

*Rec. zool. Surv. India* : 106(Part-2) : 79-98, 2006

## **FRESHWATER OLIGOCHAETES FROM KOLKATA AND ITS ADJACENT AREAS**

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### **INTRODUCTION**

Aquatic oligochaetes, constituting a most important component of the benthic invertebrates of littoral zones of fresh water bodies like pond, tank, ditches *etc.*, are poorly known in India. These worms belong to Phylum Annelida and are grouped together along with few earthworms into the group microdrili. There are three families such as Aelosomatidae, Naididae and Tubificidae under aquatic oligochaetes.

These worms live either singly or in groups, sometimes in association with other group of animals such as fresh water sponges or adhering to submerged and floating vegetation or substratum. They are either microscopic or small (about 200 mm) in size, colourless, pale red and deep brown in colour; slender to relatively robust in size constituting the bulk of food for other aquatic animals like fishes.

The most constant and dependable character identifiable even in the preserved state are the locomotor organelles or setae which are of various morphological patterns as regards shape, size, number and of immense taxonomical importance for the determination of genera and species. A perusal of literature reveals that altogether 67 species under 20 genera and 3 families have so far been recorded from India. Mukhopadhyay (1998) reported the record of 27 species under 14 genera and 3 families from West Bengal. The present attempt was taken to survey twelve water bodies and roadside drains in and around Kolkata (North 24 Paraganas, South 24 Paraganas, Hoogly and Howrah districts) and recorded 7 species and 5 genera and 2 families. The present material deals with two new records. Mukhopadhyay (1998) recorded only 19 species from the area recently visited by present author. Therefore the present paper includes description, distribution along with the key for identification of 26 species so far recorded from the present study area.

## MATERIAL AND METHODS

Aquatic worms living in mud and silt are collected along with water soil and then washing them on a white based enamel trays. Those found on surface of water are collected readily with the help of a wide mouthed pipette or needle. Specimen living among aquatic vegetation and algal masses are collected along with the substrata and wash them out afterwards.

### Preservation

The most suitable method of preservation of those delicate soft bodied specimens is to put them directly into 4% formalin solution.

Though formalin bring about certain amount of opacity of the skin, a greater part of it may be overcome by bleaching the skin with chemicals like lactophenol. Narcotisation prior to preservation with alcohol appeared to be useless because their soft bodies disintegrate easily under its influence.

### Study

The best result of study is obtained by examining the specimen in living condition whenever opportunity permits. In the laboratory preserved material is treated with glycerine before study to bring about some degree of transparency of specimen. During the process of study the setae are examined in minutest details besides the prostomium, sexual organ, position of nephridia, blood vessels, bronchial organs *etc.*, for detailed study seatae the material is to be placed under oil immersion lens.

## SYSTEMATIC ACCOUNT

### I. Family AEOLOSOMATIDAE

Genus *Aeolosoma* Ehrenberg 1831

1. *Aeolosoma bengalense* Stephenson 1911

### II. Family NAIDIDAE

#### Subfamily CHAETOGASTRINAE

Genus *Chaetogaster* Von Baer

2. *Chaetogaster langi* Bretscher 1896
3. *Chaetogaster limnaei bengalensis* Annandale 1905

#### Subfamily NAIDINAE

Genus *Allonais* Sperber, 1948

4. *Allonais inaequalis* (Stephenson, 1911)
5. *Allonais paraguayensis* (Michaelsen, 1905)

Genus *Branchiodrilus* Michaelsen, 1900

6. *Branchiodrilus hortensis* (Stephenson, 1910)

Genus *Dero* Oken, 1815

7. *Dero (Dero) dorsalis* Ferroniere, 1899
8. *Dero (Dero) indica* Naidu, 1962
9. *Dero (Dero) cooperi* Stephenson, 1932

Genus *Nais* Müller, 1773

10. *Nais elinguis* Müller, 1773
11. *Nais barbata* Müller, 1773
12. *Nais simplex* Piguet, 1906

Genus *Slavina* Vejdovsky, 1883

13. *Slavina appendiculata* (d'Udekim), 1855

## Subfamily PRISTININAE Vastockin, 1924

Genus *Pristina* Ehrenberg, 1828

14. *Pristina longiseta longiseta* Ehrenberg, 1828
15. *Pristina aequiseta* Bourne, 1891
16. *Pristina proboscidea* Beddard, 1896

## Family TUBIFICIDAE

Genus *Bothrioneurum* Stolc, 1885

17. *Bothrioneurum iris* Beddard, 1901

Genus *Branchiura* Beddard, 1892

18. *Branchiura sowerbyi* Beddard, 1892

Genus *Limnodrilus* Claparede, 1862

19. *Limnodrilus hoffmeisteri* Claparede, 1862

**Key to the Families**

1. Crochet setae and septa absent ..... Aeolosomatidae
2. Crochet setae in both ventral and dorsal bundles ..... Tubificidae
3. Crochet setae in ventral bundles only ..... Naididae

## Family AEOLOSOMATIDAE

*Diagnosis* : Setae in four bundles, in both dorsal and ventral bundles. With capillary setae, often with single or double pointed or needles setae. Septum wanting in most part small size, upto 10 mm. Prostomium ventrally with cilia, testes and ovaries in V and V segments.

*Remarks* : Acolosomatidae is represented by a single genus *Aeolosoma* Ehrenberg.

Genus *Aeolosoma* Ehrenberg, 1831

1831. *Aeolosoma* Ehrenberg, *Synb. Phys.* (Mammalia vertebrate : 1-293.

1980. *Aeolosoma* Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (eds). : 80.

*Diagnosis* : Eyes and septa absent. Prostomium not separated from body by a well marked groove. Dorsal and ventral setae from II segment onwards and composed of needles and hairs. Stomach conspicuous. Nephridia paired starts from II or III segment; budding zone present cosmopolitan.

*Remarks* : The genus *Aeolosoma* is represented in India by six species, one so far known from West Bengal.

1. *Aeolosoma bengalense* Stephenson 1911 is *Aeolosoma headleyi* Beddard 1888

1911. *Aeolosoma bengalense* Stephenson, *Rec. Ind. Mus. Calcutta*, **6** : 204-205.

1962. *Aeolosoma bengalense*, Naidu, *J. Bomb. Nat. Hist. Soc.*, **38**(3) : 648-649.

1998. *Aeolosoma bengalense* : Mukherjee, *Fauna of West Bengal*, State Fauna Series, **3** (Part 10) : 99.

*Material examined* : Material not available, description based on literature.

*Diagnosis* : Setae all straight, capillary bundles consists as a rule of one long and several shorter, the longer one nearly twice the length of the shorter, bayonet shaped and non serrate.

Mouth ventral V shaped; esophagi in II and stomach in IV to ½ VIII segment. *Nephridia* begins in II segment. Budding zone more than one is common.

*Habit* : Gliding, not swimming purely freshwater.

*Distribution* : INDIA : West Bengal, Kolkata, Kerala. *Outside India* : South America.

## Family NAIDIDAE

Hair setae present or absent; dorsally needle setae of various kinds; pharynx with dorsal diverticulum, pharynxgeal oesophageal or septal glands present; nephridia open; testes and spermathecae in V and atria in VI segment.

*Distribution* : Europe; Pakistan; Tibet; India; Ceylon and South America.

*Remarks* : Naididae is the biggest family of the freshwater Oligochaeta including 11 genera in India and in state of West Bengal. It is divided into three subfamilies.

**Key to the subfamilies**

- Dorsal setae beginning from segment IV, V or VI, Prostomium without proboscis except in one genus..... Naidinae
- Dorsal setae usually, beginning from segment n or III; Prostomium with proboscis. Pristininae  
Dorsal setae absent/segment III specially elongated..... Chaetogastrinae

**Subfamily CHAETOGASTRINAE**

*Diagnosis* : Dorsal setae usually absent, when present consists of double pronged crotchets. Segment III elongated; Prostomium reduced. Eye absent oesophageal as well as septal glands absent. Nephridia closed. Testes in V and ovaries in VI segment. Prostate gland absent.

**Genus *Chaetogaster* Von Baer, 1827**

1827. *Chaetogaster* Von Baer, *Nova Acta Phys. Med. Acad. Weop. Card. Nat. car. Bonn.*, **13** : 611.

1980. *Chaetogaster* : Persia, In : *Aquatic Oligochaete biology*, Brinkhurst and Cook (Eds.), p. 85.

*Type species* : *Chaetogaster limnae* Von Boer.

*Diagnosis* : Dorsal setae absent; ventral setae double pronged or simple crotchets but absent in III<sup>rd</sup> to V<sup>th</sup> segment. Setae incomplete. Stomach well defined. Elitellum in ½ V–VI segment. Peneal setae absent.

*Distribution* : Europe; Pakistan; Tibet; Persia; Burma and India.

**Key to the species**

- 1. Double pronged crotchets with strongly curved teeth ..... *C. limnae bengalensis*
- Double pronged crotchets with normally curved teeth ..... *C. langi*

**2. *Chaetogaster langi***

1896. *Chaetogaster langi* Bretscher, *Rev. Suisse. zool.*, **3** : 512-513. Fig. 1.

1966. *Chaetogaster langi* : Naidu, *Hydrobiologia*, **27**(1-2) : 211.

*Diagnosis* : Prostomium short and blunt fringed with sensory hair. Setae per bundle in II segment, 3–6 in the rest, length equal to two third the diameter of the body; distal prong of the forked end longer than the proximal. Nephridia two per segment beginning from VII segment.

*Habits* : Usually stick to the walls of the container. Found in brackish water also.

**3. *Chaetogaster limnae bengalensis* Annandale, 1905**

1905. *Chaetogaster bengalensis* Annandale, *Journ and Proc. Asiat Soc. Bengal*, **1** : 117, Pl. III, Fig. 1-4.

1966. *Chaetogaster limnae bengalensis* : Naidu, *Hydrobiologica*, **27**(1-2) : 211.

*Diagnosis* : Setae in bundle of 15–17, arranged in semicircles, shaft straight. Prongs almost equal in length and thickness; in segment II the setae are longer than those of others, position of nodules median to distal. Size small, about 10 mm at full length; diameter less than 0.5 mm. Prostomium practically absent.

*Habit* : Purely freshwater. Sometimes commensal on water snails.

*Distribution* : INDIA : West Bengal, Kolkata, Madhya Pradesh, Punjab. *Outside India* : Pakistan, Burma.

#### Subfamily NAIDINAE

*Diagnosis* : Prostomium simple and rounded, hind end simple; dorsal setae beginning in VI segment and include moderately long hair setae and simple or bifid needle setae; ventral bundles having double pointed crotchets. Clitellum includes segments V to VII. Penial setae present or absent.

#### Key to the genera

1. Oranomal process present ..... 2
- Branchial process absent ..... 3
2. Branchial process dorso laterally arranged, finger like, a pair per segment ..... *Branchiodrilus*
- Branchial process are located within a branchial fossa at the hind end, leaf like of variable Number ..... *Dero*
3. Dorsal bundle of setae with double pointed or pectinate needles ..... *Allonais*
- Dorsal bundle of setae with simple needles ..... 4
4. Specially elongated hair setae present in VI segment. Body covered with rows of sensory papillae ..... *Slavina*
- Specially elongated hair setae absent, no sensory papillae ..... *Nais*

#### Genus *Allonais* Sperber, 1948

1948. *Allonais* Sperber, *Zool. Bidr. Uppsala*, **28** : 299.

1980. *Allonais* : Persdia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 95.

*Type species* : *Allonais inaequalis* (Stephenson, 1911).

*Diagnosis* : Dorsal bundle of setae from VI segment and consisting of hairs and double pointed or pectinate needles; ventral setae of II to V segment only slightly different from those of following segments. Septal glands absent. No eyes. Prostomium bluntly triangular.

*Distribution* : Asia; Africa; North and South America; Australia.

#### 4. *Allonais inaequalis* (Stephenson, 1911)

1911. *Nais pectinata* var. *inaequalis*, Stephenson, *Rec. Ind. Mus. Kolkata*, **6** : 208-209, Fig. 2.

1948. *Allonais inaequalis* : Sperber, *Zool. Bidr. Uppsala*, **28** : 201-203, Fig. 21 A-D.

*Material* : Central Kolkata Museum Tank—3 exs. 13.8.2003, Hoogly-Srirampur—2 exs. 19.8.2003. Coll. T. Biswas and C. K. Mondal.

*Diagnosis* : Prostomium elongated. Dorsal bundle of setae begin from VI segment and consists of 1–2 hairs and 1–2 needles per bundle, hairs smooth and slightly curved needles pectinate with 1–4 intermediate teeth connected by Webb, proximal prong longer than distal; ventral setae 4–6/ bundle those of segments II–V thinner and straighter than other with slightly proximal nodules, other having nodules slightly distal and teeth equally long elitellum embracing segments VI to VIII. Nephridium begins from VIII segment found among aquatic plants and decaying vegetable matter.

#### 5. *Allonais paraguayensis* (Michaelson, 1905)

1905. *Nais paraguayensis* Michaelson, *Z. wiss. Zool.*, **82** : 354-355.

1948. *Allonais paraguayensis paraguayensis*; Sperber, *Zool. Bidr. Uppsala*, **28** : 203-204, Fig. 28B.

1980. *Allonaig paraguayensis* : Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 98.

1998. *Allonaig paraguayensis* : Mukhopadhyay, *State Fauna Series 3 : Fauna of West Bengal, Part 10* : 95-102.

*Material examined* : Material not available, description is based on literature.

*Diagnosis* : Size small, 10 mm, light orange, segments 100 (approx.) Prostomium short, rounded. Anus dorsal. Dorsal setae from VI segment onwards, with needles and hair, 1–2 of each/segment; needle sickle shaped, bifid with proximal tooth being twice as long as and thicker than distal which is again bifid; ventral bundle of setae with 3–6 bifid crochets having distal prongs of equal length with the proximal clitellum embracing V–VIII segments, nephridium starts between VII and VIII. Peneal setae present.

*Habit* : Swims on water surface with transverse movements rotating round its axis.

*Distribution* : INDIA : West Bengal, Kolkata; Malda districts; Bihar; Madhya Pradesh. *Outside India* : East Asia, North and South America.

#### Genus *Branchiodrilus* Michaelson, 1900

1890. *Chaetobranchnus* Bourne, *Quart. J. Micro. Sci.*, **31** : 83.

1900. *Branchiodrilus* Michaelson, *Das Tier.*, : 10.

1962. *Branchiodrilus* : Naidu, *J. Bomb. Nat. Soc.*, **59**(2) : 526.

1998. *Branchiodrilus* : Mukhopadhyay, *Fauna of West Bengal, Part 10* : 103.

*Type species* : *Branchiodrilus semperi* (Bourne, 1890).

*Diagnosis* : Prostomium rounded; paired branchial process dorso-laterally placed on many or most of the body segments beginning immediately after anterior end of the body; dorsal setae and gill begin from the same segment and consists of hairs and needles ventral setae of bifid crotches, no Penial setae.

*Distribution* : Europe; Asia; Africa and Australia.

#### 6. *Branchiodrilus hortensis* (Stephenson, 1910)

1910. *Lahoria hortensis* Stephenson, *Rec. Ind. Mus. Calcutta*, **5** : 59-66, text figs. 1-3, Pl. VII, Figs. 1-3.

1912. *Branchiodrilus hortensis* : Stephenson, *Rec. Ind. Mus. Calcutta*, **7** : 229.

1948. *Branchiodrilus hortensis* : Sperber, *Zool. Bidr. Uppsala*, **28** : 157-158, Fig. 28A.

*Material examined* : South Kolkata, Eden Garden, 4 exs., 13.8.2002, Central Kolkata Museum Tank, 2 exs., 13.8.2003, Hooghly-Srirampur, 5 exs., 19.8.2003, North Kolkata Ultadanga, 3 exs., 16.8.2003, Coll. T. Biswas and party.

*Diagnosis* : Dorsal setae consisting of usual hairs and needles, two of each/bundle; First 40 hair setae enclosed inside the gills, behind which they are free; needles short and pointed, ventral setae consisting of 4–5 bifid crotchets having distal prong longer than proximal and thinner and at the base, nodule a little distal. Gills extend almost upto the hind end of the body, gradually diminishing in size posteriorly largest being three times the diameter of the body. Prostomium bluntly conical. Well marked, transverse pigmented bands extend over the body upto XX segment clitellum includes V to VIII segments. Peneal setae 2–3 in each bundle simple but hooked.

*Habit* : Mud dwellers, not swimming.

*Distribution* : INDIA : West Bengal, Kolkata; Uttar Pradesh; Andhra Pradesh.

#### Genus *Dero* Oken, 1815

1815. *Dero* Oken, *Lehrbuch der Naturgeschichte 3 Zoologie 1* : Leipzig, p. 313.

1980. *Dero* : Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (eds.) : 90.

1998. *Dero* : Mukhopadhyay, In : *State Fauna Series, 3 : Fauna of West Bengal, Part 10* : 104.

*Type species* : *Dero digitata* (Müller, 1773).

*Diagnosis* : Dorsal setae beginning from IV, V or VI segment onwards, consisting of hairs and double pointed, pectinate or palmate needles; ventral setae of II to V segment different from the rest having the distal teeth longer than the proximal but equally thick, compared with equally long or short but thinner in the later segments. Pharynx extends from II to V segment and have pharyngeal glands; tube dwellers.

*Distribution* : Cosmopolitan.

### Key to the Species

1. Dorsal setae begin from VI segment, with one hair and one needle in all segments .....  
..... *D. (D) cooperi*
2. Dorsal setae bundles with 2 hair and 2 needles in anterior and middle segment .....  
..... *D. (D) indica*

#### 7. *Dero cooperi* Stephenson, 1932

1932. *Dero cooperi* Stephenson, *Proc. Zool. Soc. Lond.*, **1932**(1-2) : 231-233, Figs. 2-5.

1980. *Dero (Dero) cooperi* : Persia, In : *Aquatic Oligochaetae Biology*, Brinkhurst and Cook (Eds.), 90-91.

1998. *Dero (Dero) cooperi* : Mukherjee, *Fauna of West Bengal*, Part 10 : 105-106.

*Material examined* : Hooghly, Sankrail; 2 exs., 19.9.2002, South 24 Parganas, Neelgunge road side pond; 2 exs., 24.7.2003, Barasat dakshinpara; 6 exs., 16.9.2003, Tollygunge pond; 3 exs., 13.8.2002, Patuli road side pond; 4 exs., 21.7.2003, Coll. T. Biswas and C. K. Mandal.

*Diagnosis* : Size small, 10 mm; pale red in colour. Prostomium bears sensory cilia; dorsal setae beginning from VI on words having 1 hair and 1 needle/bundle; hair bayonet shaped, needles bifid, teeth short; ventral setae 4 per bundle with distal nodulus and short teeth, proximal prong thicker and longer than distal; ventral setae from II-V, 3-5/bundle, longer, nodulus median and distal tooth 1½ times longer than proximal; branchial fossa with posterior prolongation; gills 4 pairs, dorsal pair foremost and the smallest, the hind most pair leaf like, the second and the third pair thicker than the rest; clitellum covers V to VII segment; nephridia starts from VII segment.

*Habit* : Live in tube with mucus sand and mud; swim with spiral movement.

*Distribution* : INDIA : West Bengal, Bankura, Burdwan, Malda, Midanapore and Nadia district; Andhra Pradesh; Karnataka and Uttar Pradesh. *Outside India* : Abyssinia and Pakistan.

*Remarks* : This species is first time recorded in Kolkata.

#### 8. *Dero dorsalis* Ferroniere, 1899

1899. *Dero dorsalis* Ferroniere, *Bull. soc. Sci. nat. ouset. Nantes.*, **9** : 255-257.

1933. *Dero dorsalis* : Michaelsen, *Zool. Jharb. Syst.*, **64** : 334.

1998. *Dero (Dero) dorsalis* : Ferroniere, *Mukhopadhaya, Fauna of West Bengal*, Part 10 : 106.

*Material examined* : Shankril station road side pond, 5 exs., 21.7.2003; Ultadanga (North Kolkata), 2 exs., 14.8.2002, Shibpur, 20.8.2002, 2 exs.

*Diagnosis* : Size small, 10-15 mm, elongated and slender; segmentation prominent. Dorsal setae begin from IV segment, one hair and one needle or 2 of each in every bundle, hairs not much elongated, bayonet shaped; needles sickle shaped, bifid having distal tooth slightly longer than

proximal; ventral setae vary in number, usually 4, 3 or 2 per bundle in anterior, middle and posterior segment respectively. Branchial fossa with 5 pairs of gills, ciliated and foliate; anterior margin of fossa entire, posterior margin with short, broad and diverging pulplike process. Clitellum in V, VII. Peneal setae absent. Tube dweller.

*Habit* : Live in soft mud along with other species of the genus.

*Distribution* : INDIA : West Bengal, Bankura, Burdwan, West Dinajpur, Hooghly, Malda, Midnapore and Nadia districts; Andhra Pradesh and Kerala. *Outside India* : Europe.

### 9. *Dero indica* Naidu, 1962

1962. *Dero indica* Naidu, *J. Bombay nat. Hist. Soc.*, **59**(1) : 533-536, Fig. 14 A-G.

1980. *Dero indica* : Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 93.

1989. *Dero indica* : Mukhopadhyaya, *Fauna of West Bengal*, Part 10 : 106-107.

*Material examined* : Hooghly, Shrirampur Doctor Bagan Lane; 2 exs., 24.7.2003, Howrah, Shibpur; 3 exs., 20.8.2002, Coll. T. Biswas and C. K. Mandal.

*Diagnosis* : Size 19–20 mm, whitish red, Prostomium bluntly triangle with sensory cilia; dorsal setae beginning from VI with 2 hairs and 2 needles per bundle in anterior half of body while 1 of each in the remaining posterior segments, hairs bayonet shaped; needles bifid with distal nodulus and teeth equal, the outer prong being longer; ventral setae 3–4 per bundle bifid crotchets teeth unequal having proximal prong thicker and slightly longer nodules distal; ventral setae of II to V segment longer and straighter; branchial organ funnel shaped; gills 4 pairs, broad. Nephridium starts in VII segment; budding zone clear.

*Habit* : Live in soft mud.

*Distribution* : Tripura, Andhra Pradesh, Karnataka, West Bengal.

### Genus *Nais* Müller, 1773

1773. *Nais* Müller, *Vermium terrestrium et fluviatilium* II. Hafniae et Lipsidae, 23-24.

1980. *Nais* Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (eds.) : 87.

*Type species* : *Nais barbata* Müller, 1773.

*Diagnosis* : Prostomium simple, rounded Hind end simple. Dorsal setae beginning in V segment, consisting of moderately long hair setae and simple or bifid needles. Ventral bundles consisting of double pronged crotchets, those of II to V segment well differentiated from those of the following segments. Pharynx in II and III segment. Pharyngeal and oesophageal glands present. Clitellum includes segments V to VII. Pineal setae present.

*Remarks* : Cosmopolitan.

**Key to the Species**

1. Needle setae single pointed ..... 2  
 — Needle setae double pointed ..... *N. elinguis*
2. Needles hair like with sharp tip and nodules slightly distal ..... *N. barbata*  
 — Needles not hair like, short with fairly obtuse tip and nodulus 1/3 from distal end .....  
 ..... *N. simplex*

**10. *Nais elinguis* Müller, 1773**

1773. *Nais elinguis* Müller, Vermium terrestrium et fluviatilium II. Hafniae et Lipsidae, 22.

1980. *Nais elinguis* Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (eds). : 88.

*Material examined* : Material not available. Description on literature.

*Diagnosis* : Dorsal bundle of setae with 2–3 needles and 2–3 hairs, needles with curved tip, finely bifid; hairs three times the length of needles; ventral setae 2–5 bundles, bifid crotchets, those of II to V segments hardly longer straighten and thinner than the rest, with nodules 1/3–1/2 from distal end, and with distal tooth about twice as long as proximal; from VI segment onward nodulus distal and distal tooth twice as long as proximal. Peneal setae 4–5 in number, dorsal vessel mid-dorsal.

*Habit* : Frequently brackish water; swim by lateral movements. Some time live in association with fresh water sponges.

*Distribution* : INDIA : West Bengal, Calcutta. *Outside India* : Europe, brackish water of North sea and Baltik.

**11. *Nais barbata* Müller, 1773**

1773. *Nais barbata* Müller, Vermium terrestrium et fluviatileum II. Hofniae et Lipsidae : 23-24.

1980. *Nais barbata* : Spencer, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 120.

*Material examined* : Material not available, description based on literature.

*Diagnosis* : Size small, 4–6 mm long. Yellow brown anteriorly. Dorsal bundle of setae consist of 2–5 needles and 1–5 stiff hairs needles with sharp long tip, single pointed; ventral setae 2–5 per bundle, bifid crotchets, those of II to V segment much longer, thinner and straighter than the rest, having distal tooth longer than proximal and slightly thinner with proximal nodulus, others having the teeth equally long and nodulus distal. Dorsal vessel to the left to the gut, peneal setae 2–3 on each side with simple fork.

*Habit* : Swim with spiral movement in fresh water habitat.

*Distribution* : INDIA : West Bengal, Kolkata; Uttar Pradesh. *Outside India* : Europe and N. America.

12. *Nais simplex*, 1906

1906. *Nais variabilis var. simplex* Piguet, *Rev. Suisse. Zool.*, **14** : 260-266 pl. XL, Fig. 22-24. pl. XII, Fig. 1-3, 14.
1909. *Nais simplex* : Spencer, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 120.

*Material examined* : Material not available, description based on literature.

*Diagnosis* : Size small, 8 mm long. Pigmented. Dorsal bundle of setae begin in VI segment, consisting of 1–2 hairs and 1–2 needles per bundle, needle single pointed; ventral setae beginning in the II segment, 2–6 per bundle, those of II to V segments longer, straighter and thinner than the rest with proximal nodulus and having distal tooth twice the length of the proximal, others have 2–5/bundle, shorter and the teeth are about equally long. Dorsal vessel to the left of the middle line.

*Habit* : Swim with spiral movements among weeds in calm water.

*Distribution* : INDIA : West Bengal, Bankura, Howrah and 24 Parganas districts. *Outside India* : Europe; N. America.

Genus *Slavia* Vejdovsky, 1883

1883. *Salvina* (Part) Vejdovsky, *Sitz. ber. Bohn. Ges. Naturw. Prag.*, 1883, p. 219.
1980. *Salvina* : Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 88.

*Type species* : *Salvina appendiculata* (d'udekem, 1855).

*Diagnosis* : Body wall provided with rows of sensory papillae and usually surrounded by adhering foreign matter. Dorsal setae beginning in IV or VI segment with hair and single pointed distally curved needles. Ventral setae consist of double pronged crotchets. Clitellum embracing segment V and VI. Oesophageal and pharyngeal glands present. Pineal setae present.

*Distribution* : Europe : Asia; India; and S. America.

13. *Slavina appendiculata* (d'ekem, 1855)

1855. *Nais appendiculata* d'ekem, *Bull. Acad. R. Belg.*, **22** : 552. pl. Fig. 3.
1883. *Slavia appendiculata* Vejdovsky, *Sitz. ber. Bohn. Ges. Naturw. Prag.*, **1883** : 219.
1980. *Slavia appendiculata* : Spencer, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 120.

*Material examined* : Material not available, description based on literature.

*Diagnosis* : Dorsal setae starts from VI segment, consisting of 1–2 stout hairs and 1–2 needles per bundle, hairs of VI segment much longer than others, sometimes reaching four times the diameter of the body, needles simple pointed, suddenly tapering toward the end; ventral setae 2–5 per bundle bifid thinner in II to V segment and longest in II, all having proximal nodulus and angular proximal

bend and distal tooth thinner and slightly longer than proximal. Size small upto 8 mm; segments upto 45.

*Habit* : Live in association with bryozoans; not swimming.

*Distribution* : INDIA : West Bengal, Kolkata. *Outside India* : Europe; Pakistan; East Asia; North and South America.

#### Subfamily PRISTININAE Lastocuin, 1924

*Diagnosis* : Protomium forming a proboscis. Eyes absent. Dorsal setae beginning in II segment, consisting of hair and needles. Nephridia sometime invested with bladder like peritoneal cell.

#### Genus *Pristina* Ehrenberg, 1828

1828. *Pristina* Ehrenberg, *Symb. Phys.*, : 209.

1980. *Pristina* : Persia. In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 96.

*Type species* : *Pristina longiseta longiseta* Ehrenberg, 1828.

*Diagnosis* : Protomium may or may not from a proboscis. Dorsal setae begin from II, III or IV segment, consisting of hairs and needles with simple and bifid tip; ventral setae of one type only. Setae and septal glands well developed. Nephridium beginning from XI segment. Budding zone present.

*Distribution* : Cosmopolitan.

#### Key to the species

1. Hair setae of III segment specially elongated ..... *P. longiseta longiseta*
- Hair setae not specially elongated in any segment ..... 2
2. Giant ventral setae present in IV segment, bifid ..... *P. acquiseta*
- Giant ventral setae absent ..... *P. proboscidea*

#### 14. *Pristina longiseta longiseta* Ehrenberg, 1828

1828. *Pristina longiseta* Ehrenberg, *Syrnub. Phys.*, p. 112 (Footnote).

1948. *Pristina longiseta longiseta* : Sperber, *Zool. Bidr. Uppsala*, **28** : 236-237 pl. XXI, Figs. 2, 6.

*Material examined* : Material not available description based on literature.

*Diagnosis* : Prostomium with a mobile proboscis. Dorsal bundle of setae starts from II segment and consists of 1–3 hair and 1–3 needles; size very small, 6 mm long slender light yellow; hair setae of III segment specially elongated, straight, non serrate and mobile, reaching beyond tip of proboscis when turned forward, those in others nearly straight; needles fine, straight, distal end

simple pointed, curved; ventral setae 4–5/bundle anteriorly, longest in II and III segment, medium to in others. Nephridium starts from X segment clitellum in  $\frac{1}{2}$  VII to  $\frac{1}{2}$  IX (2 segments).

*Habit* : Like among algal masses in clear water; not swimming.

*Distribution* : INDIA : West Bengal, Kolkata; Maharashtra; Madhya Pradesh; Kerala and Uttar Pradesh. *Outside India* : Europe; Pakistan and Australia.

#### 15. *Pristina aequiseta* Bourne, 1891

1891. *Pristina aequiseta* Bourne, *Q. J. Mic. Sci. (N.S.)*, **32** : 352-353.

1963. *Pristina aequiseta* : Yamaguchi, *J. Fac. Sci. Hokkaido Univ; Ser.*, **6(2)** : 284-285, Fig. 4.

*Material examined* : Material not available, description based on literature.

*Diagnosis* : Dorsal setae begin in n segment, consisting of 1–2 hairs and 1–2 fine needles, hair longer than body diameter; needles bayonet shaped having distal end slightly curved, without nodulus and equal teeth; ventral setae 5–6 per bundle, bifid crotchets those of n segment much shouter than those of middle and hind segments with proximal nodules and distal tooth twice as long as proximal; in segment to V setae are shorter and thicker with distal nodulus and having distal teeth longer than proximal.

#### 16. *Pristina proboscidea* Beddard, 1896

1896. *Pristina proboscidea* Beddard, *Ergen Hamburger Malgahaensische Sammelreise, 1892/93*, **3** : 4, Fig. 18.

1980. *Pristina proboscidea* : Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 96.

1989. *Pristina proboscidea* : Mukhopadhyay, *Faune of West Bengal, Part 10* : 111-112.

*Material examined* : Material not available, description based on literature.

*Diagnosis* : Dorsal setae begin II segment consisting of hair and needles, 1–4 each per bundle; needles simple pointed, straight and fine, modulus absent, hairs serrated and none specially elongated; ventral setae vary in number 2–4 anteriorly, may go uptoa posteriorly, uniform all through distal prongs longer than proximal those of segment II longer and thinner than the rest. Prostomium continuous as a proboscis of varying length. Size small. Nephridium begins from IX segment.

*Habit* : Live in association with fresh water sponges, not swimming.

*Distribution* : INDIA : West Bengal, Bankura and Kolkata districts. *Outside India* : Africa; E; E. Asia; Java; S. America.

*Habit* : Usually live in association with freshwater sponges. Also live in oligohaline water.

*Distribution* : INDIA : West Bengal- Kolkata, Andhra Pradesh. *Outside India* : Europe; Pakistan, West Indies.

## Family TUBIFICIDAE

*Diagnosis* : Moderate to large in size; length may extend upto 200 mm; Pale to deep red in colour; muscular both dorsal and ventral setae starting from segment II, dorsal setae either bifid to pectinates setae number varying asexual reproductive does not occur.

*Distribution* : Tibet; China; India; Japan; Malay; North and south America.

## Key to the genera

1. Gills present in dorsal and ventral series ..... *Branchiura*  
 — Gills absent ..... 2
2. Prostomium with a sensory pit ..... *Borthroneurum*  
 — Prostomium without sensory pit ..... *Limnodrilus*

Genus *Branchiura* Beddard

1892. *Branchiura* Beddard, *Quart J. Micr. Sci.*, **33** : p. 325.

1989. *Branchiura* : Mukhopadhyay, Fauna of West Bengal, Part 10 : 113.

*Type species* : *Branchiura sowerbyi* Beddard, 1892.

*Diagnosis* : Dorsal bundle with hair setae along with single pointed or bifid crotches. Posterior segments with paired gills on mid dorsal and mid ventral.

*Distribution* : Cosmopolitan.

17. *Branchiura sowerbyi* Beddard 1892

1892. *Branchiura sowerbyi* Beddard, *Q. J. Mic. Sci.*, **33** : 325-340. pl. XIX. Figs. 1-5.

1980. *Branchiura sowerbyi* : Persia; In : *Aquatic Oligochaeta Biology*, Brinkhurst and Cook (Eds.) : 103.

*Material examined* : South 24 Pgs. (Chulkunir Beel, 10 km, south-west of Ghatakpukur bus stand; 5 exs., Tollygunge Pond (South Kolkata); 3 exs., Coll : T. Biswas and C. K. Mandal.

*Diagnosis* : Size large, 50–80 mm; robust dark brown. Posterior third with hollow mid-dorsal and mid-ventral gills serially arranged, a pair per segment gradually increasing in length to reach a length of the widest diameter of the body, about 50 to 150 pairs; these are contractile and each enclose a vascular loop. Dorsal bundle of the setae begin in II segment, having 2–4 hairs and 2–6 crotchets per bundle hairs bayonet shaped, longest anteriorly decreasing gradually in the branchial region; crotches bifid with proximal prongs longer than distal sometime pectinate; ventral setae 4–6/bundle anteriorly 1–2 posteriorly, nodulus distal simple pointed or bifid nephridium begin in IX–XII segment peneal setae absent.

*Habit* : Worms live in clayey silt at bottoms of tanks, canals and even drains along with *Limnodrilus hoffmeisteri*, when disturbed coil into spirals immediately. The branchial region is easily detachable.

*Distribution* : INDIA : West Bengal, Burdwan, Hooghly, Kolkatta, Malda, Purulia district; Madras, Manipur and Uttar Pradesh. *Outside India* : Africa; Europe; China; Japan.

#### Genus *Bothrioneurum* Stolc, 1888

1888. *Bothrioneurum* Stolc, *Abhik Bohn. Ges.Wiss.*, p. 43.

1980. *Bothrioneurum* : Persia, In : *Aquatic Oligochaeta Biology*, Brinkhurst and Cook (Eds.) : 103.

1989. *Bothrioneurum* : Mukhopadhyay, In State Fauna Series : Fauna of West Bengal. Part 10 : 113.

*Type species* : *Bothrioneurum vej dovskyauum*, Stolc, 1888.

*Diagnosis* : Prostomium with a sensory pit. Both dorsal and ventral bundle of setae consisting of bifid crotches; hair setae absent special branchial region in the body absent.

*Distribution* : Cosmopolitan.

#### 18. *Bothrioneurum iris* Beddard, 1901

1901. *Bothrioneurum iris* Beddard, *Proc. Zool. Soc. London*, 1, 81, text Figs. 8-10.

1989. *Bothrioneurum iris* : Mukhopadhyay, Fauna of West Bengal, Part 10 : 113.

*Material examined* : North 24 Paraganas; Bangaon road side pond; 4 exs., Shriampur Doctor Bagan Lane (Hooghly); 3 exs., Krishnapur road side pond (North Kolkatta); 2 exs., Coll. T. Biswas and C. K. Mandal.

*Diagnosis* : Prostomium semicircular setae beginning from segment II composed of crotchets 4 per bundle; dorsal crotchets having distal prong thinner and shorter than proximal one; ventral crotches having distal prongs much thinner and longer in outer but shorter in inner bundles than proximal prong; clitellum covering XI to XII segment nephridium beginning on VII segment.

*Habit* : Live usually in soft mud of ponds and lakes; coil up readily when disturbed.

*Remark* : This species is first time recorded from Kolkatta.

#### Genus *Limnodrilus* Claparede, 1862

1862. *Limnodrilus* Claparede, *Mem. Soc. Phys. Hist. nat. Geneve*, 16 : 248-252, pl. I, Figs. 1-3; pl. II, Fig. 12; pl. IV, Fig. 6.

1980. *Limnodrilus* Persia, In : *Aquatic Oligochaeta Biology*, Brinkhurst and Cook (eds).

*Type species* : *Limnodrilus hoffmeisteri*, Claparede, 1862.

*Diagnosis* : Dorsal and ventral bundles of setae are bifid crotches of same type; hair setae absent. Vascular net work in posterior part of the body lateral pulsative heart in VIII segment testes in X and ovaries in XI segment.

*Distribution* : Cosmopolitan.

### 19. *Limnodrilus hoffmeisteri* Claparede, 1862

1862. *Limnodrilus hoffmeisteri* Claparede, *Mem. Soc. Phys. Hist. nat. Geneve*, **16** : 248-252, pl. I, Figs. 1-3; pl. II, Fig. 12; pl. IV, Fig.
1912. *Limnodrilus socialis* Stephenson, *Roy. Soc. Edin*, **48** : 294-302, pl. II, Figs. 1-3, 6, p. 93, pl. VI, Figs. 6-7.
1980. *Limnodrilus hoffmeisteri* : Persia, In : *Aquatic Oligochaete Biology*, Brinkhurst and Cook (Eds.) : 99.
1989. *Limnodrilus hoffmeisteri* : Mukhopadhyay, In : *State Fauna Series : Fauna of West Bengal, Part 10* : 114.

**Diagnosis** : Size large, 70–80 mm, brown anteriorly and light posteriorly. Posterior portion whip like and without setae (achaetous). Both dorsal and ventral bundle of setae start from II segment and are bifid crotchets of one type only, having both prongs equal in length, the distal prong thinner; dorsal bundles consisting of 6–7 setae in anterior, 3–5 in the middle and 1–2 setae in hind segments, thinner and shorter than the setae of ventral bundles. Nephridium begins between VIII and IX segment. Clitellum embraces XI segment, opaque white.

**Habit** : These worm live buried in soft clay or mud in clear, turbid even foul water and perform wavy movements of the hind portion and disappear in the mud the moments they are disturbed.

**Distribution** : INDIA : West Bengal, Burdwan, Coochbihar, Howrah, Jalpaiguri, Malda, Midnapur, Nadia and Purulia district; Andhra Pradesh; Karnataka. *Outside India* : Europe, Pakistan, Turkey, China, Java, Japan, Malay and S. America.

### SUMMARY

The paper deals with description distribution, key for identification of 19 species under 10 genera of fresh water aquatic Oligochaeta hitherto known from Kolkata and its adjacent areas. 7 species and 5 genera have been collected in present surveys and two species are first time reported from Kolkata. A classified upto date list of aquatic oligochaetes of Kolkata and adjacent areas has been furnished.

### ACKNOWLEDGEMENTS

I am thankful to the Director, Dr. J.R.B. Alfred and Sri. A.K. Singh, Officer-in-Charge, F.P.S. Building, Dr. A.K. Misra, Officer-in-Charge, General Non-Chordata Section, Dr. A.K. Sanyal, Officer-in-Charge, Technical Section of Zoological Survey of India for the facilities and necessary help and suggestions provided to the authors for undertaking the tour. I am also grateful to S.K. Mukherjee for his constant encouragement, inspiration, active support in many ways.

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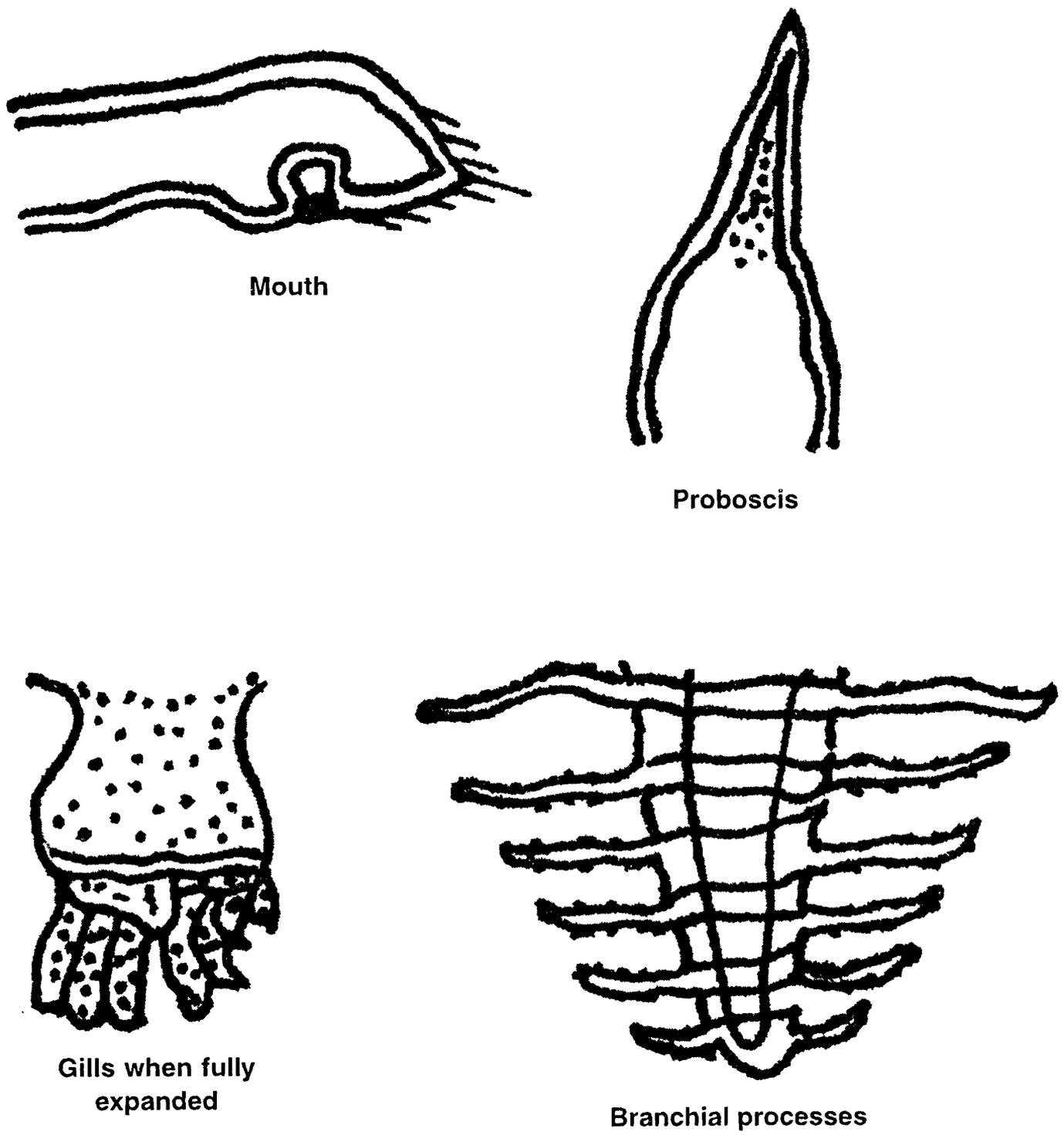


Fig. 1.

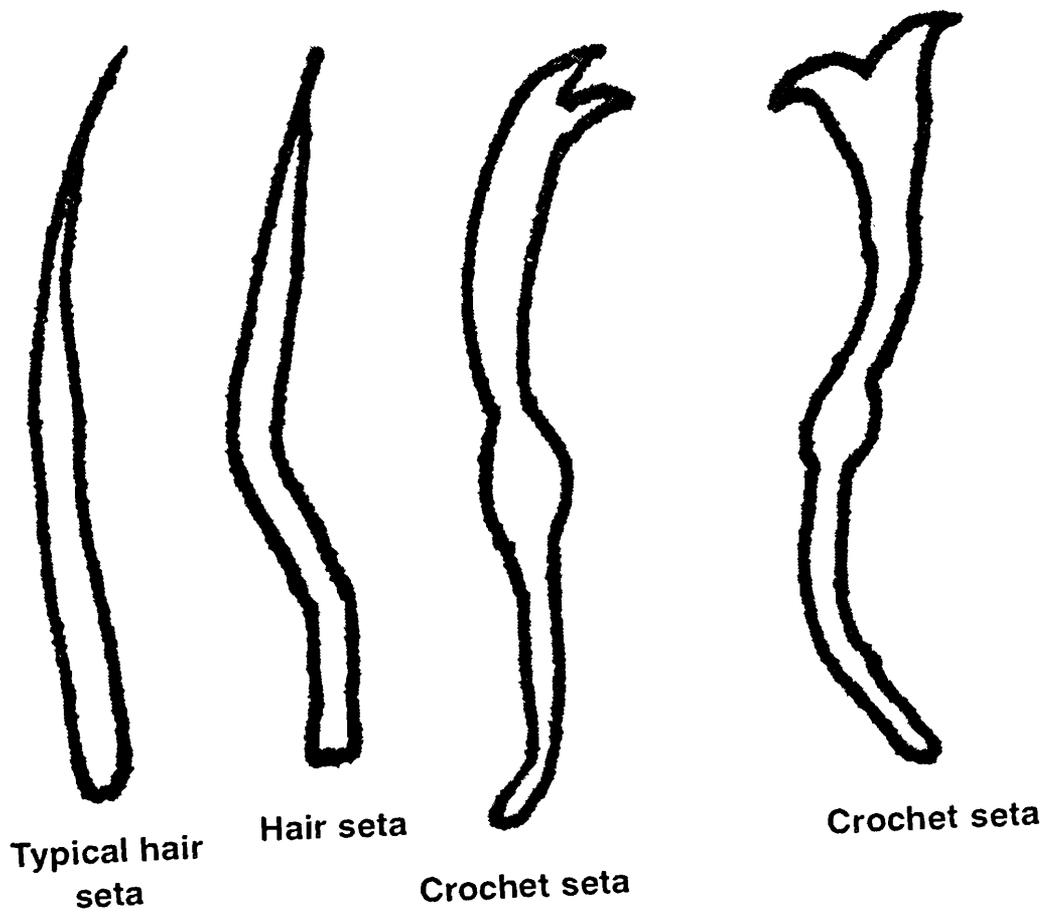
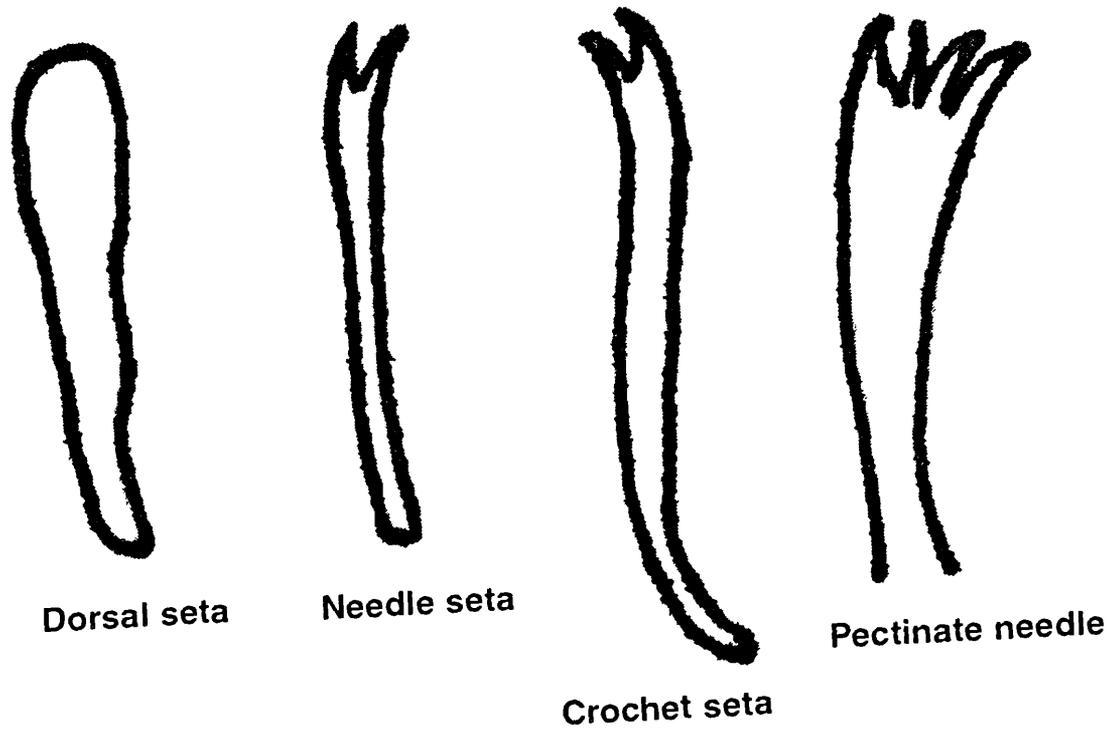


Fig. 2.