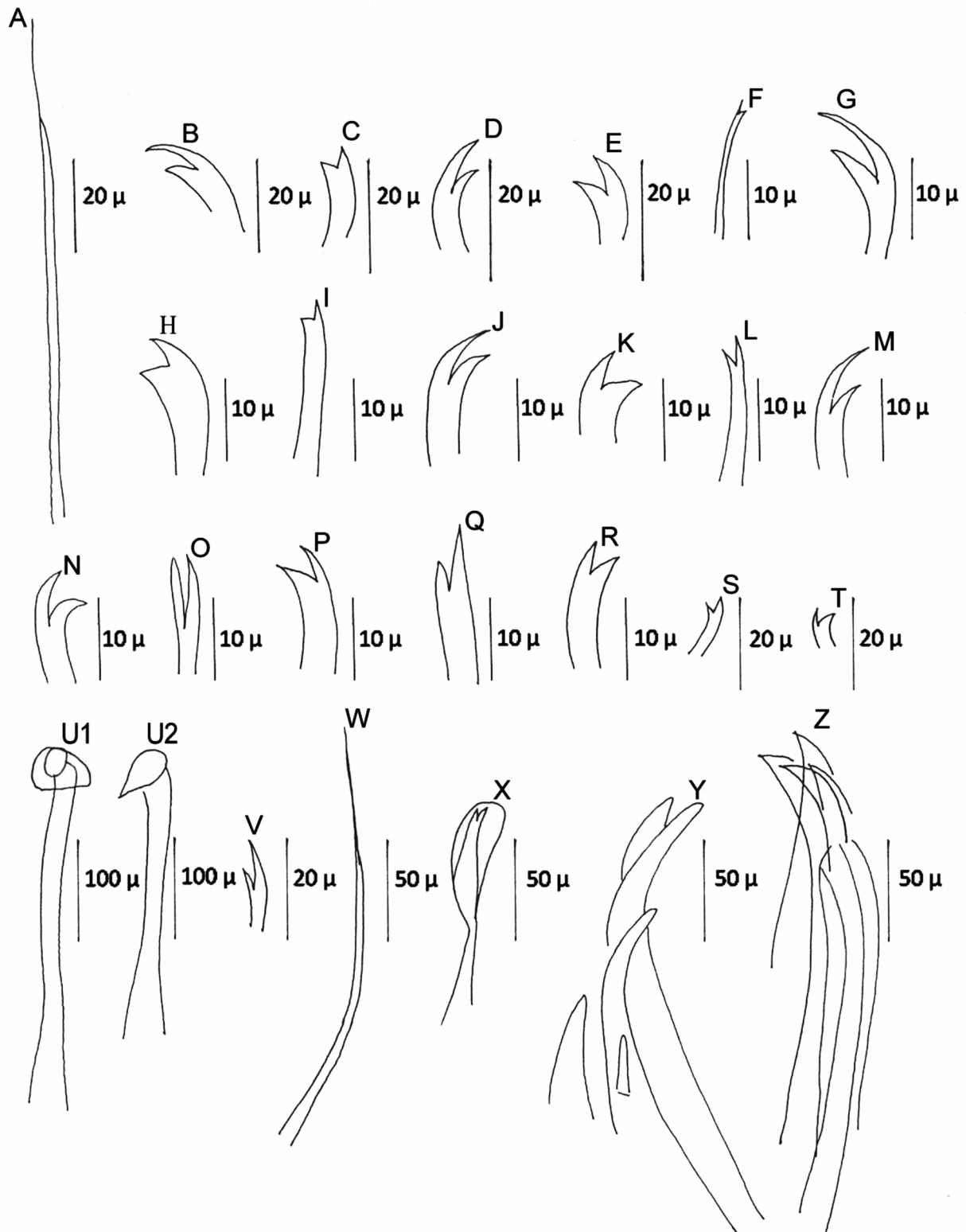


FIGURE 2. *Branchiodrilus semperi*: A) needle chaeta, B) ventral chaeta. *Aulophorus furcatus*: C) needle chaeta, D) ventral chaeta of segment II, E) ventral chaeta of a posterior segment. *Dero digitata*: F) needle chaeta, G) ventral chaeta of segment II, H) ventral chaeta of a posterior segment. *Dero indica*: I) needle chaeta, J) ventral chaeta of segment II, K) ventral chaeta of a posterior segment. *Dero zeylanica*: L) needle chaeta, M) ventral chaeta of segment II, N) ventral chaeta of a posterior segment. *Pristina brevichaeta*: O) needle chaeta, P) ventral chaeta of a posterior segment. *Pristina jenkiniae*: Q) needle chaeta, R) ventral chaeta of a posterior segment. *Limnodrilus hoffmeisteri*: S) dorsal chaeta, T) ventral chaeta, U1) penis sheath “Plate-topped”, U2) penis sheath “typical”. *Limnodrilus udekemianus*: V) dorsal chaeta of the anterior segment. A polychaete: W) hair chaeta, X) dorsal chaetae of segment VIII, Y) ventral chaeta of segment IX, Z) ventral chaeta of segment X.

Polychaeta?

Material examined: Porur Lake in Chennai on 03.03.2011 (n=1) collected from mud and aquatic vegetation.

Morphological observations: Only anterior 10 segments present, with remnants of segment XI and the rest of the worm missing. Length of the first 10 segments about 4–5 mm. Prostomium bluntly conical. Dorsal and ventral bundles starting from segment II, consisting of about 4–6 bayonet-shaped hair chaetae per bundle (Fig. 2W). Eight bifid chaetae beginning from segment VIII, with upper teeth shorter and with thin lateral projections surrounding the distal portion of chaetae, giving them an oar- or spoon-shaped appearance (Fig. 2X). Simple-pointed chaetae about 5 in number ventrally in segment IX (Fig. 2Y) and X (Fig. 2Z). Hair chaetae absent in segments IX and X, but oar-shaped chaetae present dorsally.

Remarks: The worm was immature with the thickest segments VI–VII without any traces of clitellum, genital pores, or internal reproductive organs. The simple-pointed (modified?) ventral chaetae cannot be genital; the respective segments, IX and X, are very thin. At first, the worm was mistakenly thought to be an *Aulodrilus* sp. as the oar-shaped dorsal chaetae resemble some species of that genus, but their structure (with a film surrounding the whole distal end of the chaetae) is not seen among tubificids so far; it may be present in some polychaetes only.

Discussion

A recent proposal of synonymy of the families Naididae and Tubificidae affects the taxonomic classification of most species commonly used in pollution biology. Thus, it has been formally proposed that the former families of Naididae and Tubificidae be merged as synonyms into the family Naididae. The growing evidence from molecular data of an increasing number of oligochaete species suggests that this interpretation may change again in the near future (Rodriguez and Reynoldson, 2011). However, it is reasonable to treat sediment-dwelling tubificids separately from the epibenthic naidids and pristinids that have derived from them, in all other branches of biology except phylogeny (Timm, 2009). Hence the classification of Timm (2009) is followed in the present work.

About 28 aquatic Oligochaeta from Tamil Nadu comprising of 16 species of Naididae, 5 species of Pristinidae, 5 species of Tubificidae, 1 species of Enchytraeidae and 1 species of Almididae were described by Naidu (2005). Recently 1 species of Naididae, 1 species of Pristinidae and 1 species of Tubificidae were reported from Tamil Nadu by Naveed (2012), hence presently 31 aquatic Oligochaeta are known from Tamil Nadu (Table 1). Naididae dominate the aquatic oligochaete fauna in Tamil Nadu and the genus *Dero* dominates over other naidids. Fifty nine species and 2 subspecies of naidids were reported out of the 102 species of aquatic Oligochaeta described from the Indian subcontinent (Naidu, 2005). A similar tendency is also encountered in Indonesian freshwaters so far surveyed, where 77% (27 spp.) of the fauna is occupied by the family Naididae (Ohtaka et al, 2000). The Naididae appear to be more poorly represented in Australia where 38 species of them have been recorded (Pinder, 2001). In the present study the naidids were mostly immature and were collected mostly from aquatic vegetation. Alves et al (2007) has shown that aquatic macrophytes provide an important habitat for naidids. Naidid worms breed mostly in an asexual way; by paratomy (budding) and mature individuals occur seldom. Fortunately, they possess many external characters useful for identification, such as specialized locomotory chaetae, body appendages, and eyes. Living mostly on bottom surface and aquatic plants, many of them are able to swim. The former subfamily Pristininae of the family Naididae which is treated as a separate family Pristinidae includes a single genus *Pristina* (Timm, 2009). The two pristinid species, *P. brevichaeta* and *P. jenkiniae*, identified from Chennai were already reported from this region by Naidu (2005) and Naveed (2012) respectively, but are yet to be reported from other parts of Tamil Nadu and North India. The success of the tubificids *Branchiura sowerbyi* and *Limnodrilus hoffmeisteri* in wide range of aquatic habitats is due to the tolerance to different environmental conditions, as well as their high rates of reproduction (Naveed et al, 2011). The identification of a polychaete found together with oligochaetes is provisory. *Limnodrilus udekemianus*, recently reported from India by Naveed (2012), was collected during this survey from Kodaikanal, a cool mountainous region of Dindugal District of Tamil Nadu. This constitutes the first report of this species for that region and the species is lacking in tropical parts of Tamil Nadu. The occurrence of megadriles belonging to the families Octochaetidae and Megascolecidae in aquatic habitats may be accidental due to flooded rain water.

Acknowledgements

We express our sincere gratitude to Dr. Tarmo Timm for his continuous support, help and guidance. We thank Adrian Pinder, Convener of the Organising Committee, 12th International Symposium on Aquatic Oligochaeta, and his team for their generous help. We thank Dr. Sultan Ahmed Ismail, Dr. Akifumi Ohtaka, Dr. Christer Erséus and Mark. J. Wetzel for their help. We are grateful to Janab U. Mohammed Kaliullah, Chairman and Janab A. Mohammed Asharaf, Secretary, The New College, Dr. Abdul Malik, Principal, The New College, Dr. Dawood Sharief, Head, Dept. of Zoology, The New College, Chennai for their generous help, encouragement and permitting the first author to present our work at the 12th ISAO held in Fremantle, Western Australia.

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