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 jenkinae 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°14'19''N, 77°30'12''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°17'55''N, 80°03'21''E) in Thiruvallur and the second author had collected samples from Sivaganga Pond (9°50'43''N, 78°29'20''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 naïdids 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 naïdids, 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 Kodai Kanal, Dindugal district constitutes the first report for that region of Tamil Nadu. Megadriles belonging to the family Octochaetidae (Dichogaster bolaii?) 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.


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.

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Records in this paper</th>
<th>Total distribution in Tamil Nadu</th>
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</thead>
<tbody>
<tr>
<td>ORDER TUBIFICIDA</td>
<td></td>
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<tr>
<td>FAMILY NAIDIDAE</td>
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<tr>
<td><em>Allonais gwaliorensis</em> (Stephenson, 1920)</td>
<td>Porur Lake, Chennai</td>
<td>Tanjavur.</td>
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<tr>
<td><em>Aulophorus furcatus</em> (Müller, 1773)</td>
<td>Porur Lake, Chennai</td>
<td>Chennai, Coimbatore, Tandikoudi, Ouralpatti, Thanjavur, Udakamandalam (Ooty).</td>
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<tr>
<td><em>Aulophorus graviyi</em> Stephenson, 1925</td>
<td>Porur Lake, Chennai</td>
<td>Ennur near Chennai.</td>
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<tr>
<td><em>Aulophorus michaelseni</em> Stephenson, 1923</td>
<td>Porur Lake, Chennai</td>
<td>Chennai, Udakamandalam.</td>
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<tr>
<td><em>Aulophorus tonkinensis</em> (Vejdovský, 1894)</td>
<td>Porur Lake, Chennai</td>
<td>Coimbatore.</td>
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<tr>
<td><em>Branchiodrilus semperi</em> (Bourne, 1890)</td>
<td>Porur Lake, Chennai</td>
<td>Chidambaram, Chennai.</td>
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<td><em>Dero digita</em> (Müller, 1773)</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<tr>
<td><em>Dero dorsiata</em> Ferronière, 1899</td>
<td>Porur Lake, Chennai</td>
<td>Coimbatore, Chennai.</td>
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<td><em>Nais communis</em> Piguet, 1906</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<td><em>Nais variabilis</em> Piguet, 1906</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<td><em>Slavina appendiculata</em> (d’Udekem, 1855)</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<tr>
<td><em>Stylaria fossularis</em> (Leidy, 1852)</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<tr>
<td>FAMILY PRISTINIDAE</td>
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<tr>
<td><em>Pristina aequiseta</em> Bourne, 1891</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<td><em>Pristina breviseta</em> Bourne, 1891</td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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<td><em>Pristina jenkinae</em> (Stephenson, 1931)</td>
<td>Redhills Lake, Chennai</td>
<td>Chennai</td>
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<tr>
<td><em>Pristina longiseta longiseta</em> Ehrenberg, 1828</td>
<td>Redhills Lake, Chennai</td>
<td>Udakamandalam, Thanjavur, Tandikoudi, Ouralpatti.</td>
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<tr>
<td>FAMILY TUBIFICIDAE</td>
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<td>SUBFAMILY TUBIFICINAE</td>
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<td><em>Aulodrilus pluriseta</em> (Piguet, 1906)</td>
<td>Porur Lake, Chennai</td>
<td>Chennai</td>
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<tr>
<td><em>Limnodrilus hoffmeisteri</em> Claparède, 1862</td>
<td>Porur Lake, Chennai</td>
<td>Coonoor, Udakamandalam.</td>
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<td><em>Limnodrilus udekemianus</em> Claparède, 1862</td>
<td>Porur Lake, Chennai</td>
<td>Annamalainagar.</td>
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<tr>
<td><em>Tubifex tubifex</em> (Müller, 1774)</td>
<td>Porur Lake, Chennai</td>
<td>Coonoor, Udakamandalam, Coonoor, Kanyakumari.</td>
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<td>FAMILY ENCHYTRAEIDA</td>
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<tr>
<td><em>Stephensoniella marina</em> (Moore, 1902)</td>
<td>Porur Lake, Chennai</td>
<td>Palani, Kodaikanal.</td>
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<tr>
<td>ORDER CRASSICLITELLATA</td>
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<td>FAMILY ALMIDAE</td>
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<tr>
<td><em>Glyphidrilus annandalei</em> Michaelsen, 1910</td>
<td>Porur Lake, Chennai</td>
<td>Chennai, Annamalainagar, Coimbatore, Coonoor, Udakamandalam.</td>
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<td>FAMILY OCTOCHAETIDAE</td>
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<tr>
<td><em>Dichogaster bolaui</em> (Michaelen, 1891)?</td>
<td>Porur Lake, Chennai</td>
<td>Annamalainagar.</td>
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<tr>
<td>FAMILY MEGASCOLECIDAE</td>
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<tr>
<td><em>Megascoleidae gen. sp.</em></td>
<td>Porur Lake, Chennai</td>
<td>Coonoor, Udakamandalam, Coonoor.</td>
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<tr>
<td>CLASS POLYCHAETA</td>
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<tr>
<td><em>Polychaeta gen. sp.</em></td>
<td>Porur Lake, Chennai</td>
<td>Udakamandalam.</td>
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</table>
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 pairs 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.


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).


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 jenkinae** (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, Udahakamanalah.

**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
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

**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

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

**Family Megascoleciidae**

**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.
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 Almidae 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. jenkinae*, 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.
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References

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