



Free-living marine nematodes in Andhra Pradesh Coast, India

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Abstract

The present paper reports 43 species of free-living marine nematodes belonging to 32 genera and 10 families from eighteen localities of the Andhra Pradesh Coast. Of these, 22 species are reported for the first time to Andhra waters. A detailed systematic account of the species is presented in this paper.

Keywords: Andhra Pradesh, Coringa Mangroves, Free-Living Marine Nematodes

Introduction

Andhra Pradesh is situated on the southeast coast of India. It has a long seacoast line of 960 km along the Bay of Bengal. Free-living marine nematodes of the Andhra coast is sufficiently rich and varied, with many meiofauna species inhabiting the algae, sandy and muddy sediments in the littoral region. Our knowledge on the taxonomy, ecology, and distribution of meiofauna of these habitats was limited to the works of Nagabhushanam & Rao (1969), Ganapati & Sarma (1973), Sarma & Ganapati (1975), Ramanamurty & Kondalarao (1987), Vijayakumar *et al.* (1991), Ansari & Ajmalkhan (2012) and Naveen *et al.* (2017) from Andhra Coast. The free-living marine nematodes of the Andhra Coast is little known. Thus, a detailed investigation of the intertidal meiofauna of the Andhra coast needed to be undertaken to explore the diversity and community of the fauna of this region. The present article deals with the results of a collection of meiofauna made on the Andhra coast during the exploratory programmes of the Zoological Survey of India, Marine biology Regional Centre, Chennai from June 2014 to March 2016. Eighteen localities on the coast from Nellore to Visakhapatnam were investigated (Figure 1).

Material and Methods

Sampling was made during low tide, mostly near the mid-tide level from 2014 to 2016 in different stations. (Figure 1) Sediment samples were collected using a hand corer (3 cm diameter). At each station, five replicate samples

were collected. Specimens were preserved immediately in 4% formaldehyde solution after collection. The nematodes were extracted from sediments by decantation technique with tap water and washing through a 500µm sieve suspended above a 45 µm sieve (McIntyre, 1969). The nematodes were fixed and preserved into a mixture of glycerin-alcohol solution and were processed in anhydrous glycerin. Nematodes were transferred to a cavity block containing by volume 5% glycerine, 5% pure ethanol, 90% freshwater (Seinhorst, 1959), covering it with cover glass and leaving it in a desiccator for few days. This allows the ethanol to evaporate and the nematodes in glycerine. Then the nematodes were mounted with paraffin wax (De Maeseneer and d' Herde, 1963). The slides were deposited at the National Zoological Collections repository of Marine Biological Research Centre, Zoological Survey of India, Chennai.

The measurements of various organs, regions of various levels were noted down from the mount, using a calibrated ocular micrometre. The measurements of species presented in this study are based on De Man's formula, as adopted by Jensen (1978, 1979). L-total body length; body length divided by maximum body diameter; b-body length divided by oesophagus length; C-body length divided by tail length. A.b.d- (anal body diameter) the length of tail. The amphid width is quoted as proportion or percentage of the corresponding body diameter (c.d) and the distance from the anterior of the head given in terms of head diameters (h.d) to the anterior amphid margin.

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Identification of nematodes was carried out to the highest taxonomic level possible using the compound microscope (Nikon Eclipse 50i) and following the standard pictorial keys (Platt & Warwick, 1983, 1988; Warwick *et al.*, 1998). The species recorded for the first time from Andhra Coast are marked with an asterisk (*).

Results

Systematic Account

Genus *Anoplostoma* Buetschli 1874

1. *Anoplostoma viviparum* (Bastian 1865) Butschli, 1874

1865. *Symplocostoma vivipara* Bastian, *Trans. Linn. Soc. London*, 25(2): 133.

1874. *Anoplostoma vivipara*: Butschli, *Abhandl. d. Senckenb. naturf. Gesellsch.* IX. Bd; 37.

Material examined: 2 ♂ (Reg. No. N. 263), Chirala, 30.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: The species is characterized from other species by the large cylindrical buccal cavity, cephalic setae, position of the amphids and length of spicule.

Distribution: Andhra Coast (Ghosh & Mandal, 2016), Pichavaram mangroves (Chinnadurai & Fernando, 2005); continental shelf of South-western Bay of Bengal (Ansari *et al.*, 2012); Vellar Estuary (Ansari *et al.*, 2014); Devipattinam and Adirampattinam; (Sivaleela, 2016); Sundarban mangroves (Ansari & Bhadury, 2017). *Elsewhere*: England- Falmouth, Blyth estuary, West Scotland, Strangford Lough, Northern Ireland.

Remarks: This species examined conforms well to the earlier description of Platt & Warwick (1983) in the long cylindrical buccal cavity, position of amphids, length of cephalic setae and length of spicules. This species was designated by Bastian (1865) and revision by Buetschli (1874).

Family THORACOSTOMOPSIDAE Filipjev 1929

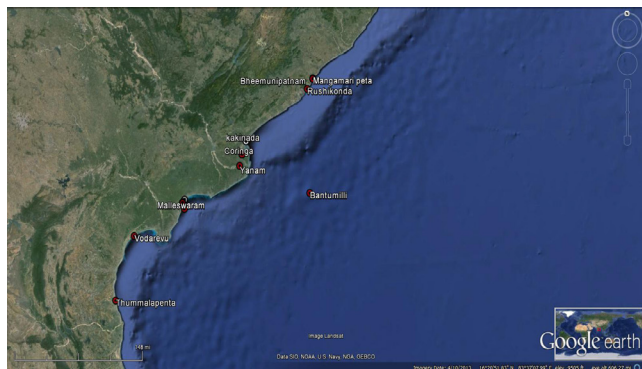
Genus *Enoplolaimus* de Man, 1893

2. *Enoplolaimus litoralis* Schulze, 1936

1936. *Enoplolaimus litoralis* Schulze. *Meeresforschungen*. 1: 375 (17 of pdf), figs. 1-20.

Table 1. List of localities surveyed along Andhra Pradesh Coast, India

Sl. No.	Locality	Coordinates
1.	Visakhapatnam (Rushi Konda)	N-17°45'3.80" E-83°21'25.01"
2.	Mangamaripeta	N-17°53'30.7" E-083°27'18.9"
3.	Bhimulipatnam	N-13° 00'08.3" E-080° 16'20.1"
4.	Kakinada	N-17°01'12.1", E-082°17'34.3"
5.	Yanam	N-16°43'25.1", E-082° 12'39.5"
6.	Coringa	N-16°52' 49.03", E-082° 14' 50.07"
7.	Machilipatnam	N-15°50'18.9", E-080°30'20.8"
8.	Nizampatinam	N-15°52'34.4" E-080°38'22.3"
9.	Malleswaram	N-16° 9'15.6", E-081°16'06.4"
10.	Bantumilli	N-16° 99' 23.2" E-081° 16'05.0"
11.	Mangalpudi-	N-16°14'32.4" E- 081°14'27.0"
12.	Bedhapatnam	N-16°17'01.2" E-081°16'37.7"
13.	Bapatla-	N-15°50'18.9", E-080°30'20.8"
14.	Suryalanka-	N-15°50'19.97"N, E-80°30'24.95",
15.	Subbaiahpalem	N-15°45'5.65"N, E-80°20'53.06"E
16.	Thumalapenta	N-14°54' 13.5" E-080 04' 44.2"
17.	Vadarevu	N-14°17'3.54" E-80°8'32.37"
18.	Ramathirtham	N-14°39'23.9", E-080°09'19.0"



(source: Google Earth).

Figure 1. Map showing sampling stations across the Andhra coastal waters.

Material examined: 4 ♂ (Reg. No. N. 208), Krishnapatinam, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: The species are characterized by the mandibles, which appear as two lateral rods joined by a curved bar, the number and arrangement of cervical setae and form of spicules, Shape of tail and form of the spicules.

Distribution: India: Kakinada bay. (Annapurna *et al.*, 2018). **Elsewhere:** England- Exe estuary; Isles of Scilly. Intertidal sand).

Remarks: The specimen examined conformed well to the earlier description of Platt & Warwick, 1983. Based on length of the setae on the head, the form of spicules and ten long cervical setae in male and the above measurements were confirmed that the present specimen is *E. littoralis*. This species was recorded on the Kakinada coast by Annapurna *et al.* (2018).

Family ONCHOLAIMIDAE Filipjev, 1916

Genus *Adoncholaimus* Filipjev, 1918

3. *Adoncholaimus fuscus* (Bastian, 1865) Filipjev, 1918

1865. *Oncholaimus fuscus* Bastian, *The Trans. Linne. Soc. London.* 25. Part II:73-184

1918. *Adoncholaimus fuscus* Filipjev, *Trans. Zool. Lab. Sevastopol. Biol. Sta. Russ. Academy of Sciences. Series.* 11. No.4 9 issue 1 7 II)

Material examined: 1 ♂ (Reg. No. N. 324), Coringa, 3.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized from other species by the presence of long slender spicule in male species.

Distribution: Andhra Coast (Ghosh & Mandal, 2016), Pamban & Kanyakumari; (Sivaleela, 2013), Pichavaram mangroves (Sulthan Ali *et al.*, 1983, (Chinnadurai & Fernando, 2005); Chilka lagoon (Ansari *et al.*, 2015); Sundarban mangroves (Ansari & Bhadury, 2017); **Elsewhere:** Northeast England.

Remarks: The specimens examined well to the earlier description of the species (Platt & Warwick, 1983). The major distinguishing characters of this species are long slender spicules in comparison with *A. viscosia*.

4. *Adoncholaimus thalassophygus* (de Man, 1876) Filipjev, 1918

1876. *Oncholaimus thalassophygus* de Man, Vereen. 2: 181.

Material examined: 2 ♀ (Reg. No. N. 344), Mangamaripeta, 3.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: This is characterized by the presence of long spicule in the male. Size is smaller than *A. fuscus*.

Distribution: Andhra Coast (Ghosh & Mandal, 2016), Kalba Devi Ratnagiri. (Ingole, 2011), Cochin mangroves. (Chinnadurai & Oliva Fernando, 2006c). **Elsewhere:** UK coast- Blythe estuary, Skippers Island, Exe estuary, Loch Etive, Scotland.

Remarks: The specimens examined well to the description of Platt & Warwick, 1983 in the Cephalic papillae and buccal teeth as in *A. fuscus* & amphids length differ from *A. fuscus* 0.3 times c.d wide. Excretory pore 1.4 buccal cavity length from anterior. Tail 3 a.b.d and tapered.

Genus *Oncholaimus* Dujardin 1845

5. *Oncholaimus dujardinii* de Man, 1876* (Figure 2A-C)

1876. *Oncholaimus dujardinii* de Man. *Tijdschr. ned. dierk. Vereen.*, 3: 88-118.

Material examined: 1 ♂, (Reg. No. N-346), Mangamaripeta, 3.iv.2016, coll. G. Sivaleela

Diagnostic characters: The species is characterized by the large left ventrolateral tooth and short spicules without gubernaculum to distinguish *Oncholaimus* from other species.

Distribution: Kalba devi; (Nanajkar, 2010). **Elsewhere:** Northumberland.

Description: Body length is 2 mm. Maximum diameter is 40 µm (a= 45-49). longer tails (3 a.b.d). Amphids are pocket shaped 8 µm wide. The longer cephalic setae are



Figure 2. *Oncholaimus dujardini*. A. Adult, B. Anterior region, C. Posterior region.

0.14 times h.d. The tail is 2.3 a.b.d. long and curved. Seven pairs of long and slender circum-cloacal setae. Spicules are shorter 1.6 a.b.d and stouter.

Distribution: Mallipatinam, Palk Bay (Sivaleela, 2016)

Remarks: This species agrees with the earlier description of the Platt & Warwick (1983) in longer Ventro- lateral tooth and short spicule & in the nature of buccal cavity, teeth, and the tail. The aforesaid details are considered for placing the present specimens as *O. dujardini* De Man 1878.

Genus *Viscosia* de Man 1890

6. *Viscosia abyssorum* Allgen, 1933* (Figure 3A-C)

1933. *Viscosia abyssorum* Allgen. *Nemys-Generis* Taxonomic database system on nematodes available online at neMys. Ugent.be

Material examined: 2 ♂, (Reg. No. N. 263), Chirala, 24. vi.2014, Coll. G. Sivaleela.

Diagnostic characters: The species being separated on the length of the cephalic setae or papillae, the size of amphid, the form of the dorsal and left sub ventral teeth in the buccal cavity, the length of tail and male copulatory apparatus.

Description: Body length is 1.8 mm. Maximum diameter is 50 µm. Labial papillae minute. Six longer cephalic 4 µm, four shorter setae. Right sub ventral tooth large and pointed. Amphids 10 µm wide. Tail is short 3 a.b.d with swollen and rounded tip. Spicules straight 26 µm in length.

Distribution: Continental shelf of South-Western Bay of Bengal (Ansari *et al.*, 2012); Chilka lagoon (Ansari *et al.*, 2015); Intertidal regions of Central West Coast of India (Bhadury *et al.*, 2015); Sundarban mangroves (Ansari & Bhadury, 2017). *Elsewhere:* England: Skippersisland, Essex, Northumberland.

Remarks: This species resembles with the description of Platt & Warwick (1983) by its body and tail length.

7. *Viscosia viscosa* Bastian, 1865

1865. *Oncholaimus viscosus* Bastian, H.C. *The Trans of the Linn soc of London*, XXV. Part11: 73-184.

Material examined: 6 ♂, (Reg.No.N.225), Krishnapatinam, 30.iv.2014, Coll. G. Sivaleela.

Diagnostic characters: The species are characterized by the length of the cephalic setae, the size of amphids, dorsal and sub ventral teeth in the buccal cavity.

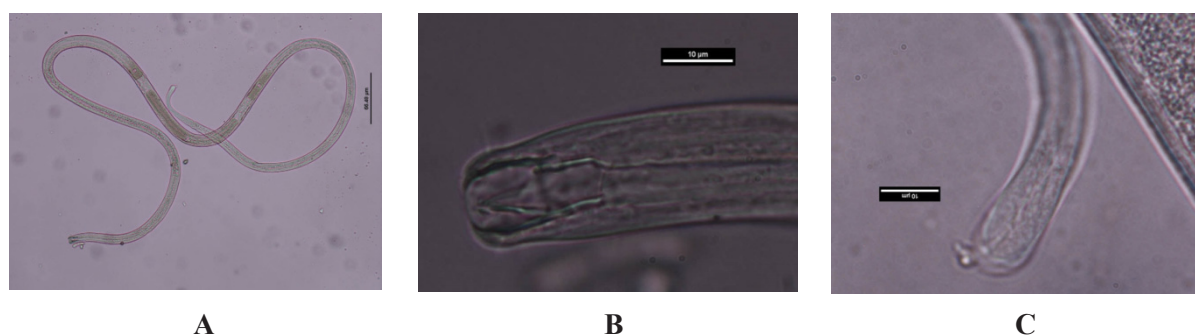


Figure 3. *Viscosia abyssorum*. A. Adult, B. Anterior region, C. Posterior region.

Distribution: Pichavaram mangroves (Sulthan Ali *et al.*, 1983; Chinnadurai & Fernando, 2005); Continental shelf of eastern Arabian Sea (Sajan & Damodaran, 2007); Inshore water of Tamil Nadu (Mondal, 2010); Continental shelf of South Western Bay of Bengal (Ansari *et al.*, 2012); Vellar estuary (Chinnadurai & Fernando, 2005; Ansari *et al.*, 2014); Chilka lagoon (Ansari *et al.*, 2015). Andhra Coast (Ghosh & Mandal, 2016). *Elsewhere:* British Coast.

Remarks: This species closely related to the earlier description of Platt & Warwick (1983) by its six longer cephalic setae 4 µm and four shorter setae. Size of Amphids 9 µm wide and pocket-like. Oesophagus 0.17 times body length and spicule size 27 µm curved. This species was previously reported in Pichavaram mangroves (Chinnadurai & Fernando, 2005).

Genus *Actinonema* Cobb, 1920

8. *Actinonema pachydermatum* Cobb, 1920* (Figure 4A-C)

1920. *Actinonema pachydermatum* Cobb. Contributions to a science of nematology, **9**: 339.

Material examined: Male, 1♂, (Reg. No. N. 352), Hope Island Date, 2.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: This species distinguished by the presence of oval amphid with a double contour, L- shaped curved spicules.

Description: Body length 0.7 mm. Maximum diameter of body is 29 µm. Cuticle ornamentation heterogeneous and complex. Amphid about 0.7 c.d wide. Oesophagus with posterior bulb. Tail conical pointed tip about 5 a.b.d. Spicules telamons. Ventral enlarged annules extend about 7 a.b.d anterior to cloaca.

Distribution: Continental shelf of eastern Arabian Sea (Sajan and Damodaran, 2007); Continental slope of Bay of Bengal (Mani, 2008). *Elsewhere:* North-east England, Northumberland coast.

Remarks: This species is closely related to the earlier description of Platt & Warwick (1983) by its oval-shaped amphids and differs in the cuticle from other species, so this species placed as *A. pachydermatum*

Genus *Chromadora* Bastian, 1865

9. *Chromadora macrolaima* de Man, 1889* (Figure 5A-C)

1889. *Chromadorina macrolaima* de Man. Mem. Soc.Zool.Fr., **2**: 1-35, Pl.VI, Figure7.

1965. *Chromadora macrolaima* Gerlach. Inst. Meeresforsch. Bremerh., **2** : 109-172.

1998. *Chromadora macrolaima* Platt & Warwick. Synop.British fauna. Free-living Marine nematodes. British Chromadorids. P.110, Figure 43.

Material examined: 7♂, (Reg.No. N.228), Ramathirtham, 30. vii.2014, Coll. G. Sivaleela.

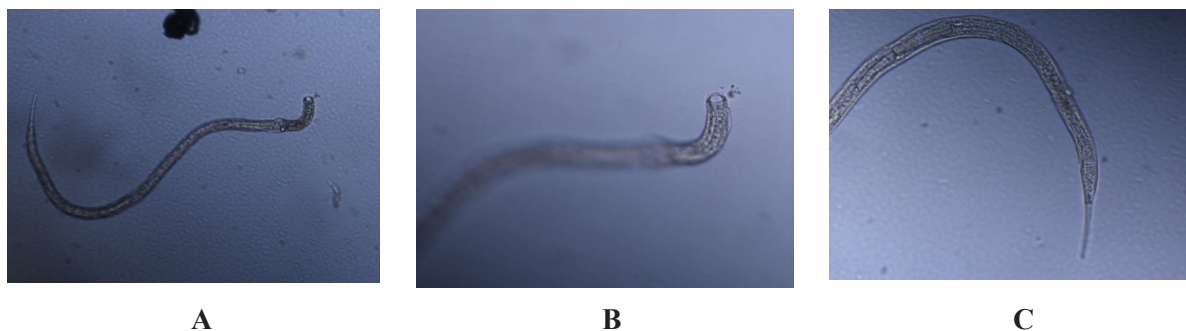


Figure 4. *Actinonema pachydermatum*. A. Adult, B. Anterior region, C. Posterior region.

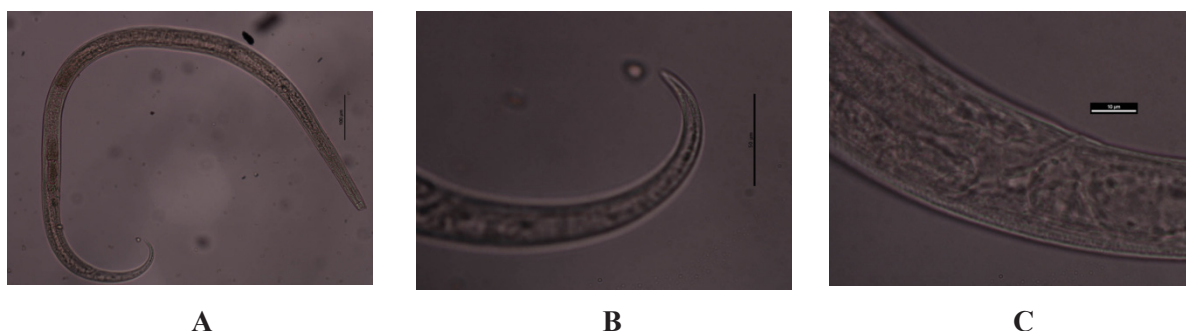


Figure 5. *Chromadora macrolaima*. A. Adult, B. Tail region, C. Posterior region.

Diagnostic characters: This species characterized by the presence of cuticle with four longitudinal rows of dots because the first punctuation of the transverse rows of enlarged. Short ventral precloacal spine is present.

Description: Body length 0.6 mm. Maximum diameter of body is 31 μm . Cuticle punctated with lateral differentiation of two longitudinal rows of dots. Four 5 μm fine cephalic setae. Amphid lying between cephalic setae loop-shaped. Tail conico-cylindrical 3.8 a.b.d in length. spicules 39 μm curved with gubernaculum 20 μm .

Distribution: Adirampattinam, Palk Bay, Tamil Nadu (Sivaleela, 2016). *Elsewhere:* North Sea, Baltic, and Tasmania.

Remarks: This species conform well to the description earlier specimen of Platt & Warwick (1983) in the buccal teeth, cuticular ornamentation, and it differs in cub shaped cloacal supplements from other species.

Genus *Chromadora* Bastian, 1865

10. *Chromadora nudicapitata* Bastian, 1865

1865. *Chromadora nudicapitata* Bastian, *The Trans. Linn Soc of London.*, XXV., Part II:73-184.

1988. *Chromadora nudicapitata* Platt and Warwick. Free living Marine Nematodes: Part. II. British Chromadorida. *Synopses of the British Fauna* No. 38. P.114.

Material examined: 4 ♂, (Reg.No. N. 217), Ramathirtham, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species distinguished by the structure of buccal teeth, cuticular ornamentation and the male copulatory apparatus and transverse slit like amhid.

Distribution: Andhra; Nellore Coast, Semprucci and Balsamo, 2012. *Elsewhere:* British and Worldwide localities.

Remarks: The material examined well with the earlier description by its cuticle punctuation, Amphid and tail shape. But it differs in precloacal supplements. It was a triangular shape. So, this species enabled in *C. macrolaima*.

Genus *Chromadorella* Filipjev, 1918

11. *Chromadorella duopapillata* Platt, 1973*

1973. *Chromadorella duopapillata* Platt. *Cah. Biol.Mar.* 14: 295-321.

Material examined: 2 ♂, (Reg. No. N. 212), Krishnapatinam, 30.vii.2014, Coll. G. Sivaleela.

Disgnostic characters: This species distinguished by the presence of heterogeneous cuticle with longitudinal rows

of dots, Oesophagus structure, amphids oval and curved.

Description: Body length 1.0 mm. Cuticle punctated with heterogeneous ornamentation. Four 8 μm cephalic setae. Amphids 6 μm wide oval-shaped situated between the cephalic setae. Conical buccal cavity with small teeth. Tail 4 a.b.d long. Terminal part un-striated. Spicules 29 μm .

Distribution: S.P Pattinam. (Sivaleela, 2016); Manginapudi -Andhra (Sivaleela, 2016). *Elsewhere:* Strangford Lough. North-east Ireland.

Remarks: The specimen examined well with description by Platt & Warwick (1983) in the cuticular differentiation, amphid and oesophagus structure.

Genus *Dichromadora* Kries, 1929

12. *Dichromadora cuculata* Lorenzen, 1973

1973. *Dichromadora cuculata* Lorenzen. *Inst. Meeresforsch. Bremerh.* 14: 127 - 130.

1988. *Dichromadora cuculata* Platt and Warwick. *Synopses of the British Fauna* No.38. P.160, Figure 69.

Material examined: 4 ♂, (Reg. No. N. 244) Yanam, 22.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: This species represented by the lateral differentiation of the cuticle in the form of two longitudinal files of enlarged dots.

Distribution: S.P. Pattinam, (Sivaleela, 2016); Manginapudi -Andhra Pradesh (Sivaleela, 2016). *Elsewhere:* Firth of Clyde, West Scotland.

Remarks: This specimen agrees well with the earlier description of Warwick *et al.*, 1998 by its cuticle, Amphid oval. Cephalic setae numbers four 3 μm . The spicule size 17 μm and differ in cephalic setae numbers are also treated for distinguishing this species from other species of *Dichromadora*.

Genus *Neochromadora* Micoletzky, 1924

13. *Neochromadora poecilosomoides* Filipjev, 1918

1918. *Chromadora poecilosomoides* Filipjev. *Trans. Zool. Lab. Biol. of the Russian academy of Science.* Series.1.no.4.

1988. *Neochromadora poecilosomoides* Platt and Warwick. *Synopses of the British Fauna* No.38. P.179, Figure77.

Material examined: 7 ♂ & 2 ♀, (Reg. No. N.327), Coringa, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species distinguished by the presence of heterogeneous cuticle. Cuticle with two or three longitudinal files of dots.

Distribution: Andhra Pradesh – Harbour region (Ansari *et al.*, 2016); Continental shelf of South-Western Bay of Bengal (Ansari *et al.*, 2012); Chilka lagoon (Ansari *et al.*, 2015); www.biosearch.in **Elsewhere:** Isles of Scilly, Plymouth, South-west England.

Remarks: This species resembles with Platt & Warwick (1983) description by its cuticular structure with lateral punctation through the length of the body. It differs in other species.

Genus *Prochromadorella* Micoletzky, 1924

14. *Prochromadorella ditlevseni* de Man, 1922* (Figure 6A-C)

1922. *Prochromadorella ditlevseni* de Man *De Boer Jr.*: 214-261.

1988. *Prochromadorella ditlevseni*. Platt and Warwick. Free-living marine nematodes: Part. II. British Chromadorida. *Synopses of the British Fauna* No.38. P.131, Figure 53.

Material examined: 3♂, (Reg. No. N. 223), Krishnapatinam, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of three solid teeth, heterogeneous cuticle without longitudinal rows of punctations, sometimes with the lateral dots enlarged.

Description: Body length 0.9mm. Maximum diameter of body is 22 µm. Cuticle marked with transverse rows of fine dots on both margins of the body. Four cephalic setae 5 µm. Buccal cavity with three solid teeth. Amphids 4 µm wide. Tail 5 a.b.d in length and Conico-cylindrical. Spicules measures 24µm and curved. Gubernaculum 16 µm.

Distribution: Pichavaram mangroves (Chinnadurai, 2007). **Elsewhere:** Exe estuary, South -West England, West Scotland, and East Scotland.

Remarks: The specimen is examined well with the earlier description of Warwick *et al.*, 1998 by its cuticle without

longitudinal rows of punctations. But the features of cephalic setae, amphid size and position from the anterior end and the striations of the tail are demarcating features from other species to identify. Hence, they are referred to as *P. ditlevseni*.

Family CYATHOLAIMIDAE Filipjev, 1918 (De Coninck & Schuurmans Stekhoven, 1933)

Genus *Paracanthonchus* Micoletzky, 1924

15. *Paracanthonchus heterodontus* Schulze, 1932

1932. *Paracanthonchus heterodontus* Schulze. *Zool. jahrb. jena. (syst)*, **62**: 331-430, Figure 51.

1988. *Paracanthonchus heterodontus* Platt and Warwick. Free-living marine nematodes: Part. II. British Chromadorida. *Synopses of the British Fauna* No.38. P.257, Figure 115.

Material examined: 4♂, (Reg. No. N. 275), Endy beach, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: *Paracanthonchus* has cuticle with transverse rows of fine dots. Gubernaculum distally expanded and dentate. The position of preloocal supplements.

Distribution: Pudukudi (Palk Bay) Tamil Nadu (Sivaleela, 2016). **Elsewhere:** Strangford Lough, North-East Ireland.

Remarks: The species resembled with description of the Platt & Warwick (1983) by its lateral differentiation of cuticle and the position of preloocal supplements. So, they are considered as *P. heterodontus*.

16. *Paracanthonchus longicaudatus* Warwick, 1971

1971. *Paracanthonchus longicaudatus* Warwick. *Cah. biol. Mar.*, **12**(1): 95-110.

1972. *Paracanthonchus longicaudatus* Lorenzen. Veroff. *Inst. Meeresforsch. Bremerh.* **13**: 285-306.

Material examined: 1♂, (Reg. No. N. 428), Katlapalem, 6.iv.2016, Coll. G. Sivaleela.

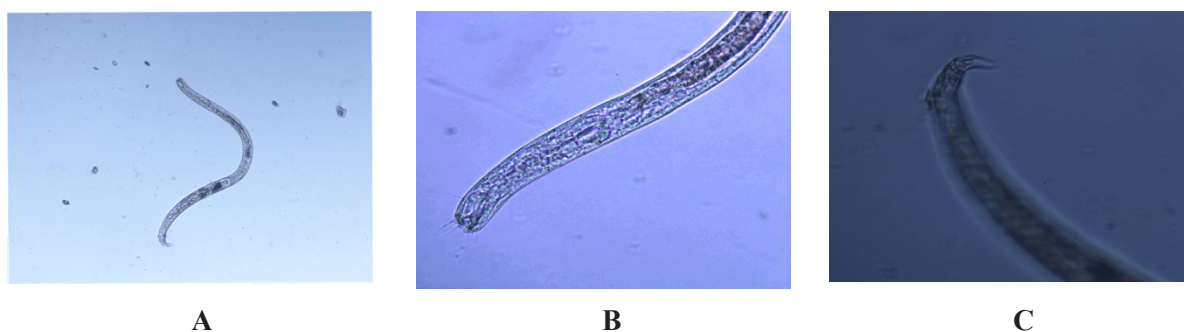


Figure 6. *Prochromadorella ditlevseni*. **A.** Adult, **B.** Anterior region, **C.** Posterior region.

Diagnostic characters: This species is represented by the cuticle with transverse rows of fine dots which are larger in the lateral field. Position of spicules.

Distribution: Pudimadaka; Annapurna *et al.*, 2018. Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); Continental shelf of Andhra (Annapurna *et al.*, 2017; Bhanu *et al.*, 2017); *Elsewhere:* Northumberland, Northeast England.

Remarks: This species closely resembled the earlier description of Warwick *et al.*, 1998 by its single lateral file of cuticle pores, Four shorter 5 μm and six longer 7 μm cephalic setae and spicular position. So, they are referred as *P. longicaudatus*. It differs from *P. macrodon* in all the organs sizes and shape.

Family CYATHOLAIMIDAE Filipjev, 1918

Genus *Paracyatholaimus* Micoletzky, 1922

17. *Paracyatholaimus occultus* Gerlach, 1956* (Figure 8A-C)

1956. *Paracyatholaimus occultus* Gerlach. *Kieler meeresforsch.* 12(1): 85-109.

1971. *Paracyatholaimus occultus* Lorenzen. *Zool. Anz.*, 187: 283-302.

Material examined: Males, 6 ♂, (Reg. No. N. 222), Ramathirtham, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: Cuticle without lateral differentiation; preloacal supplements are setose gubernaculum small and simple. Tail conical.

Description: Body length 0.9mm. Cuticle is transverse rows of punctations. Ten short 3.5 μm cephalic setae. Amphids are 11 μm wide and rounded in appearance. Buccal cavity with large pointed dorsal tooth and minute sub-ventral tooth. Tail is 3 a.b.d in length. Spicules are 23 μm arcuate. Gubernaculum with caudally directed apophysis. Supplements are distinct in the present specimen.

Distribution: Indian Ocean (Ansari *et al.* 2012): Karaikal (Sivaleela, 2016). *Elsewhere:* Loch Ewe, West Scotland, Firth of Clyde.

Remarks: The specimen is well examined with an earlier description of Platt and Warwick in the cuticle with transverse rows of dots, amphid shape and specular structure. Hence, they are considered as *P. occultus*.

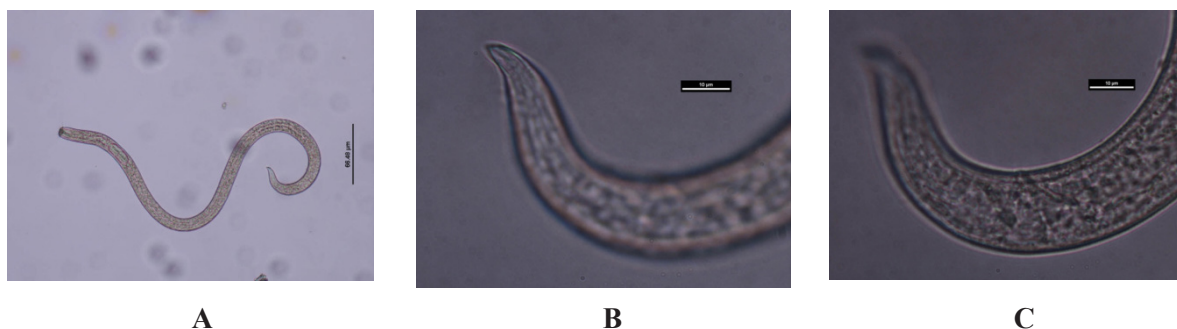


Figure 7. *Paracyatholaimus occultus*. A. Adult, B. Tail region, C. Posterior region.

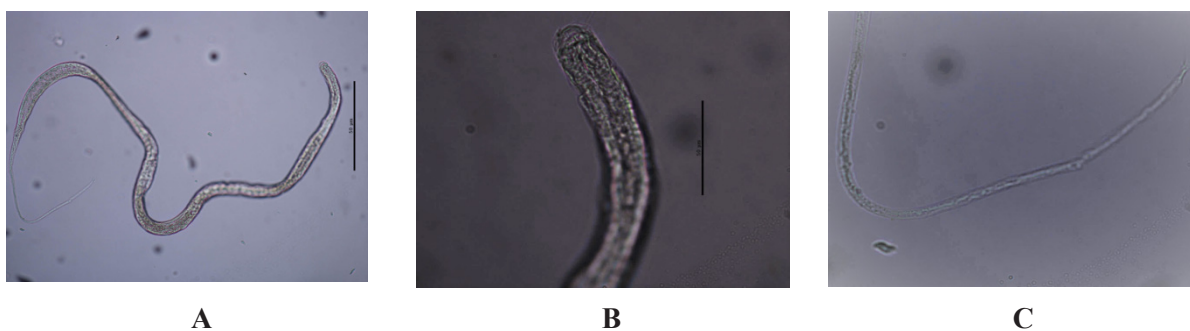


Figure 8. *Paralongicyatholaimus minutus*. A. Adult, B. Anterior region, C. Posterior region.

Genus *Paralongicyatholaimus* Schuurmans Stekhoven, 1950

18. *Paralongicyatholaimus minutus* Warwick, 1971* (Figure 9A-C)

1971. *Paralongicyatholaimus minutus* Warwick. *Cah. Biol. Mar.*, 12: 95-110. P.101-102

Material examined: 8 ♂ and 3 ♀ (Reg. No. N. 328), Coringa, 30.7.2014, Coll. G. Sivaleela.

Diagnostic characters: Buccal cavity is without teeth. Cuticle without lateral differentiation. Oesophagus with a posterior bulb. Spicules are simple. Gubernaculum without teeth. Preloacal supplements are absent. Tail is filiform.

Description: Body length is 0.7 mm. Maximum diameter of body is 21 µm. Cuticle with transverse rows of small dots. Four shorter 2 µm and six longer 3 µm cephalic setae. Buccal cavity without teeth. Amphids are 5 µm wide. Oesophagus 87 µm long with rounded bulb. 15 µm long. Tail is 230 µm in length and filiform. Spicules are 29 µm and curved. Gubernaculum 14 µm with distal swelling.

Distribution: Pichavaram mangroves (Chinnadurai & Fernando, 2005); Continental shelf of eastern Arabian

Sea (Sajan & Damodaran, 2007); Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); www.biosearch.in. *Elsewhere*: Northumberland Coast, North-East England.

Remarks: This species is well examined with the earlier description of the species Warwick, 1983 by its buccal cavity, cuticle without lateral differentiation and its tail shape. Hence, they are referred to as *P. minutus*.

Order DESMODORIDA De Coninck, 1965
Family DESMODORIDAE Filipjev, 1922

Genus *Desora* de Mamodn., 1889

19. *Desmodora (Desmodorella) sanguinea* (Southern, 1914) (Figure 10A-C)

1914. *Desmodora (Desmodora) sanguinea* Southern, *R. Proc. R. Ir. Acad.*, XXXI: 1-80

Material examined: 5 ♂, (Reg. No. N. 252), Machilipatinam, 23.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: The species are characterized by the amphids are multispiral, labial capsule inconspicuous. Tail tip smooth without punctation. Cephalic capsule not wider than long.

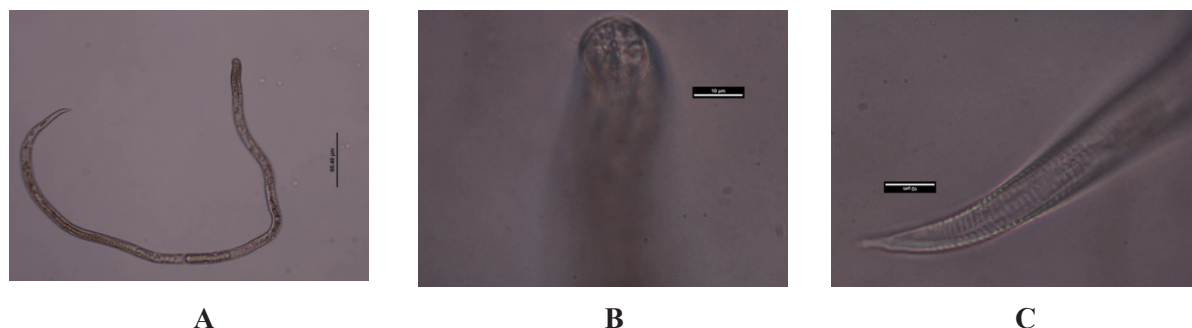


Figure 9. *Desmodora sanguinea*. A. Adult, B. Tail region, C. Posterior region.

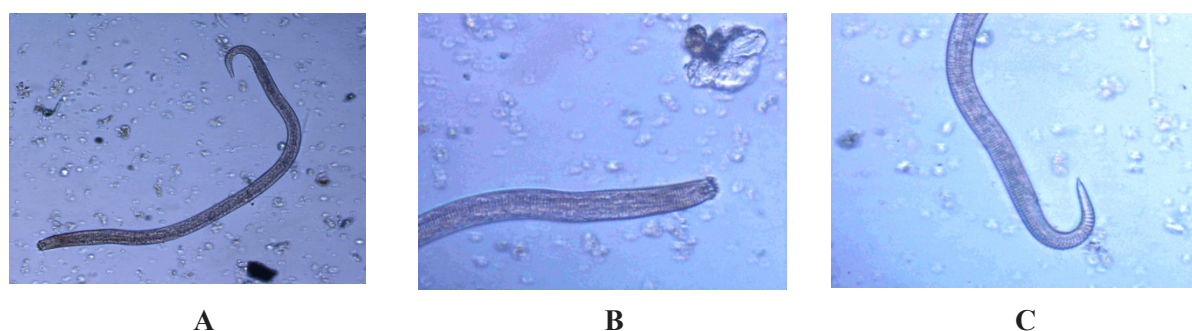


Figure 10. *Desmodora (Desmodora) schulzii*. A. Adult, B. Anterior region, C. Posterior region.

Distribution: Cuddalore (Sivaleela, 2013) Pichavaram mangroves (Chinnaduari & Fernando, 2005); Chilka lagoon (Ansari *et al.*, 2015); Sundarban mangroves (Ansari & Bhadury, 2017), www.biosearch.in. **Elsewhere:** Clew Bay, West Ireland. Isles of Scilly.

Remarks: This species is well examined to the earlier description of Platt and Warwick, 1983 by its un-striated head region of cuticle with coarse striation, amphids on entirely on cephalic capsule & spicule shape and supplements are absent in this species. Body with bright red coloration and files of short fine setae. Based on these characters, it is placed as *D. sanguinea*.

Genus *Desmodorella*

20. *Desmodorella schulzi* (Gerlach, 1950)*
(Figure 11A-C)

1950. *Desmodorella schulzi* Gerlach, *Journals of Sea Research*, 25: 181-188.

Material examined: 8 ♂, (Reg. No. N. 240), Ramathirtham, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species un-striated head, thickened cuticle, amphids on cephalic capsule, tubular preloacal supplements

Description: Body length is 1.3 mm. Cuticle with coarse striation and longitudinal files of fine setae. Four 5 µm

cephalic setae with anterior of amphids. Eight pairs of subcephalic setae is present posterior to amphids. Amphids are loop-shaped. Tail is 3.5 a.b.d in length and conical. Spicules are 68 µm in length and arcuate.

Distribution: Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); Vellar estuary (Ansari *et al.*, 2014); Chilka lagoon (Ansari *et al.*, 2015); Sundarban mangroves (Ansari & Bhadury, 2017). **Elsewhere:** Exe estuary, Southwest England, Isles of Scilly.

Remarks: This species examined well with the earlier description of (Platt & Warwick, 1983) by its cuticle with fine striation, amphids structure and position, un-striated tail and supplementary organs.

Genus *Metachromadora* Filipjev, 1918

21. *Metachromadora suecica* (Allgen, 1929) Schulze, 1938*
(Figure 12A-C)

1929. *Oistolaimus suecica* Allgen. *Handl.*, 1 B (2): 1-40.

1959. *Metachromadora suecica* Luc, M. & L.A. De Coninck. *Archs. Zool. Exp.gen.*, 98: 103-165.

Material examined: 2 ♂, (Reg. No. N. 416), Subbaiya palem, 6.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: Cuticle finely striated. Amphids surrounded by cuticle striations. Oesophagus well



Figure 11. *Metachromadora vivipara*. A. Adult, B. Anterior region, C. Posterior region.



Figure 12. *Sabatieria celtica*. A. Adult, B. Anterior region, C. Posterior region.

developed into. Two sections partitioned. Supplements are in various forms.

Description: Body length is 1.1 mm. Maximum diameter of body is 48 µm. Body dark brown in colour. Cuticle finely striated. Six short 2 µm and four 7 µm cephalic setae. Amphids are 5 µm wide and loop-shaped. Buccal cavity with dorsal tooth projections. Oesophagus with elongated posterior bulb. Tail is 2 a.b.d conical with unstriated tip. Spicules are 42 µm and arcuate with ventral ala. Gubernaculum 25 µm parallel to spicules.

Distribution: Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); Chilka lagoon (Ansari *et al.*, 2015); Intertidal regions of Central West Coast of India (Bhadury *et al.*, 2015); www.biosearch.in. **Elsewhere:** Skippers island, Essex, North East Ireland, Firth of Clyde.

Remarks: This species is examined well with the earlier description of Platt & Warwick (1988) except for minor variation in size.

Genus *Metachromadora* Filipjev, 1918

22. *Metachromadora vivipara* (de Man, 1907)*

(Figure 13A-C)

1907. *Chromadora vivipara* de Man. *Vereening.*, **10**: 227-244.

1949. *Metachromadora vivipara* Allgen. *Selek. Forh.*, **21**: 117-120.

Material examined: 1♂, (Reg. No. 355), Hope-Island, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of fine cuticle striations, large dorsal tooth in the buccal cavity. Cuticular lining partitioned into two or three sections.

Description: Body length is 1.4 mm. Maximum diameter of body is 75 µm. Six longer and four short 4 µm cephalic setae present. Amphids are 7 µm in wide with loop-

shaped. Oesophagus with elongated posterior bulb, 100 µm long. Tail is 1.8 a.b.d long and conical with a short unstriated tip. Spicules are 60 µm arcuate. Gubernaculum parallel to spicule 16 µm in length.

Distribution: Continental shelf of Southwestern Bay of Bengal (Ansari *et al.*, 2012). **Elsewhere:** North- East England, Exe estuary, South -West England, Tamar estuary, South-west England, Northeast Ireland.

Remarks: This species is resembled with earlier description of Platt and Warwick, 1988 by its cuticle with finely striated, Amphids surrounded by cuticle striations, Oesophagus with heavily cuticularized internal lining.

Family DESMODORIDAE

Genus *Spirinia* Gerlach, 1963

23. *Spirinia laevis* Bastian, 1865*

(Figure 14A-C)

1865. *Spirinia laevis* Bastian. *Trans. Linne. Soc of London.*, **25**(2): 160.

Material examined: 2♂ (Reg. No. N. 232), Coringa, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: Teeth in the buccal cavity absent, and supplements are absent in this species.

Description: Body length 3 mm. Maximum diameter of body is 52 µm. Cephalic setae 13 µm. Buccal cavity without teeth. Spicules with triangular cephalization.

Distribution: Nagaipattinam, Karaikal, (Sivaleela, 2013). **Elsewhere:** South-West England, South Bay, North-East Ireland, Exe Estuary.

Remarks: The specimen examined well with the earlier description of Bastian (1865) by its cuticle structure, Amphid surrounded by cuticle striations. It is distinguished from other species by absent of teeth in the buccal cavity and supplements.

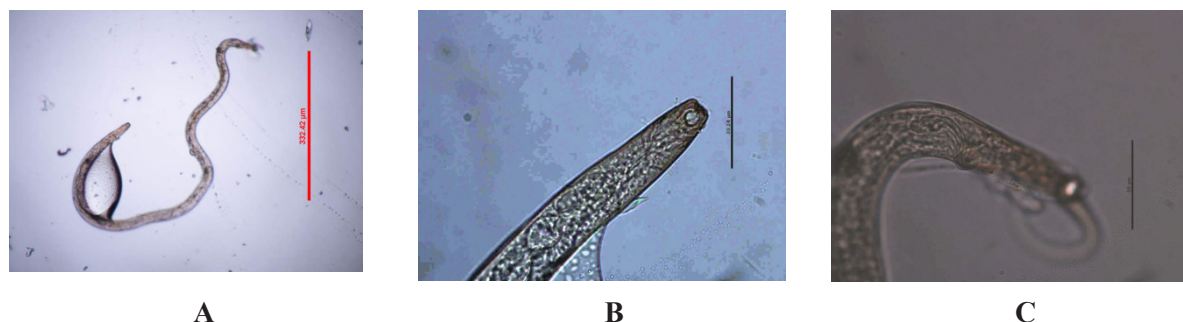


Figure 13. *Terschellingia longicaudata*. A. Adult, B. Anterior region, C. Posterior region.

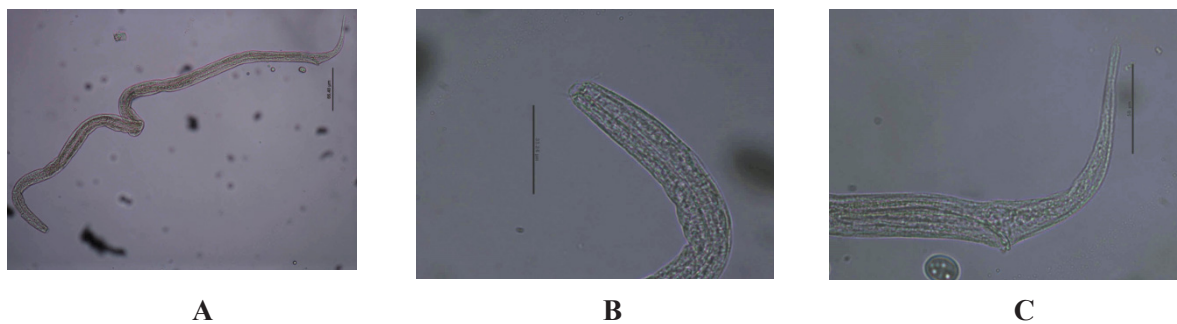


Figure 14. *Daptonema furcatum*. A. Adult, B. Anterior region, C. Posterior region.

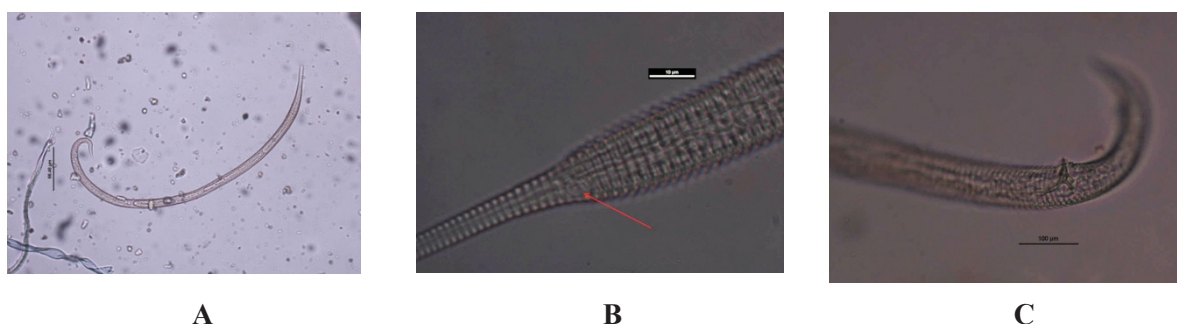


Figure 15. *Rhynchonema cinctum*. A. Adult, B. Anterior region, C. Posterior region.

Family EPSILONEMATIDAE Steiner, 1927

Genus *Epsilonema* Stemer, 1927

24. *Epsilonema pustulatum* Gerlach, 1952*

(Figure 15A-C)

1952. *Bathyepsilonema pustulatum* Gerlach, S.A. Abh. math. -naturw. kl. Akad. Wiss. Mainz., **6**: 315-372.

Material examined: 4♂, (Reg. No. N. 218), Ramathirtham, 30.vii.2014, 7♂(N.218), Mypadu, 30.iv.2014. coll. G. Sivaleela.

Diagnostic characters: The species characterized by epsilon shaped, Cuticle with annulations. Four rows of ventral ambulatory setae in the middle of the body.

Description: Body epsilon shaped with anterior and posterior regions. Cuticle with annulations. Body length is 0.5 mm. Maximum diameter of body is 33 µm wide. Four cephalic setae in the anterior end. Amphids are 5 µm wide. Tail is 1.5 a.b.d long conical shaped. Spicules are 47 µm measured.

Distribution: Continental shelf Southwestern Bay of Bengal (Ansari *et al.*, 2012); www.checklist.org.br.
Elsewhere: Exe estuary, South-West England.

Remarks: The specimens examined well to the earlier description of Platt & Warwick (1988) by its body with epsilon shape curvature. This species was recorded by

(Ansari *et al.*, 2012) from off Karaikal. The photo of this specimen could not give clearly because of poor quality of specimen.

Genus *Microlaimus* de Man, 1880

25. *Microlaimus marinus* Schumann Stekhoven & De Coninck 1933*

(Figure 16A-C)

1933 *Calomicrolaimus marinus* Schulze. Zool. Jahrb. Jena (Syst) **62**: 331-430 Figure 51.

1933. *Microlaimus marinus* Schumann Stekhoven & De Coninck Bull. Mus. royal d' Hist. Nat. Belg./Med. Kon. Natuurhist. Mus. Belg., **9**(4): 1-15, 5 plates.

Material examined: 2 ♂, (Reg. No. N. 265), Coringa, 3.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of development of buccal cavity, length of cephalic setae structure, position, and size of the amphids and the form of the copulatory structure.

Description: Body length is 1.3mm. Maximum diameter is of body 29 µm. Cuticle with transverse rows of dots. Six small and four longer 6 µm cephalic setae are present. Amphids are 7 µm wide. Buccal cavity is with one dorsal and two ventral teeth. Tail is 3 a.b.d in length. Spicules are 32 µm arcuate. Gubernaculum 18 µm in length.



Figure 16. *Theristus flevensis*. **A.** Adult, **B.** Anterior region, **C.** Posterior region.

Distribution: Nellore Coast (Balsamo, 2012). **Elsewhere:** Strangford Lough, Northeast Ireland, South Bay.

Remarks: This species is resembled well with the description of Platt & Warwick (1988) by its cephalic setae, size of amphids and preloacal structure.

Family DESMOSCOLECIDAE Shipley, 1896
Genus *Tricoma* Cobb, 1894

26. *Tricoma brevirostris* Southern 1914

1970. *Tricoma deuterium*. Timm. University of California., **93**: 1-115.

Material examined: 2 ♂, (Reg. No. N.213), Krishnapatinam, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species characterized by the presence of 60-80 oval-shaped desmen.

Distribution: Gaderu, Andhra Coast (Annapurna *et al.*, 2015), Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012), www.biosearch.in **Elsewhere:** Clew Bay, West Ireland.

Remarks: The material is examined well with the earlier description of Platt & Warwick (1983) by its oval desmen without gaps. Maximum 68 desmen were present in the specimen.

Family SELACHINEMATIDAE De Coninck, 1965
Genus *Choniolaimus* Ditlevsen, 1918

27. *Choniolaimus panicus* Gerlach (1956)

1956. *Choniolaimus panicus* Gerlach. *Kieler Meeresforsch.*, **12**(1): 93.

Material examined: 1 ♂, (Reg. No. N. 275), Endy beach, 30.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: The species is characterized by the presence of buccal cavity is divided into cup shaped section extended posteriorly tubular section. Cephalic sensilla setose. Preloacal supplement prominent.

Distribution: Visakhapatnam: Andhra coast (Sivaleela, 2016). **Elsewhere:** Exe estuary, South-West England.

Remarks: This species agree well with the description of the Gerlach, 1956 by its cuticle with punctations, buccal cavity structure & amphids position. The body dimensions are well in agreement with the species described by Gerlach. The aforesaid details are taken into account for placing the present specimens as *C. panicus*.

Genus *Sabatieria* Rouville, 1903

28. *Sabatieria breviseta* Schuurmans Stekhoven, 1935

1935. *Sabatieria breviseta* Schuurmans Stekhoven *Mém. Mus. R. Hist. Nat. Belg.*, **72**: 1-36.

Material examined: 2 ♂, (Reg. No. N. 234), Coringa, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species characterized by punctated cuticle without longitudinal files of dots. Spicules short.

Distribution: Tammenapatnam, Andhra Pradesh (Kapuli Gani *et al.*, 2017) (Continental slope of South -East Coast of India (Mani, 2008); Continental shelf of South-Western Bay of Bengal (Ansari *et al.*, 2012). **Elsewhere:** Southeastern Australia -South Wales.

Remarks: The specimen agrees well with the description by Platt & Warwick (1988) in cuticle and preloacal supplements. But it differ in cephalic setae 3 µm from *S. pulchra* (6-7 µm). Other dimensions are in well agreement with the species described by Platt & Warwick.

29. *Sabatieria celtica* Southern, 1914*
(**Figure 17A-C**)

1914. *Sabatieria celtica* Southern. *Proc. R. Ir. Acad.*, **XXXI**: 1-80.

1959. *Sabatieria celtica*. Wieser. *Acta. Univ. Lund N.F. Avd.2*, **50**(16): 148 P.

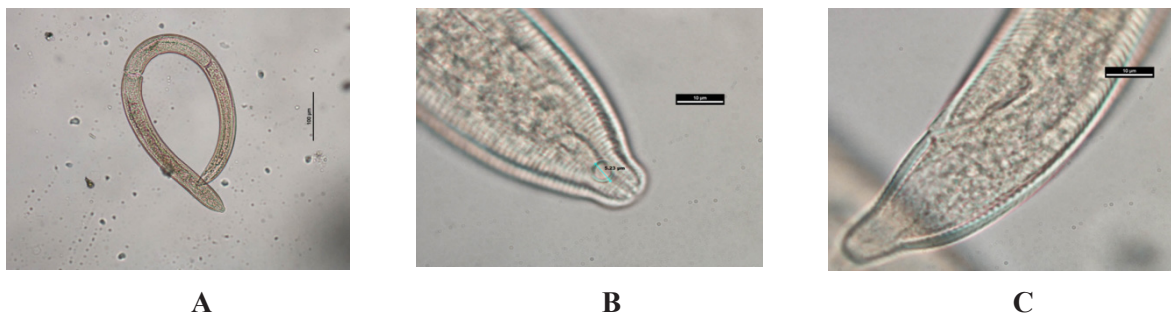


Figure 17. *Leptolaimus papilliger*. A. Adult, B. Anterior region, C. Posterior region.

Material examined: 3 ♂, (Reg. No. N. 248), Machilipatinam, 23.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of punctated cuticle without longitudinal lateral files of dots. Cephalic setae in two separate circles, posterior ones longer than anterior. Amphids immediately posterior to the posterior cephalic setae. Buccal cavity cup-shaped without teeth, spicules short.

Description: Body length is 1.8 mm. Maximum diameter of body is 48 µm. cuticle is with lateral differentiation of larger dots. Six short and four longer (8 µm) cephalic setae are present. Cervical setae are longer than somatic setae. Amphids are of 2-5 turns and 11 µm in wide. Tail is 3.1 a.b.d conico-cylindrical about half of total length. Spicules are 46 µm long and arcuate. Gubernaculum apophysis was curved about half the spicule length. Precloacal supplements are absent.

Distribution: Continental shelf of South-western Bay of Bengal (Ansari *et al.*, 2012); Vellar estuary (Ansari *et al.*, 2014); Chilka lagoon (Ansari *et al.*, 2015); Sundarban mangroves (Ansari & Bhadury, 2017). **Elsewhere:** Cosmopolitan (Europe- Belgium, France, North Atlantic Ocean & North Sea).

Remarks: This species examined conformed well to the earlier description of Platt & Warwick (1983) by its cuticle, cephalic setae, amphids shape and position. The dimensions are agreed well with Platt and Warwick.

30. *Sabatieria punctata* (Kreis, 1924)

1924. *Parasabatieria punctata* Kreis. *Busum.* 2: 157-170.

Material examined: 11 ♂, (Reg. No. N. 369), Mangamaripeta, 3.iv.2016, Coll. G. Sivaleela.

Distribution: Continental shelf of Southwestern Bay of Bengal (Ansari *et al.*, 2012); Continental shelf of Andhra

(Annapurna *et al.*, 2012); Chilka lagoon (Ansari *et al.*, 2015); Continental margin of Indian Ocean (Singh & Ingole, 2016); Continental shelf of Andhra Pradesh (Babu *et al.*, 2017). **Elsewhere:** Northeast England and South Wales.

Remarks: The specimen is examined well to the earlier description of Warwick *et al.*, 1998 by its dimensions and nature of cuticle, amphid structure and gubernaculum apparatus.

Genus *Terschellingia* de Man, 1888

31. *Terschellingia longicaudata* de Man, 1907* (Figure 18A-C)

1907. *Terschellingia longispiculata* de Man. *Mem. Soc.Zool. Fr.*, p: 39-40 Figure 4-4g.

Material examined: 1 ♂, (Reg. No. N. 269), Coringa mangroves, 30.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: The species is characterized by the presence of minute buccal cavity. Four setose cephalic



Figure 18. *Spirinia laevis* (Anterior).

sensilla and four sub-cephalic setae. Amphid positioned far forward on the head. Tail conico-cylindrical.

Description: Body length is 1.4mm. Maximum diameter of body is 35 μm . Cuticle transversely striated. Four cephalic setae of 3 μm in length. Four 4 μm sub cephalic setae is situated on either side of amphid. Amphids are 8 μm in wide. Buccal cavity is absent. Oesophagus with posterior bulb and long cardia. Tail is 10 a.b.d long with filiform tip. Spicules are 47 μm as curved. Gubernaculum is 20 μm dorsal apophysis.

Distribution: Andaman Island (Chatturjee & Kitto, 2019). **Elsewhere:** Long Island Sound, Florida, Kiel Bay, North Sea, English Channel, Mediterranean Sea, Maldives, Bay of Bengal, Australia, British Isles, Essex, Exe, Tamar and Fal estuaries, Skippers Island, Northumberland coast and British Isles (Warwick *et al.*, 1998).

Remarks: The material is examined conforms well to the earlier description of the species of Warwick *et al.*, 1998 by its nature of cuticle, length of cephalic setae, and long filiform tail (10-17 a.b.d) length.

Family XYALIDAE Chitwood, 1951 (Lorenzen, 1933)

Genus *Daptonema* Cobb, 1920

32. *Daptonema furcatum* (Juario, 1974)* (Figure 19A-C)

1974. *Pseudoheritus furcatus* Juario, *Bremenk.* 14: 287.

Material examined: 1♂, (Reg. No. N. 374), Mangamaripeta, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of its conical-cylindrical tail with terminal setae,



Figure 19. *Epsilonema pustulatum*.

relative length of setation, size and position of amphid shape and length of the tail to distinguish the species.

Description: Body length is 0.5 mm. Cephalic setae are 7 μm in length. Amphids are 11 μm wide. Tail is 4 a.b.d long and conico-cylindrical. Spicules are 24 μm in length and gubernaculum single between spicules.

Distribution: Upper, Palk Bay (Sivaleela, 2016). **Elsewhere:** Northeast coast of England.

Remarks: The species is examined well with the earlier description of Warwick *et al.* (1998) by the form of the tail (conical without terminal setae), size and position of amphid, structure of spicule.

33. *Daptonema hirsutum* Vitiello, 1967

1967. *Mesotheristus hirsutus* Vitiello *Cah. biol. mar.*, 8: 403-416.

Material examined: 13♂, (Reg. No. N. 243), Mypadu, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species characterized by the presence of conico-cylindrical with terminal setae.

Distribution: Tammenapatanam, Andhra Pradesh (Ansari *et al.*, 2013), Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); intertidal regions of Central west coast of India (Bhadury *et al.*, 2015); www.biosearch.in. **Elsewhere:** Strangford Lough, Northeast Ireland, Isles of Scilly.

Remarks: This species is examined well to the earlier description of Warwick *et al.*, 1998 in cervical setae position, amphid position and tail 5.a.b.d length.

34. *Daptonema procerum* Gerlach, 1951

1951. *Daptonema procerum* Gerlach *Zool. Jb. (Syst)*, 80: 379-406.

Material examined: 4♂, (Reg. No. N. 261), Chirala, 24.vi.2014, Coll. G. Sivaleela.

Diagnostic characters: This species characterized by the presence of conico-cylindrical with terminal setae. The size is smaller than other species of *Daptonema*.

Distribution: Continental shelf of Andhra (Bhanu *et al.*, 2017); Continental shelf of Southwestern Bay of Bengal (Ansari *et al.*, 2012); intertidal regions of Central West Coast of India (Bhadury *et al.*, 2015). **Elsewhere:** Exe, Tamar and Fal estuaries, Southwest England.

Remarks: The species is resembled well the earlier description of Warwick *et al.* (1998) by its short terminal setae and cephalic setae length. Cuticle was transversely striated.

35. *Daptonema psammoides* (Warwick, 1970)

1970. *Daptonema psammoides* Warwick. *Bull.Br.Mus.Nat. Hist. (Zool.)*, 19(4): 134-177.

Material examined: 3♂, (Reg. No. N. 438), Bheemunipatnam, 1.iv.2016, Coll. G. Sivaleela.

Distribution: Continental shelf of South-Western Bay of Bengal (Ansari *et al.*, 2012); Vellar estuary (Ansari *et al.*, 2014); Sundarban mangroves (Ansari & Bhadury, 2017). **Elsewhere:** Exe estuary, South-West England.

Remarks: The specimens examined conformed well to the earlier description of Warwick *et al.* (1998) by its amphid size, the length of cephalic setae size and cuticle striations, size and shape of tail and size of the spicule.

36. *Daptonema setifer* (Gerlach, 1952)

1952. *Mesotheristus setifer* Gerlach. *Abh. Math-naturv. Kl. Acad. Wiss. Mainz.*, 6: 315-372.

1988. *Daptonema setifer*: Platt and Warwick. Free-living Marine nematodes, Part-3: Monhysterids.

Material examined: 1♂, (Reg. No. N. 438), Bheemunipatnam, 1.iv.2016, Coll. G. Sivaleela.

Distribution: Continental shelf of Andhra (Annapurna *et al.*, 2017); Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012). **Elsewhere:** Exe estuary, South-West England, North- East Ireland.

Remarks: This species resembles the earlier description of Warwick *et al.* (1998) by its spicular structure, the distinct conico-cylindrical tail with terminal setae justifies the species *Daptonema setifer*.

37. *Daptonema tenuispiculum* Ditlevsen, 1918

1918. *Cylindrotheristus tenuispiculum* Ditlevsen, H. *Vidensk. Meddr. Dansk. Naturh. Fovea*, 70, 7: 147-214.

Material examined: 10♂ & 2♀ (Reg. No. N. 226), Krishnapatnam, 30.vii.2014, Coll. G. Sivaleela.

Distribution: Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); Vellar estuary (Ansari *et al.*, 2014); Continental shelf of Andhra Pradesh (Bhanu *et al.*, 2017). **Elsewhere:** Blyth estuary, Northeast England, Plymouth.

Remarks: The specimens examined well with the earlier description of Warwick *et al.* (1998) by their cephalic setae length, amphid size and tail length.

38. *Daptonema vicinum* Riemann, 1966

1966. *Daptonema vicinus* Riemann, F. *Arch. Hydrobiol. Suppl.* XXXI. ½: 1-279.

Material examined: 5 ♂ (Reg. No. N. 326), Coringa, 3.iv.2014, Coll. G. Sivaleela.

Diagnostic characters: This species differs from other species by the size of total body length and tail structure, and size.

Distribution: Vishahapatnam (Annapurna and Srinivasa Rao, 2017). Continental shelf of Andhra (Annapurna *et al.*, 2017, Bhanu *et al.*, 2017). **Elsewhere:** Firth of Forth, East Scotland.

Remarks: This species is resembled with Warwick *et al.* (1998) by its total body length, tail length and spicule size.

Genus *Rhynchonema* Cobb, 1920

39. *Rhynchonema cinctum* Cobb, 1920*
(Figure 20A-C)

1920. *Rhynchonema cinctum* Cobb, *Cont. Sci. of Nemat.* 9: 260.

Material examined: 1♀ (Reg. No. N-356), Tummelapenta, 7.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: The species is characterized by the presence of cuticle is coarsely annulated, and buccal cavity is elongated; anterior third of oesophagus region is attenuated; amphid is posterior to attenuated section.

Description The total body length is 0.85 mm. Cuticle coarsely ringed. Head diameter is 5 µm. Oesophagus is 3 µm. Buccal cavity is cylindrical 60 µm long extend up to amphid. Ten cephalic and four cervical setae are visible. Amphid is circular 4 µm wide. Somatic setae 10-15 µm long. Tail conical and setose.

Distribution: Continental shelf of eastern Arabian Sea (Sajan & Damodaran, 2007); Continental slope of Bay



Figure 20 *Paracanthonus heterodontus*.

of Bengal (Mani, 2008). *Elsewhere*: Peru, Atlantic and Pacific Ocean

Remarks: This specimen agrees well with the earlier description of Cobb (1920) by its total body length, cuticular structure and tail length.

Genus *Theristus* Bastian 1865

40. *Theristus flevensis* Stekhoven, 1935* (Figure 21A-C)

1935. *Theristus flevensis*. Stekhoven. Grimpe, G and E. Wagler, *Die Tierwelt der Nord-und. Ostsee.*, V. b: 1-173.

Material examined: 1♀, (Reg. No. N.435), Manginapudi, 4.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of 10-14 cephalic setae in six groups, unarmed conical buccal cavity. Tail conical without terminal setae.

Description: Body length is 1.3 mm. Maximum diameter of body is 41µm. Cuticle bears fine lateral with fine setae. Cephalic setae include twelve six longer 10 µm in size. Somatic setae are short. Amphids are 7 µm wide located from anterior. Tail is 4 a.b.d long. Spicules are 37 µm length and curved. Gubernaculum not distinct.

Distribution: Pichavaram mangroves (Chinnadurai & Fernando, 2005). *Elsewhere*: Exe estuary, South -West England, Clyde estuary.

Remarks: The specimen is examined well with the earlier description of Warwick *et al.* (1998) by its cephalic setae size, amphid size.

Genus *Theristus* Bastian, 1865

41. *Theristus longus* Platt, 1973

1973. *Theristus longus* Platt. *Cahiers de biologie Marine.*, 14(3): 295-321.

Material examined: 3♂, (Reg. No. N.270), Coringa, 3.iv.2016, Coll. G. Sivaleela.

Diagnostic characters: This species differs by the tail conical without terminal setae.

Distribution: Tammenapatanam, Andhra (Ansari *et al.*, 2013) Continental shelf of southwestern Bay of Bengal (Ansari *et al.*, 2012); Sundarban mangroves (Ansari and Bhadury, 2017); www.biosearch.in. *Elsewhere*: Strangford Lough, North-East Ireland.

Remarks: The species examined well with the earlier description of Platt (1998) by its long tail length, body length and amphid size. This species was recorded by Ansari *et al* at Tammenapatanam.

Genus *Xyala* Cobb, 1920

42. *Xyala striata* Cobb, 1920

1920. *Xyala striata* Cobb, *Contr. Sci. Nematol.*, 9: 217-343.

Material examined: 1♂ & 1♀, (Reg. No. N. 211), Krishnapatinam, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: The species is characterized by the cuticle with longitudinal ridges and setiform labial sensilla.

Distribution: Manginapudi, Andhra Coast (Sivaleela, 2016). *Elsewhere*: Southwest England, West Scotland.

Remarks: The material examined well with the earlier description of Warwick *et al.*, 1998 by its cuticle with longitudinal ridges, cephalic setae length, amphid position and tail length.

Genus *Leptolaimus* de Man, 1876.

43. *Leptolaimus papilliger* de Man, 1876* (Figure 22A-C)

1876. *Leptolaimus papilliger* de Man, *Tijdschr. ned. dierk. Vereen.*, 2: 169-170.

Material examined: 2♂, (Reg. No. N.210), Krishnapatinam, 30.vii.2014, Coll. G. Sivaleela.

Diagnostic characters: This species is characterized by the presence of a long buccal cavity, tubular and cuticularized amphids and tubular preloacal supplements.

Description: Body length 0.5mm. Maximum diameter 15 µm. Cuticle with longitudinal un-striated lines and four sub ventral files of setae. Cephalic setae 3.3.-5 µm long. Buccal cavity is small and tapering. Oesophagus is cylindrical (124-148 µm). Tail is conico-cylindrical (4 a.b.d). Spicules are 15-19 µm wide and arcuate. Gubernaculum with a pointed dorsal apophysis.

Distribution: Continental shelf of southwest Bay of Bengal (Ansari *et al.*, 2012). *Elsewhere*: Exe estuary, South-west England, Strangford Lough.

Remarks: This species examined well with the earlier description of Platt & Warwick (1988) by its long buccal cavity. The length of the described specimen and the present specimen is the same.

Discussion

In the present study, a total of 43 species of free-living marine nematodes were identified which included 10

families under 32 genera belonging to 815 specimens have been recorded from the Andhra coast. Out of which twenty-two species have been described as a new distributional record (given * for those species) to Andhra Coast. It was represented by 3 orders, 15 families and 16 genera. Of the 43 adenophorean nematode species, 7 belongs to Enoplida, 24 Chromadorids and 13 species were Monhysterids. As per the present study, the greatest number was reflected by the order Chromadorids (24 species) followed by Monhysterida (13 species) and Enoplida (7 species), and there are many species are still to be explored in the future thoroughly. So far, around 250 species of nematodes have been reported from various habitat regions, including estuaries, backwaters, lagoons, mangroves on the east & west coast of India (Ansari & Bhadury, 2017).

According to (NeMys database – Bezerra *et al.*, 2019), a total of 6935 free-living marine species were recorded globally. Sajan and Damodaran (2007) reported 154 species in the Western continental shelf of India. The highest diversity is observed at Bheemunipatnam,

Kakinada and Katlapalem where the genus *Xyala* and *Rhynchonema* is highly abundant. In the present study, *Microilaimus monstrosus*, *Terschellingia longicaudata*, and *Leptolaimus papilliger* are the dominant species from this coast. *Halalaimus*, *Viscosia*, *Sabatieria* and *Theristus* are present in all regions. The fluctuation in species number throughout the Indian coast is probably due to differences in geomorphology, habitat heterogeneity among coastal regions.

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