

*Glyceriform polychaetes
of
Andaman and Nicobar Islands*



A guide for identification

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Preface

Polychaetes commonly called as segmented worms, are the most abundant and diverse group among invertebrates in marine sediments. They are distributed world-wide, from intertidal to deep sea habitats, with certain species adapted to survive even in extreme conditions. They play a major role in marine realm forming an integral part in benthic pelagic coupling. The species composition of polychaetes has been well studied in the continental margin of peninsular India (Arabian Sea and Bay of Bengal). But studies on polychaetes around oceanic island margins (Andaman and Nicobar Islands, Lakshadweep Islands) of Indian EEZ are very limited. The development of regional identification guides for polychaetes with descriptions, drawings, photographs of respective regions is a necessity. It will be a useful tool for the taxonomists and ecologists working in the region for biodiversity assessments, description of new species and new records and updating the checklist of species. This e-book is based on the species collected as part of the effort of Marine Living Resources Programme (MLRP), Ministry of Earth Sciences based on the benthic surveys conducted around Andaman and Nicobar Islands at a depth range of 50-200m. The e-book includes the 18 species recorded under the suborder Glyceriformia, with their collection and preservation techniques, classification, descriptions, drawings and distribution in Indian Ocean etc. This e-book will form an identification guide for the researchers and students working on marine worms especially in the field of marine benthos.

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Introduction to polychaetes

Polychaetes (poly=many, chaeta=bristles) is a class under Phylum Annelida with usually marine forms distributed widely from poles to tropics. Majority of the polychaetes species are benthic forms, while some pelagic species. Based on the body structure, feeding habits etc. polychaetes are of two different types- Errants and Sedents. Errants have well-developed parapodia, which make them fast crawlers and swimmers and are scavengers or predators as they possess strong jaws. Sedents are tube dwelling or burrowing forms, with reduced parapodia (uncini), mainly feeding on deposited organic matter (deposit feeders) on the sediment or suspended particles (suspension feeders) in the water column (Fauchald and Jumars, 1979). The substratum, mainly sediment texture and grain size along with organic matter in the sediments, are main factors for their establishment in a region (Gray and Elliott, 2009) along with bottom water dissolved oxygen, temperature and salinity. In addition, bottom currents also play a major role in their colonisation.

Polychaetes play a key role in benthic-pelagic coupling in the marine realm (Griffith et al., 2017). They are major contributors of secondary production, as they obtain energy by feeding on other organisms or detritus falling on the sediments. They form a key link in the energy transfer between primary producers and tertiary consumers especially by forming food of demersal fishes and shellfishes (Parulekar et al., 1980). Organic matter falling on the sediments are ingested by polychaetes and egested as faecal pellets. These faecal pellets are degraded by microorganisms and release nutrients back to water column. The reworking of sediment particles by polychaetes through movement, tube building and sediment engulfing enhances pore ventilation, and mixing of organic matter to deeper layers of sediments, which makes the organic matter available for microbial remineralization – a process termed as ‘bioturbation’ (Hutchings, 1998). Most of the polychaetes have meroplanktonic larval stages, thereby connects benthic and pelagic realms. Polychaetes are found in extreme environmental environments like hydrothermal vents, methane seeps, cold seeps, and oxygen minimum zones etc. as certain species are well adapted to these conditions (Levin, 2003). Due to the sedentary nature and their ability to respond environmental stress, polychaetes can be used as indicators of organic enrichment, organic contaminants, heavy metals etc.

Study Area

The Andaman and Nicobar Islands are one of the significant oceanic islands in the northern Indian Ocean. It lies between 6° N and 14° N latitude and 92° E to 94° E longitude. The Andaman and Nicobar Islands, comprise of 572 islands and the island arc separates Bay of Bengal and Andaman Sea. These islands are volcanic in origin, located on the Andaman Nicobar Ridge system, at the edge of the Burma plate. The islands are covered by fringing reefs (Brown, 2007) and the uniqueness of the Andaman and Nicobar Islands, is that it houses rich biodiversity, with tropical rainforest and coral reefs. The position of this archipelago among repositories of biodiversity like the Indian subcontinent, Myanmar, Malay Archipelago, Sumatra and coral triangle through Malacca Strait, makes it an exceptional biodiversity hotspot.

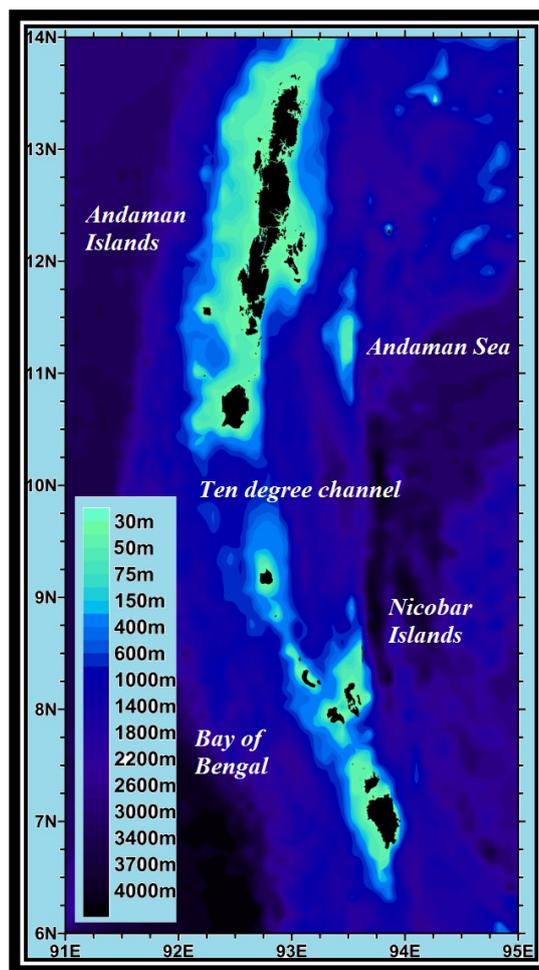


Fig.1. Map of Andaman and Nicobar Islands

Sampling and Preservation

Systematic stratified sampling was carried out onboard Fishery and Oceanographic Research Vessel (FORV) *Sagar Sampada* along the insular margin of the Andaman and Nicobar archipelago in three depth strata - 50m, 100m and 200m. A modified Smith-McIntyre grab was used for collecting sediments (Eleftheriou, 2013). Test sieve of 300 μ m were used for separating polychaetes and the residual sediments were collected in a tray. The organisms were narcotised using magnesium chloride solution and kept for 10 min. Then the organisms were preserved in 8% buffered formalin solution and labelled. Polychaetes were stained using Rose Bengal solution. The pink colour stained polychaetes were sorted out of the sediments using fine forceps.

Polychaetes were identified to family and genus level using stereozoom microscope (Leica EZ4) and up to species level using compound microscope (Leica DM1000). The identification of polychaetes up to family and genus levels was done using standard keys of Fauchald (1977) and Rouse and Pleijel (2001). Species identification was done using standard keys (Fauvel, 1953; Day, 1967), taxonomic revisions (Glyceridae: Böggemann, 2002, 2005) and species reported from Andaman Sea (Böggemann and Eibye-Jacobsen, 2002) and other areas of the world in the tropical zone (e.g. Uebelacker and Johnson, 1984). Validity and status of taxa (species, genera etc.) were checked and updated using the World Register of Marine Species (WoRMS, 2020). The distribution of species was based on the records of Ocean Biogeographic Information System (OBIS) and WoRMS.



Fig.2. Smith-McIntyre Grab sampler (Photo courtesy: CMLRE)

Classification

Kingdom: Animalia

Phylum: Annelida

Class: Polychaeta Grube, 1850

Subclass: Errantia Audouin & H Milne Edwards, 1832

Order: Phyllodocida Dales, 1962

Suborder: Glyceriformia

Glyceriformia includes 4 families

- **Glyceridae** Grube, 1850
- **Goniadidae** Kinberg, 1866
- **Paralacydoniidae** Pettibone 1963
- **Lacydoniidae** Bergström, 1914

Identification Characters of Families

Glyceridae are called as blood worms, which are found venomous causing inflammations in the skin after the bite (Böggemann, 2002). They are distributed from intertidal to abyssal depths. Glyceridae and Goniadidae possess elongate body, with numerous segments giving them a visual similarity. But there are remarkable variations in their body appendages and proboscis. In Glyceridae, the prostomium is long, annulated and conical bearing 4 antennae at its tip. Proboscis is very long, with dense papillae of different types arranged in a manner. The jaw supports or ailerons are V shaped, which vary in shapes among species. In Goniadidae, the prostomium is similar to Glyceridae, but marked variations are present in the case of proboscis. Proboscis bears papillae, with jaws supported by large teeth or macrognaths and denticles or micrognaths which forms a circle around the mouth. V shaped chevrons are arranged in longitudinal row on either side of proboscis is a sole feature in Goniadidae. The number and shape of macrognaths, micrognaths and chevrons (number only) vary among species which form the major identification character. In Glyceridae, the first chaetiger bears uniramous parapodia and rest of the body bears biramous parapodia while in Goniadidae, the anterior region bears uniramous parapodia and posterior region with biramous parapodia. Branchiae is present in Glyceridae while it is absent in Goniadidae. Both families have capillaries as notochaetae and compound spinigers as neurochaetae.

The families Paralacydoniidae and Lacydoniidae have similarities among each other, as the Paralacydonia was under the family Lacydoniidae, later it was erected as separate family (Pettibone, 1963). Prostomium truncate in Paralacydoniidae, whereas rounded in Lacydoniidae with both bearing a pair of antennae and palps. Large, single pair of eyes in Lacydoniidae while small subdermal eyes in Paralacydoniidae. In Lacydoniidae, a pair of cirri present in peristomium with next 2-3 segments uniramous and subsequent segments with biramous parapodia. In Paralacydoniidae, cirri absent with peristomium being apodus, with next one segment only uniramous and all other segments bears biramous parapodia. Both families bear notochaetae as simple capillaries and neurochaetae as compound spinigers.

Family: Glyceridae Lamarck, 1818

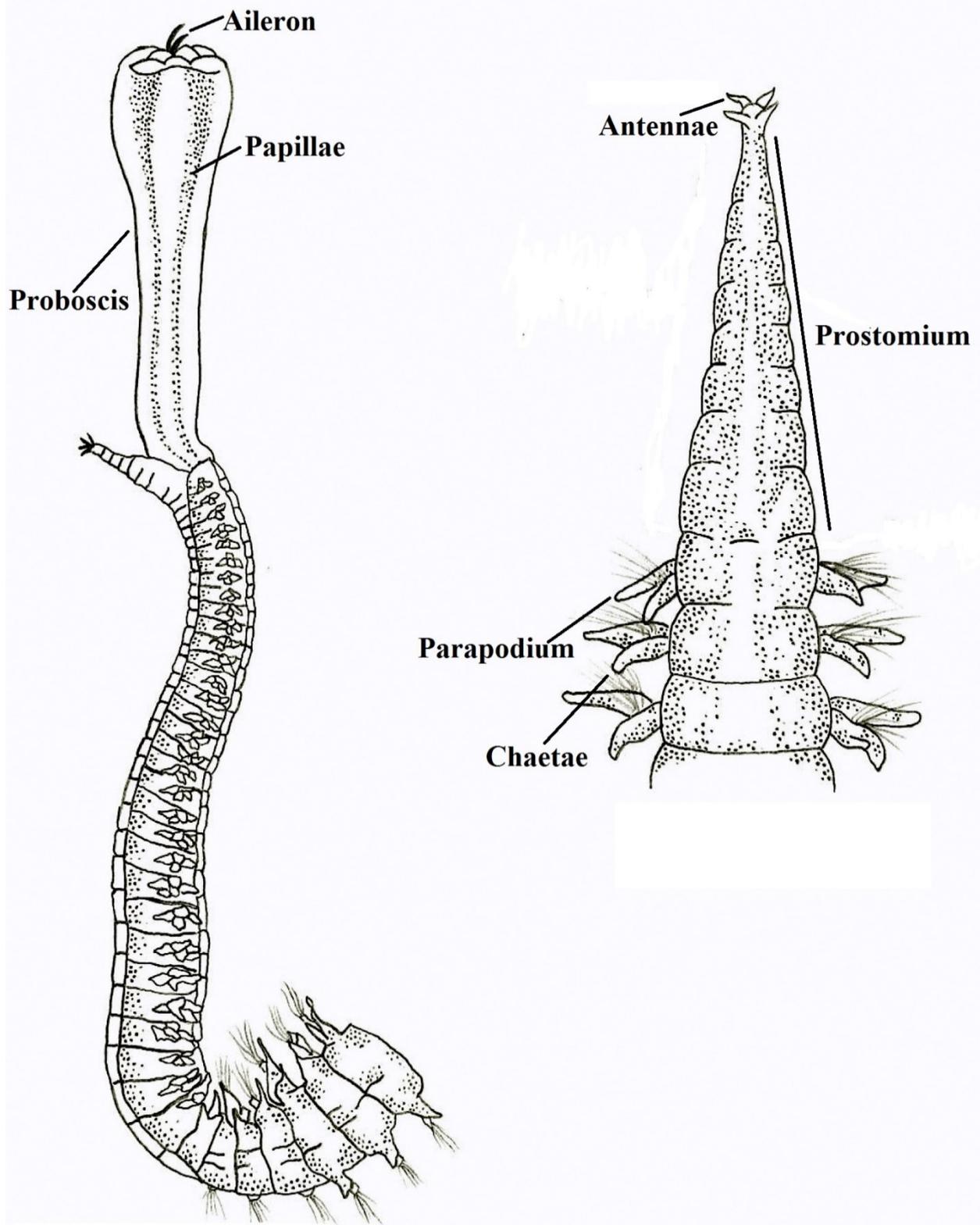


Fig.3. Identifications characters of the family Glyceridae

Family: Goniadidae Kinberg, 1866

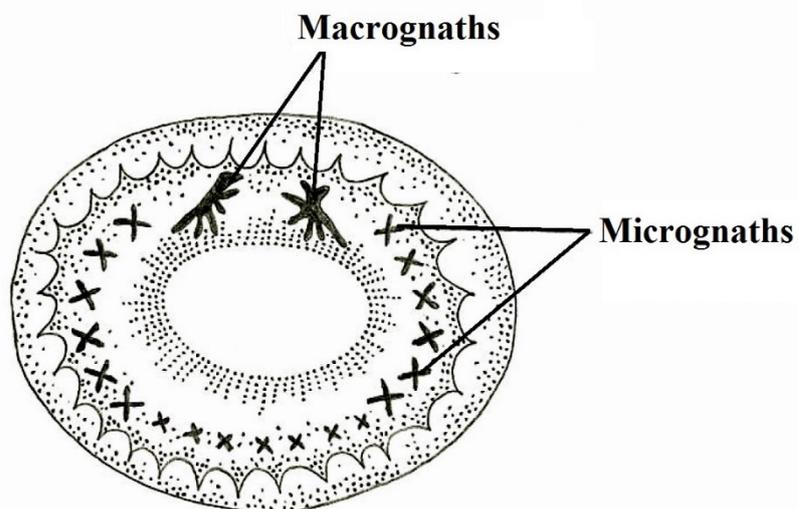
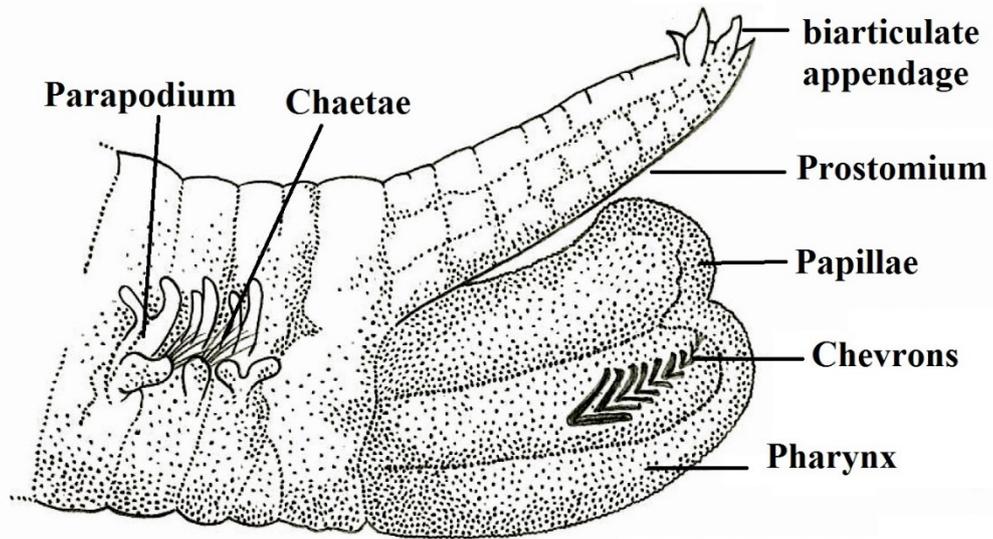
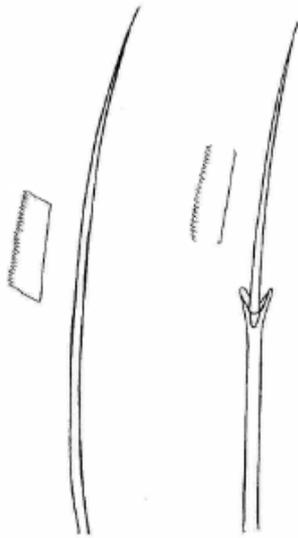


Fig.4. Identification characters of the family Goniadidae and the cross section of the jaw

Glycera



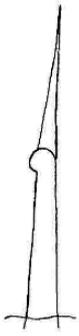
Notochaetae Neurochaetae

Goniada



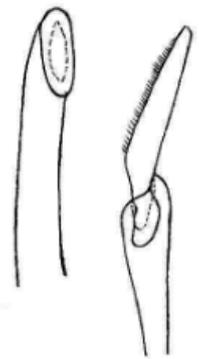
Notochaetae Neurochaetae

Glycinde



Notochaetae

Goniadopsis



Notochaetae Neurochaetae

Goniadella



Notochaetae Neurochaetae

Fig.5. Chaetae in different genera of glyceriform polychaetes

Family: Glyceridae Lamarck, 1818

***Glycera alba* (O.F. Müller, 1776)**

Type locality: Norwegian EEZ

Description: Prostomium (9-11 rings) conical in shape. Proboscis bearing 3 types of papillae: 1) numerous papillae with terminal fingernail structure with long stalk and some longitudinal ridges on nail; 2) less numerous digitiform papillae with straight, median longitudinal ridge; 3) isolated, broader, oval to globular papillae without ridges. The base of ailerons is pointed and triangular. The parapodia of first 2 segments are uniramous while all other chaetigers bear biramous parapodia. The parapodia middle portion bears 2 slender triangular to digitiform prechaetal lobes of about same length and two shorter postchaetal lobes, with slender triangular short notopodial lobe, more or less rounded neuropodial lobe. Dorsal cirri conical to oval in shape, starting from chaetiger 3 inserted on body wall slightly above parapodial base. Ventral cirri slender, triangular to digitiform in shape. It is as long as neuropodial postchaetal lobe in the anterior chaetigers whereas in posterior parapodia it becomes slender and elongated. Branchiae simple and digitiform situated dorsal side of parapodia, starting from chaetiger 17–23 as long as prechaetal lobe.

Distribution: Red Sea, Madagascar, Thailand, India - Arabian Sea, Andaman and Nicobar Islands

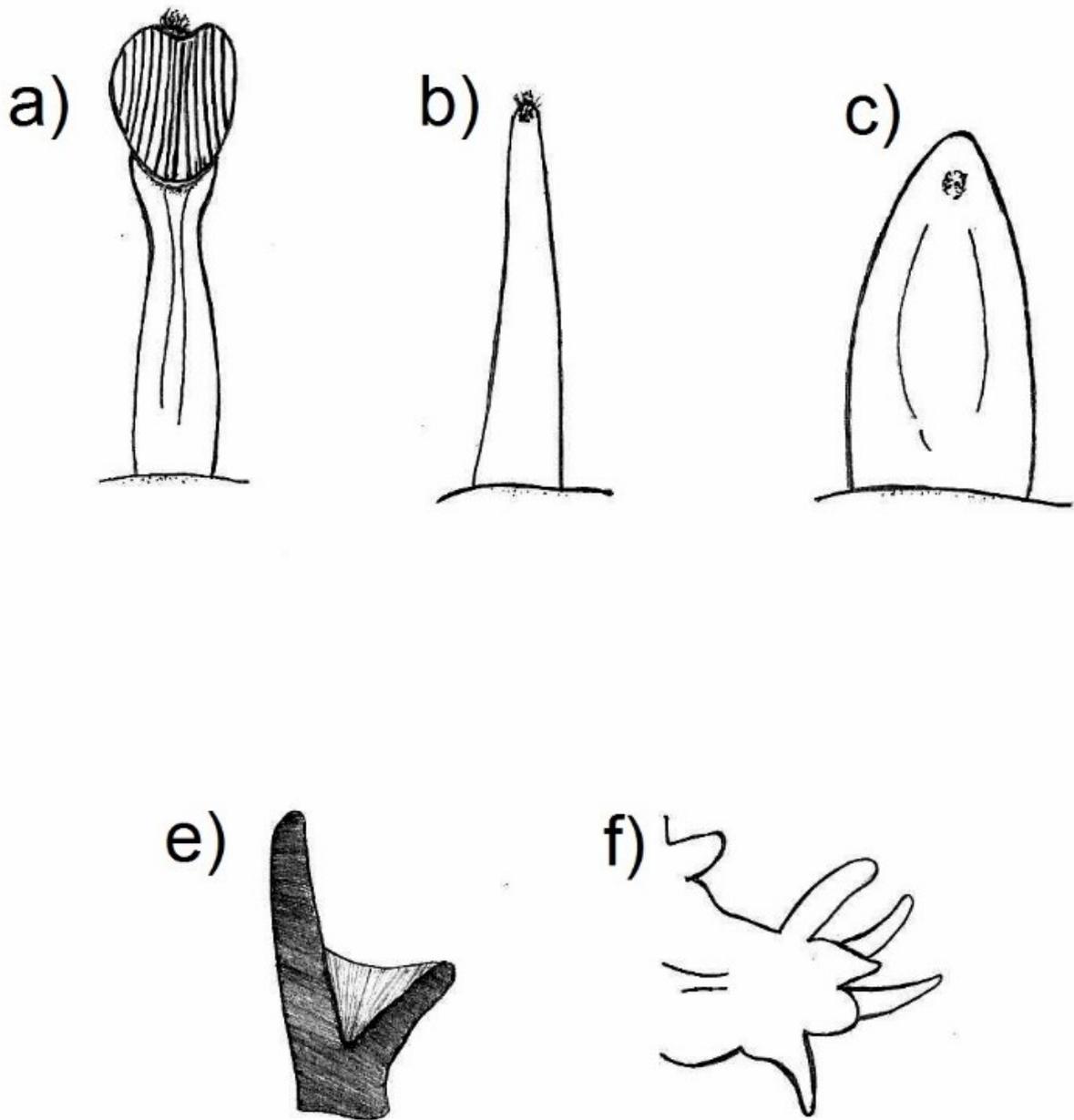


Fig.6. a, b, c) Proboscideal papillae, e) Alieron, f) Parapodia

***Glycera benguellana* Augener, 1931**

Type locality: Southwest Africa

Description: Prostomium long, with numerous indistinct rings. Proboscis with 2 types of papillae 1) few broadly conical papillae and 2) numerous digitiform ones with 10-16 rings. Aileron are blade-like, the shorter limb being a mere expansion at the base of the other. Parapodia with two triangular prechaetal lobes with superior one is slightly shorter in the middle of the body and in posterior segments. The postchaetal lobe is low and rounded. Dorsal cirrus is relatively large and arises in the junction of the parapodium with the body. Branchiae absent.

Distribution: Africa, India - Arabian Sea, Andaman and Nicobar Islands

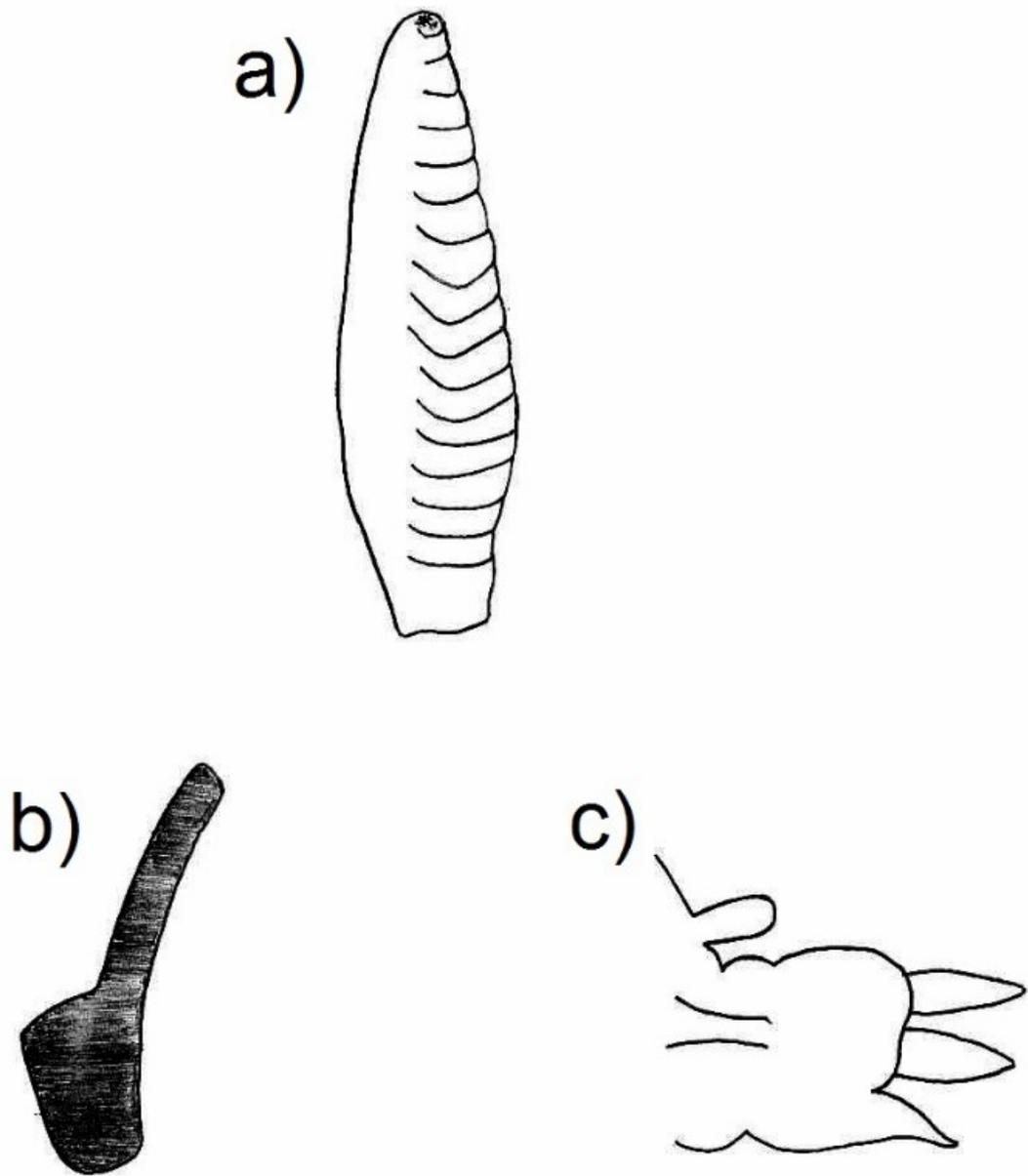


Fig.7. a) Proboscideal papillae, b) Alieron, c) Parapodia

***Glycera lancadivae* Schmarda, 1861**

Type locality: Sri Lanka

Description: Prostomium (9-12 rings) conical in shape. Proboscis bearing 2 types of papillae: 1) numerous digitiform papillae with undulating ridges, 2) few shorter and broader, conical to oval papillae without ridges. Ailerons with slight dent in pointed triangular base. The parapodia of first 2 segments are uniramous while following chaetigers bear biramous parapodia. Two slender, triangular to digitiform prechaetal lobes and neuropodial lobes were twice longer than notopodial lobes. One short rounded postchaetal lobe. Dorsal cirri oval to globular in shape, starting from chaetiger 3 inserted on body wall above parapodial base. Ventral cirri slender, triangular to digitiform in shape, about as long as postchaetal lobe whereas in posterior parapodia it becomes slender and elongated. Branchiae absent.

Distribution: Red Sea, Madagascar, India - Arabian Sea, Andaman and Nicobar Islands

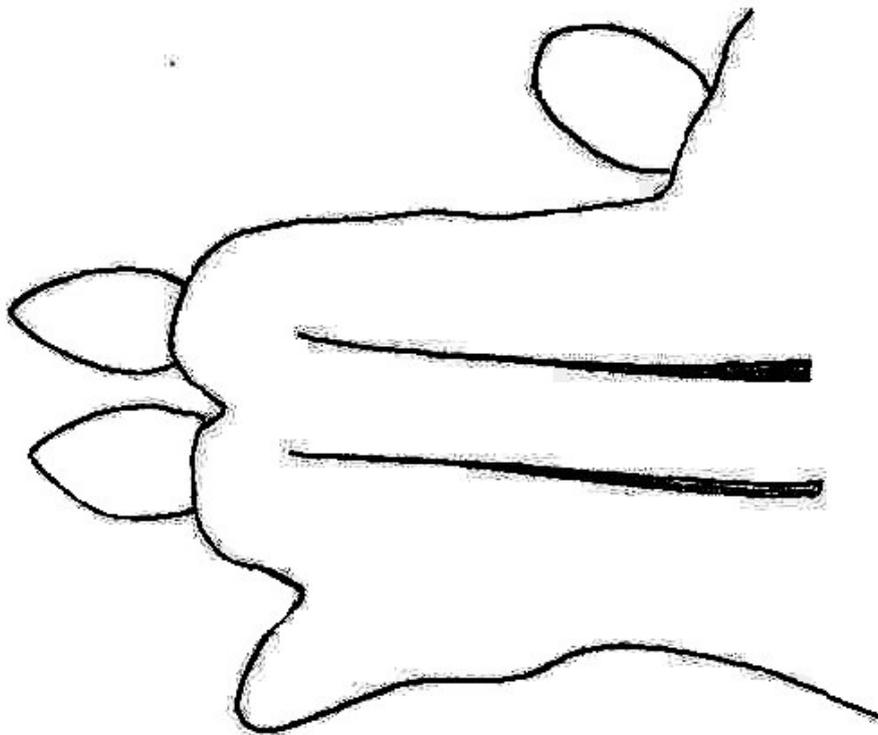


Fig.8. Parapodia

Glycera lapidum Quatrefages, 1866

Type locality: Berwick Bay, England

Description: Prostomium conical in shape and long (as long as 9 chaetigers), consisting of about 15 rings. Proboscideal papillae of two types 1) numerous, digitiform papillae sometimes with discreet undulating ridge, 2) isolated, shorter and broader, conical papillae without ridges. Aileron with pointed triangular base. The parapodia of first 2 chaetigers uniramous, following parapodia biramous, with two triangular to digitiform prechaetal lobes. Notopodial lobe usually smaller than neuropodial lobe. Single, short and rounded postchaetal lobe. Dorsal cirrus oval to round in shape, inserted dorsolaterally on body wall far from parapodial base starting from chaetiger 3. Ventral cirrus triangular to digitiform slightly smaller than postchaetal lobe, starting from first parapodium. Notosetae simple capillaries covered with minute serrations. Neurosetae compound spinigers with smooth shafts and blades with minute serrations. Branchiae absent. Pygidium rounded.

Distribution: Australia, Indonesia, India - off Cape Comorin, Andaman and Nicobar Islands

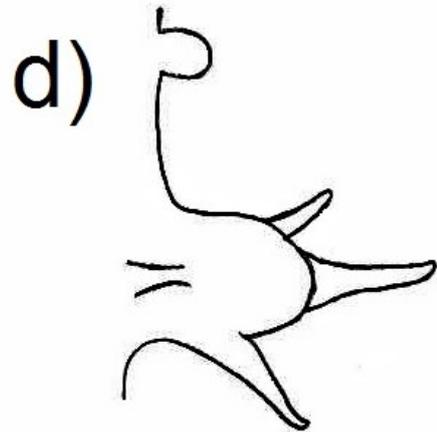
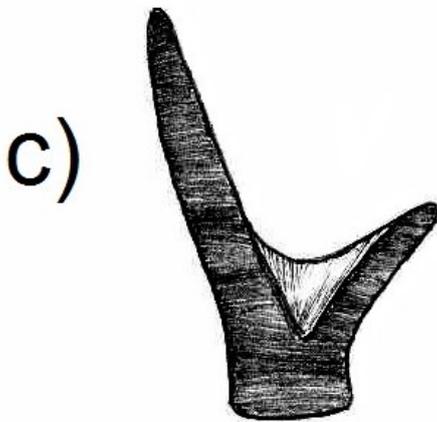
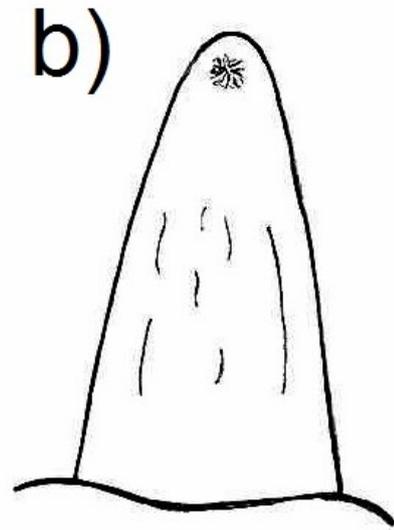
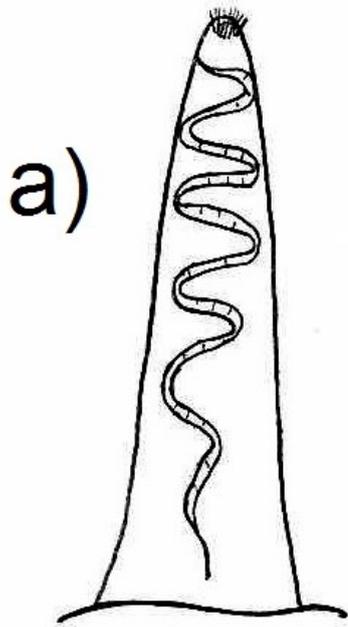


Fig.9. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

Glycera longipinnis Grube, 1878

Type locality: Philippines

Description: Prostomium (12 rings) conical in shape. Proboscis with 2 types of papillae 1) long cylindrical papillae without rings 2) few stout forms. Aileron with two long slender rami, one twice the length of the other and narrowly united at the base. Prechaetal lobes elongate, pointed and subequal whereas postchaetal lobes single low, rounded or faintly bilobed structure. Dorsal cirrus ovoid. Ventral cirrus triangular, much shorter than the prechaetal lobes. Notochaetae and neurochaetae with rows of minute spinules along the blades. Branchiae present from the 20th chaetiger. Branchiae is a single filament situated on the dorsal edge of the parapodia longer than the prechaetal lobes.

Distribution: Red Sea, Sumatra, India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

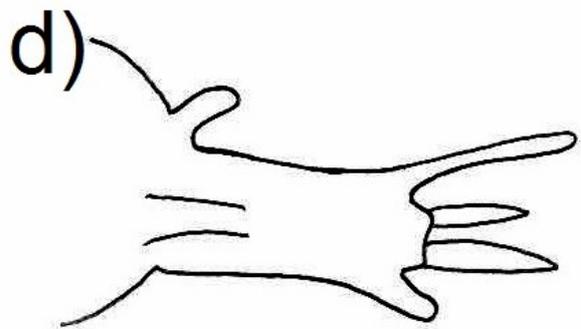
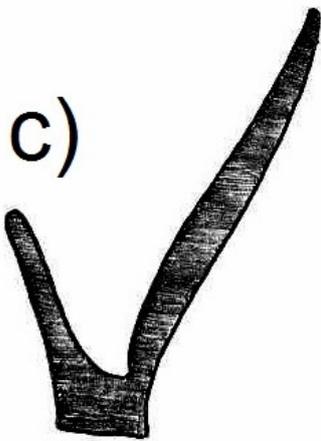
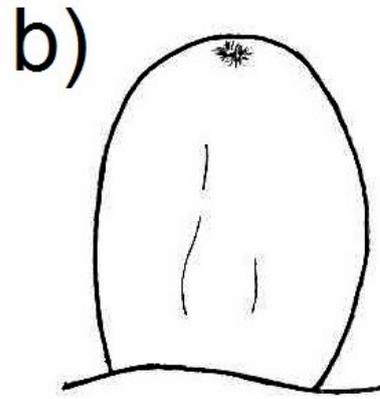
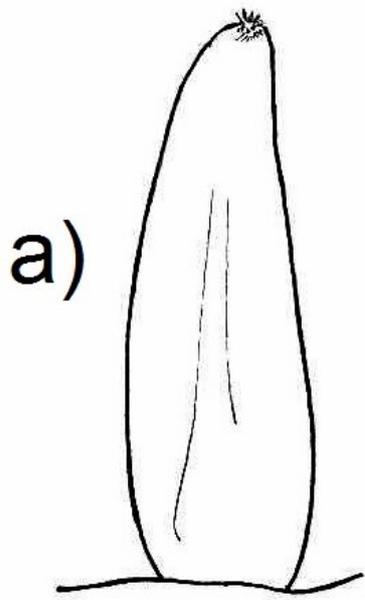


Fig.10. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

Glycera natalensis Day, 1957

Type locality: Durban, South Africa

Description: Prostomium (16-21 rings) conical in shape. Proboscis bearing 3 types of papillae: 1) numerous papillae with terminal fingernail structure with long stalk with V shaped ridges and some longitudinal ridges on nail, 2) less numerous digitiform papillae with indistinct straight, median longitudinal ridge; 3) isolated, broader, oval to globular papillae without ridges. The base of ailerons is triangular. The parapodia of first 2 segments are uniramous while all other chaetigers bear biramous parapodia. The parapodia bears 2 slender triangular to digitiform prechaetal lobes of about same length. Two shorter postchaetal lobes with rounded lobes in the anterior region whereas in the following chaetigers notopodial lobe slender triangular and slightly longer than rounded neuropodial lobe. Dorsal cirri conical to oval in shape, starting from chaetiger 3 inserted on body wall slightly above parapodial base. Ventral cirri slender, triangular to digitiform in shape, about as long as neuropodial postchaetal lobe whereas in posterior parapodia it becomes slender and elongated. Branchiae simple and digitiform, situated termino-dorsally on parapodia, starting from chaetiger 32-53rd chaetiger to near posterior end.

Distribution: Africa, Sri Lanka, India - Arabian Sea, Andaman and Nicobar Islands

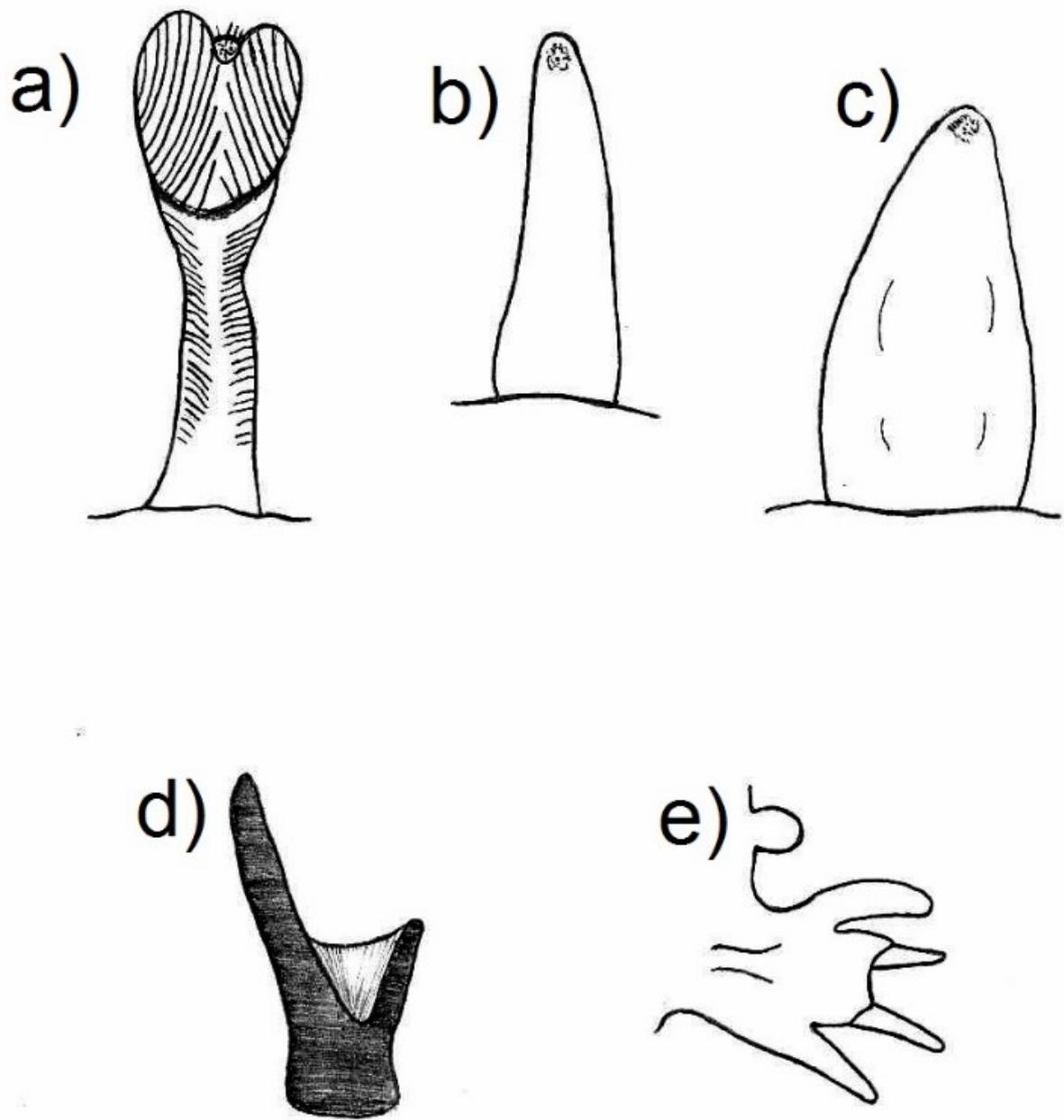


Fig.11. a, b, c) Proboscideal papillae, d) Alieron, e) Parapodia

***Glycera papillosa* Grube, 1857**

Type locality: Chile

Description: Prostomium conical with 8 rings. The papillae on the proboscis includes 2 types 1) a few ovoid forms and 2) numerous long, slender forms without rings. Aileron are deeply forked and slender, the shorter limb being half the length of the longer one and united to it. The superior prechaetal lobe is small, the inferior one large and pointed. Single rounded postchaetal lobe present. Dorsal cirrus is small arises from body wall above the parapodium. Ventral cirrus has a length of postchaetal lobe. Branchiae absent.

Distribution: India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

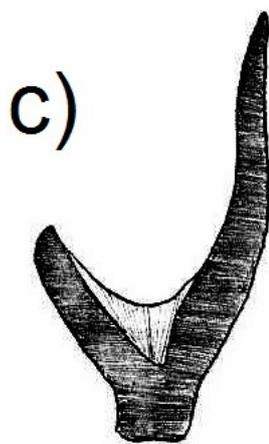
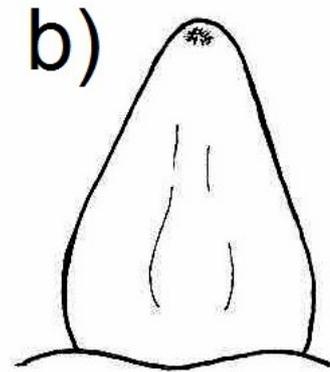
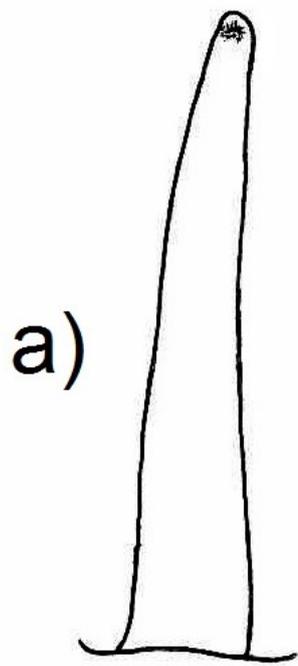


Fig.12. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

***Glycera subaenea* Grube, 1878**

Type locality: Philippines

Description: Prostomium with 8 rings. Aileron with one well developed prong and the other prong short and completely united to the first by an oblique shelf. Proboscis with 2 types of papillae 1) numerous bluntly conical papillae with 1-2 rings 2) subspherical papillae without rings. Parapodia with 2 long, equal pointed prechaetal lobes. The superior postchaetal lobe is pointed, the inferior one is shorter and blunt. Branchiae starting from chaetiger 12 situated on the anterior end of parapodium, with 2 to 5 branched digitiform lobes.

Distribution: Australia, Madagascar, India - Arabian Sea, Andaman and Nicobar Islands

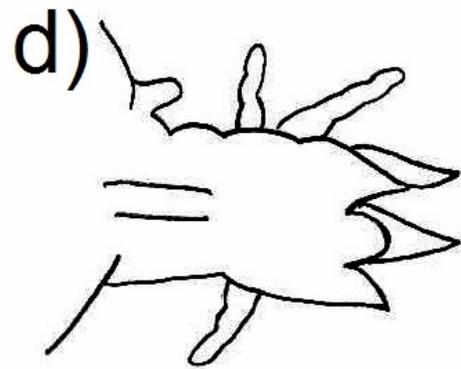
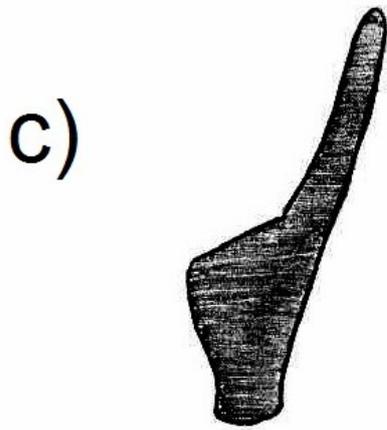
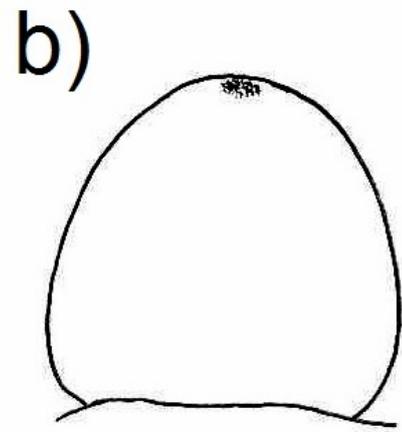
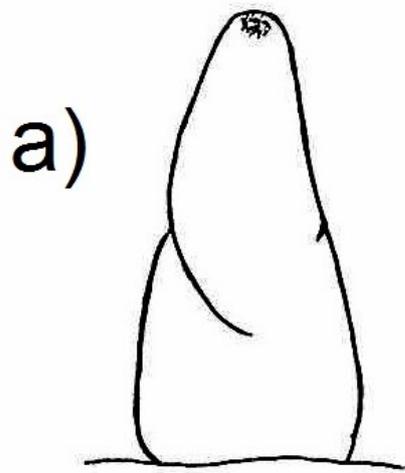


Fig.13. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

Glycera tessellata Grube, 1863

Type locality: Mediterranean Sea

Description: Prostomium conical, long (as long as first 12 chaetigers) with indistinct rings. Proboscideal papillae of two types 1) numerous digitiform papillae posteriorly with straight, median, longitudinal ridge 2) isolated, shorter and broader, conical papillae, posteriorly with more or less distinctly straight, median, longitudinal ridge. Anterior margins of both papillae smooth. Aileron with deeply incised base. Parapodia of first 2 chaetigers uniramous, with single prechaetal and postchaetal lobe. The parapodia in the subsequent chaetigers biramous, with 2 triangular to digitiform prechaetal lobes of about same length. Notopodial lobe slightly shorter than the neuropodial lobe on anterior to median parapodia whereas notopodial lobe usually slightly shorter than neuropodial lobe on median to posterior parapodia. Two short, rounded postchaetal lobes, about same length, but both lobes becoming slender on posterior parapodia. Dorsal cirrus conical to oval in shape, inserted on body wall near parapodial base starting from chaetiger 3. Ventral cirrus triangular to digitiform, shorter than the postchaetal lobes. Parapodia with simple capillary notochaetae and compound spinigerous neurochaeta. Branchiae absent.

Distribution: Red Sea, Madagascar, India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

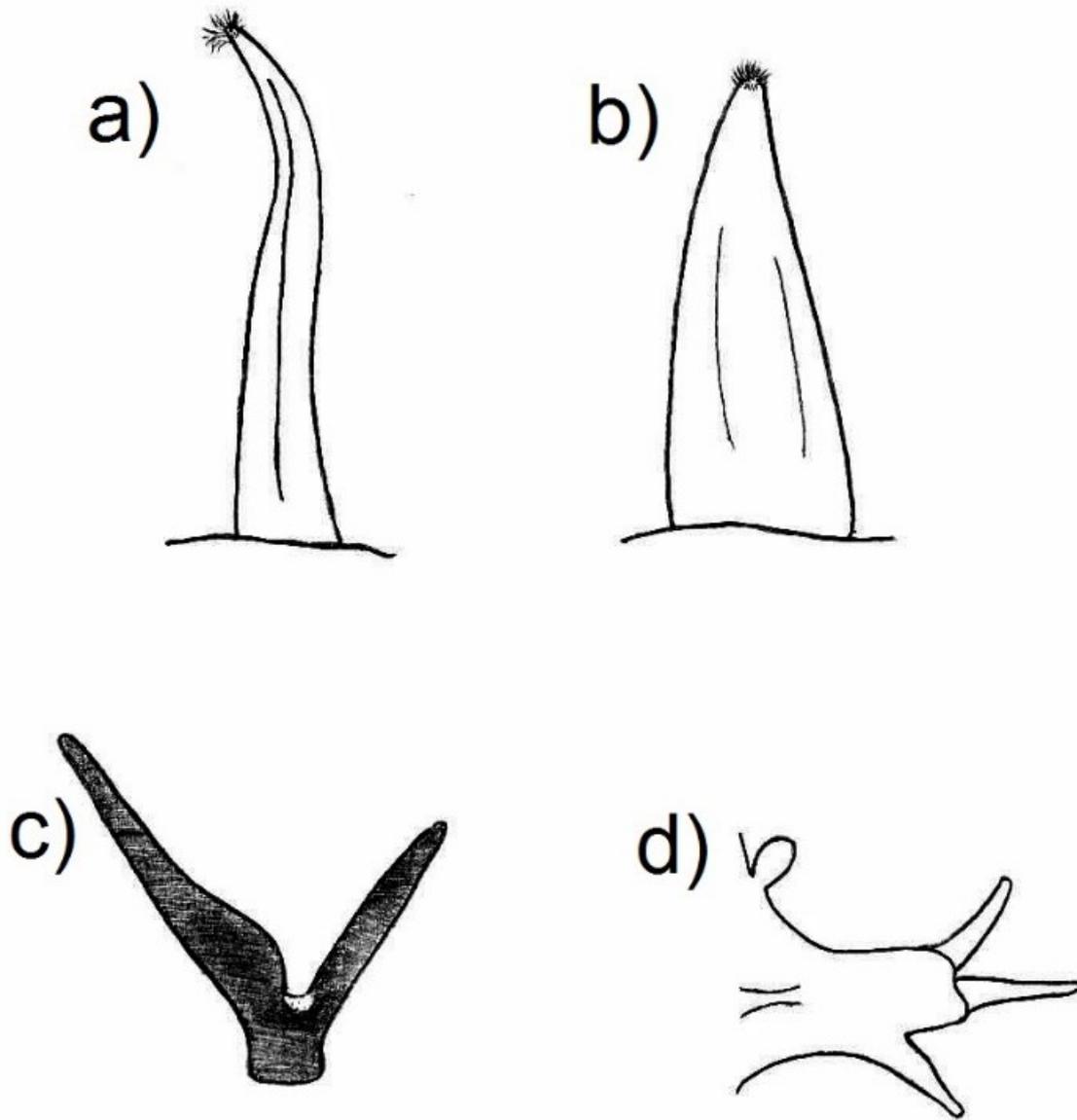


Fig.14. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

Glycera tridactyla Schmarda, 1861

Type locality: Atlantic Ocean

Description: Conical prostomium (13–15 rings) terminal ring with 4 appendages. Proboscis with 3 types of papillae: 1) numerous papillae with terminal fingernail structure on posterior surface, with short stalk and some longitudinal ridges on nail; 2) less numerous and slightly shorter conical papillae; 3) isolated, broader, oval to globular papillae without ridges. Proboscis with 4 hook-shaped jaws. Ailerons with triangular base. The parapodia in first two chaetigers uniramous while in following chaetigers parapodia biramous. Two triangular to digitiform prechaetal lobes of about same length. In last parapodia notopodial lobe shorter than neuropodial one. Two shorter postchaetal lobes, anteriorly both lobes rounded and in following parapodia notopodial lobe elongated and slender triangular, distinctly longer than rounded. Neuropodial lobe blunt and triangular. Notopodial lobe in posterior parapodia slender and elongated. In last parapodia notopodial lobe generally shorter. Dorsal cirri is conical to oval in shape, inserted on body wall slightly above parapodial base starting from 3rd chaetiger. Ventral cirri slender, triangular to digitiform in shape, about as long as neuropodial postchaetal lobe in the anterior chaetigers. In posterior parapodia, ventral cirri is slender and elongated. Notopodia and neuropodia each with a single acicula. Notochaetae capillaries. Neurochaetae compound spinigers with blades of different lengths. Branchiae non-retractile, simple, digitiform starting from about 21- 32nd parapodium to near posterior end, situated termino-dorsally on parapodia. Pygidium with dorsal anus and terminal pair of slender, elongated cirri.

Distribution: Red Sea, Gulf of Oman, Gulf of Aden, Africa, Madagascar, Australia, India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

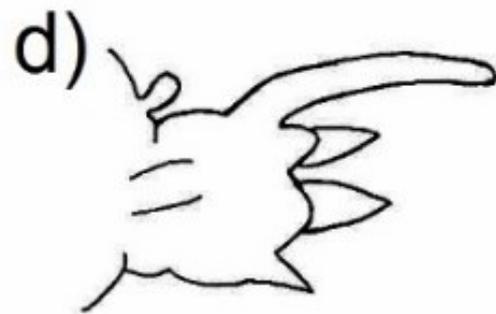
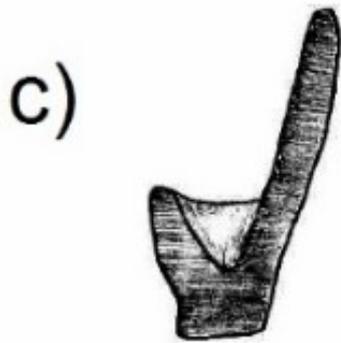
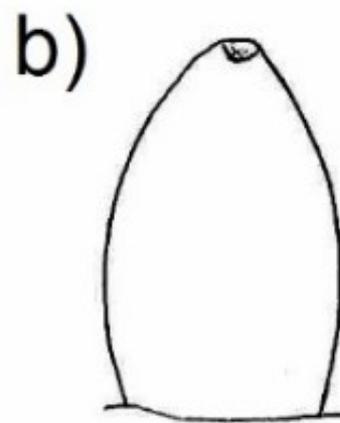
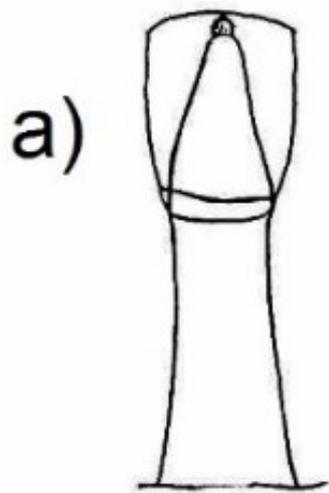


Fig.15. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

***Glycera nicobarica* Grube, 1866**

Type locality: Nicobar Islands

Description: Conical prostomium consisting of about 9–11 rings. Proboscis with two types of papillae 1) numerous conical papillae with 3 U shaped ridges, 2) isolated, broader and globular papillae without ridges. Ailerons with triangular base. First 2 parapodia uniramous, following parapodia biramous. Biramous parapodia consists of 2 slender triangular to digitiform prechaetal lobes of about same length. Two shorter postchaetal lobes present with slender triangular notopodial and shorter, rounded neuropodial postchaetal lobe. Dorsal cirri from chaetiger 2, conical to oval, inserted on body wall slightly above parapodial base. Ventral cirri slender triangular to digitiform, about as long as neuropodial postchaetal lobe whereas in posterior parasopodia slender and elongated, situated termino-ventrally on parapodia. Branchiae simple and digitiform starting from parapodium 18–30 to near posterior end, situated medially on anterior side of parapodia, which may extend beyond prechaetal lobes in the middle portion of the body.

Distribution: Australia, Thailand, India - Andaman and Nicobar Islands

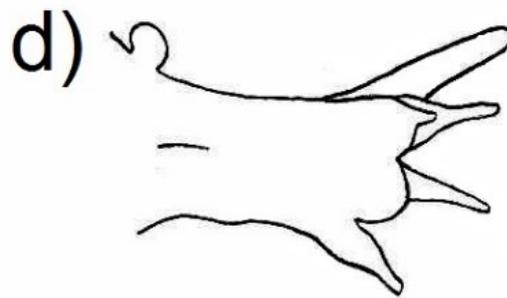
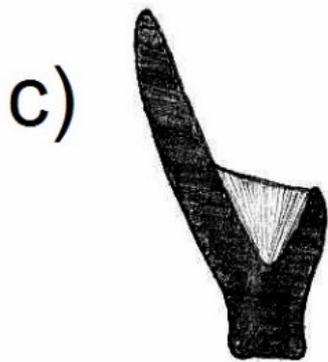
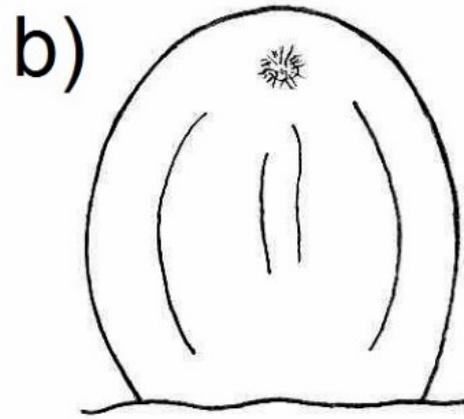
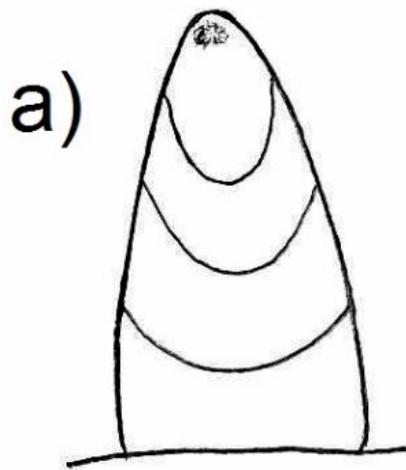


Fig.16. a, b) Proboscideal papillae, c) Alieron, d) Parapodia

Family: Goniadidae Kinberg, 1866

***Goniada emerita* Audouin & H Milne Edwards, 1833**

Type locality: Mediterranean Sea

Description: Prostomium (9–10 rings) with terminal annulus bearing biarticulate appendages. Proboscis dorsally with large number of irregularly arranged papillae, lateral and ventral parts with few papillae in more or less distinct longitudinal rows. Basal papillae rounded to heart-shaped. Dorsal papillae heart-shaped to rectangular with broadly rounded tip on short stalks. Lateral papillae smaller heart-shaped with slightly laterally bent tip on short stalks. Ventral papillae smaller heart-shaped to rounded papillae on short stalks. Terminal papillae all small, rounded and without stalks. Macrognaths tridentate to hexadentate. Dorsal and ventral compound micrognaths present. Proboscis with 4–26 chevrons on each side.

First segment partially apodous and achaetous, with a pair of small lateral cirri. First chaetiger with one neuropodial prechaetal and one postchaetal lobe. Second, lower prechaetal lobe developed from chaetiger 2–6; both prechaetal lobes digitiform and of about same length. Postchaetal lobe are shorter having conical to triangular shape. Anterior region with 46–69 uniramous chaetigers, following parapodia biramous with conical to triangular notopodial lobes. Parapodia is enlarged from 54-90th chaetiger with clearly separated notopodia and neuropodia. Neuropodial postchaetal lobes slightly elongated. In posterior parapodia notopodial lobes, lower neuropodial prechaetal lobes and neuropodial postchaetal lobes shorter and upper neuropodial prechaetal lobes slightly more slender.

Dorsal cirri on anterior chaetigers digitiform, about as long as neuropodial postchaetal lobes or slightly shorter. In biramous parapodia, dorsal cirri more conical and about as long as notopodial lobe. In the posterior parapodia dorsal cirri is slender, elongated and digitiform. Ventral cirri in anterior parapodia digitiform, about as long as neuropodial postchaetal lobes or slightly longer. In posterior parapodia, ventral cirri is slender, elongated and digitiform, about as long as upper neuropodial prechaetal lobes. Acicular notochoetae with straight tip, situated between dorsal cirrus and notopodium. Neurochaetae compound spinigers with blades of different lengths.

Distribution: Madagascar, Australia, India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

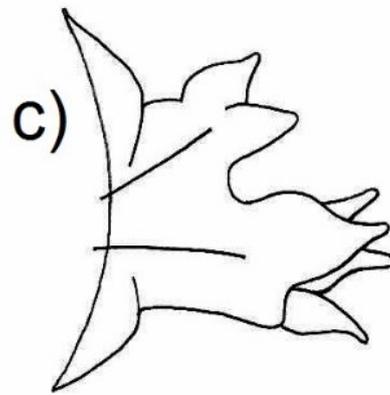
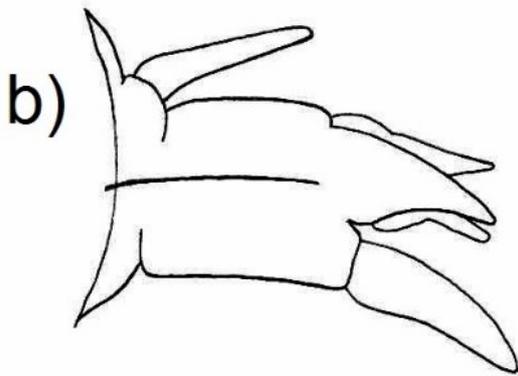
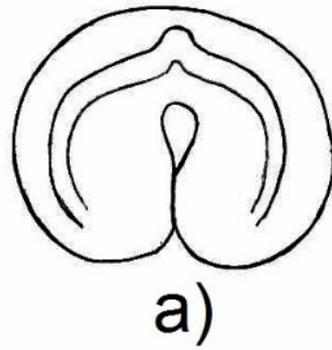


Fig.17. a) Proboscideal papillae, b) anterior parapodia, c) posterior parapodia

Goniada maculata Örsted, 1843

Type locality: Denmark

Description: Prostomium (9–10 rings) with terminal annulus bearing biarticulate appendages. Proboscis dorsally with irregularly arranged papillae, lateral and ventral parts with fewer papillae arranged in longitudinal rows. Pillow-like papillae in dorso-basal part below prostomium and rounded papillae with about tiny teeth in ventro-basal part. Basal papillae rounded on short stalks, with tiny teeth and terminal papillae small, rounded and without stalks. Macrognaths quadri- to octodentate. Dorsal arc with 4 smaller, inverted Y-shaped micrognaths with bifid tips and ventral arc with compound micrognaths. 3-11 chevrons on each side of proboscis.

Anterior chaetigers with a single neuropodial prechaetal and postchaetal lobe. The lower prechaetal lobe well-developed from chaetiger 17–51. The upper prechaetal lobe digitiform, slightly broader and longer while postchaetal lobe is shorter, rounded to triangular in shape. 31–51 (or 60) uniramous chaetigers present. The following biramous parapodia bears conical to triangular notopodial lobes and lower neuropodial prechaetal lobes more digitiform and about as long as upper ones. From 36th to 58th chaetiger, parapodia enlarged and with noto- and neuropodia clearly separated. Dorsal cirri on uniramous parapodia digitiform, about as long as neuropodial postchaetal lobes or slightly shorter. In biramous parapodia dorsal cirri are conical and about as long as notopodial lobes. Ventral cirri in uniramous parapodia digitiform, slightly longer than neuropodial postchaetal lobes. In biramous parapodia, ventral cirri is conical, about as long as neuropodial postchaetal lobes or slightly shorter. In posterior parapodia, ventral cirri is slender elongated and digitiform, about as long as upper neuropodial prechaetal lobes or slightly shorter. Notochaetae capillary. Neurochaetae compound spinigers with blades; additional natatory chaetae sometimes present in enlarged biramous parapodia.

Distribution: Red Sea, India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

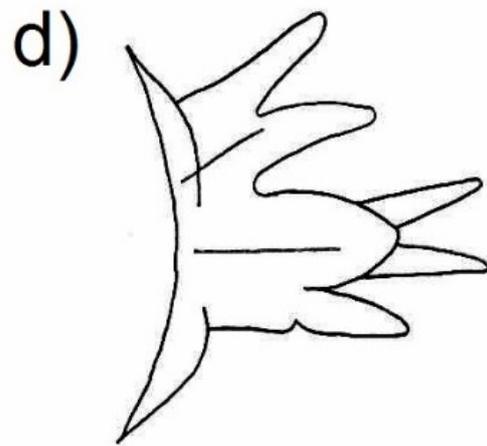
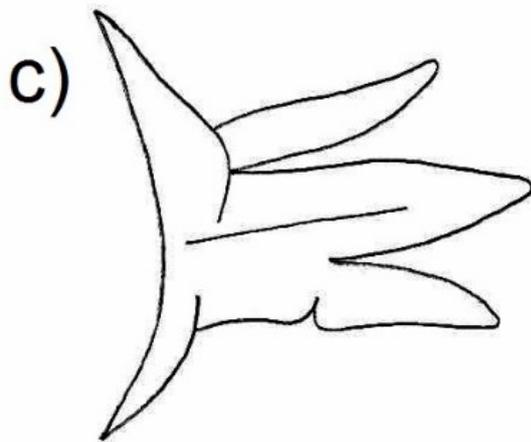
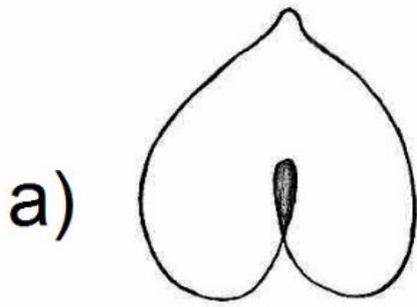


Fig.18. a, b) Proboscideal papillae, c) anterior parapodia, d) posterior parapodia

Goniadella gracilis (Verrill, 1873)

Type locality: Massachusetts

Description: Prostomium (8 rings) having terminal annulus with biarticulate appendages. Proboscis with papillae of different types 1) dorsal rows with numerous heart-shaped papillae on short stalks 2) lateral ones few in number, smaller heart-shaped with slightly laterally bent tip on shorter stalks, 3) ventral rows with few small bifid rectangular papillae without stalks, 4) few small distally rounded papillae present around chevrons and in basal and terminal proboscival parts 5) in dorso-basal part pillow-like papillae were present below prostomium. Macroganths bidentate to quadridentate. Dorsal and ventral compound microganths present. 4–32 chevrons on each side of proboscis, each one with slender arms and a pointed tip. First segment apodous and achaetous, only with a pair of small lateral cirri. Anterior chaetigers (26–30) with uniramous parapodia. The following sub-biramous parapodia, with one conical to digitiform neuropodial prechaetal lobe and one short, rounded postchaetal lobe. Notopodial lobes absent. Dorsal cirri on anterior chaetigers slightly pointed conical, about as long as neuropodial postchaetal lobes. In sub-biramous parapodia, dorsal cirri slender triangular, shorter than notopodial postchaetal lobes. Ventral cirri on anterior and median chaetigers slightly pointed conical to digitiform, about as long as neuropodial postchaetal lobes or slightly shorter. 2-3 straight acicular notochaetae, superior with slightly bent tip. In posterior parapodia, ventral cirri is slender and digitiform, about as long as neuropodial prechaetal lobes or slightly shorter. Neurochaetae compound with blades of different lengths.

Distribution: India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

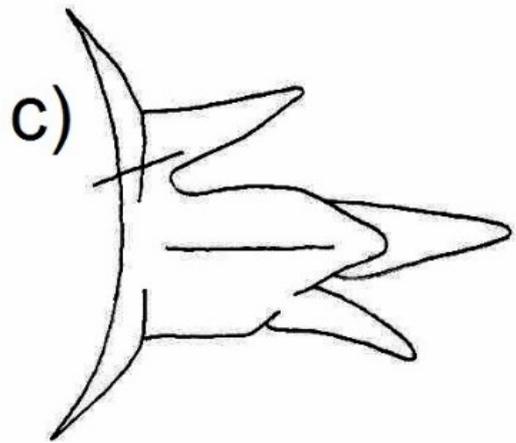
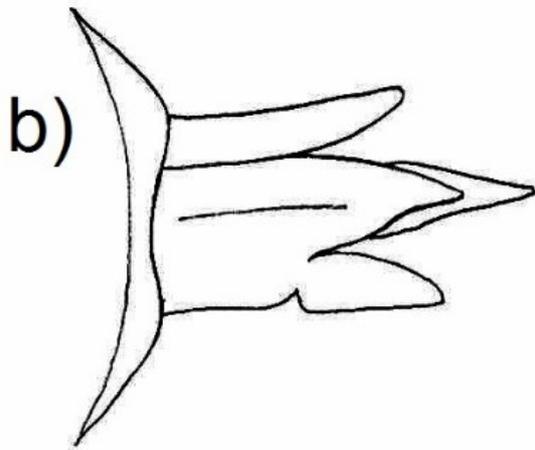


Fig.19. a) Proboscideal papillae, b) anterior parapodia, c) posterior parapodia

Goniadides carolinae Day, 1973

Type locality: North Carolina

Description: Prostomium (8 rings) with terminal annulus having biarticulate appendages. Proboscis with different types of papillae, arranged in distinct longitudinal rows 1) long, unidentate, fang-shaped papillae with bent tip and broad base, 2a) slightly shorter, unidentate, fang shaped papillae with slightly bent tip and smaller base, 2b) shorter, unidentate, more or less straight, conical papillae with slender base, 3) small, stout conical papillae, 4) slightly smaller, stout conical to globular papillae, 5) distinctly smaller, globular to rounded papillae, 6) without papillae; small rounded papillae without cilia in dorso-basal part below prostomium. Macrognaths tridentate to hexadentate, 3-14 dorsal and 0-3 ventral compound micrognaths. Chevrons absent.

First segment apodous and achaetous, only with a pair of small lateral cirri. Anterior 7-9 chaetigers with uniramous parapodia, following region with sub-biramous parapodia, with one pointed digitiform neuropodial prechaetal lobe and one short, rounded postchaetal lobe, notopodial lobes absent. Dorsal and ventral cirri pointed digitiform, of same length, both shorter than neuropodial postchaetal lobes. In posterior parapodia, dorsal and ventral cirri slender and elongated. 2 acicular notochaetae with curved tip, arising from body wall dorsal to dorsal cirri. Neurochaetae compound with blades of different lengths, uppermost and lowermost ones falcigers with short blades and middle ones spinigers with longer blades.

Distribution: Madagascar, Thailand, India - Andaman and Nicobar Islands

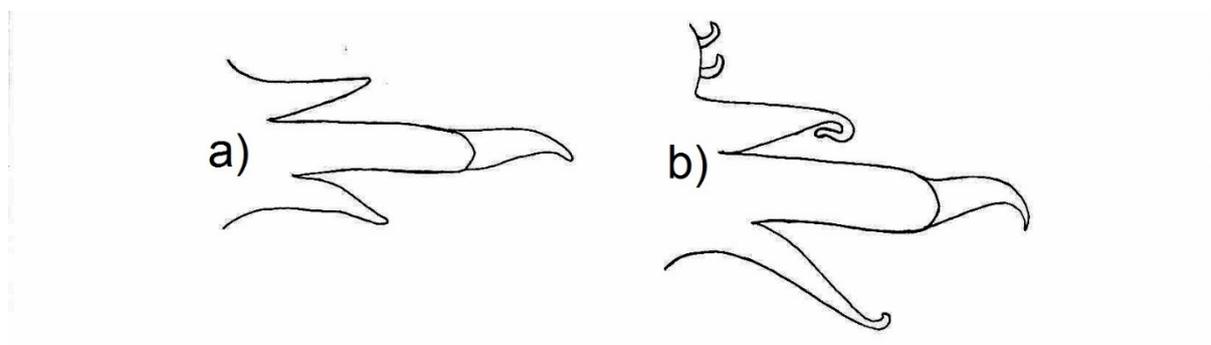


Fig.20. a) anterior parapodia, b) posterior parapodia

Glycinde capensis Day, 1960

Type locality: South Africa

Description: Prostomium (10 rings) terminal annulus with biarticulate appendages. Proboscis with several different types of papillae, arranged in distinct longitudinal rows 1) one row of small teapot-shaped papillae with laterally directed beak 2) short, tridentate papillae with broad base; longer fang-shaped papillae of decreasing in length, bases becoming slender and tips less curved; unidentate papillae; bidentate papillae with decreasing distance between distal and subdistal tooth 3) one row of small, rectangular papillae with narrow base and more or less developed short lateral beaks 4) one row of duckfoot-shaped papillae 5) one row of straight conical papillae, tip sometimes appears to be separated 6) without papillae; double row of spatulate papillae in dorso-basal part below prostomium and small conical papillae without cilia in ventro-basal part. Macrognaths tri- to quinquedentate, 4–26 dorsal and 0 ventral compound micrognaths. Chevrons absent.

Anterior chaetigers with conical to digitiform neuropodial prechaetal lobe and short rounded to conical postchaetal lobe. Anterior region with 27–33 uniramous chaetigers, following parapodia biramous with conical notopodial prechaetal lobes and distinctly shorter rounded postchaetal lobes. From 38-64th chaetiger parapodia slightly enlarged and with notopodia and neuropodia clearly separated, lobes of about same shape. In posterior parapodia, notopodial prechaetal lobes and neuropodial postchaetal lobes shorter and neuropodial prechaetal lobes slightly more slender. Dorsal cirri on anterior chaetigers digitiform, about as long as neuropodial postchaetal lobes. In biramous parapodia, dorsal cirri is more conical and about as long as notopodial prechaetal lobes or slightly longer. In posterior parapodia, dorsal cirri is slender, elongated and digitiform. Ventral cirri in anterior parapodia digitiform, about as long as neuropodial prechaetal lobes or slightly shorter. In biramous parapodia, ventral cirri is conical and distinctly shorter than neuropodial postchaetal lobes. In posterior parapodia ventral cirri is slender, elongated and digitiform, slightly longer than neuropodial postchaetal lobes. Notochaetae stout, hooked at tip and with terminal pointed hood. Neurochaetae compound spinigers with blades of different lengths.

Distribution: Africa, India - Arabian Sea, Bay of Bengal, Andaman and Nicobar Islands

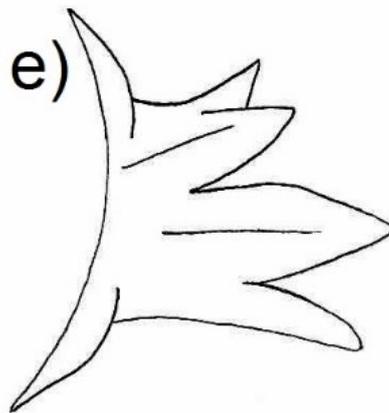
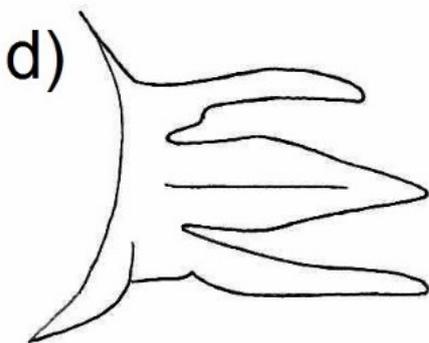
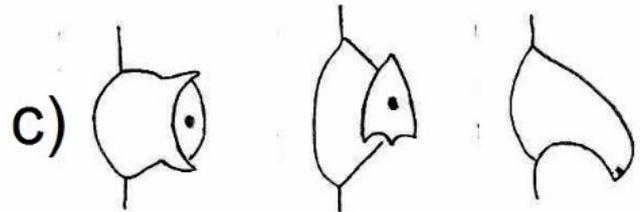
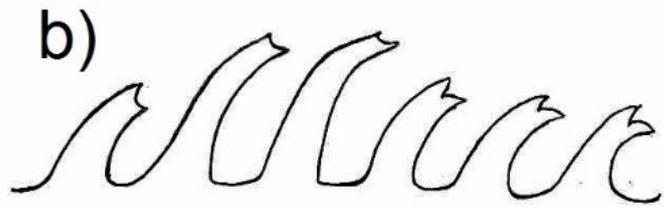
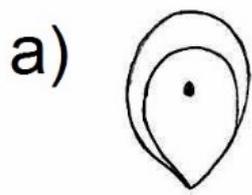


Fig.21. a, b, c) Proboscideal papillae, d) anterior parapodia, e) posterior parapodia

Glycinde kameruniana Augener, 1918

Type locality: West Africa

Description: Prostomium (8–10 rings) having terminal annulus with biarticulate appendages. Proboscis with several different types of papillae, arranged in distinct longitudinal rows and best developed in median proboscidal part; 1) one row of small teapot-shaped papillae with lateral directed beak; 2) short, unidentate papillae with broad base; longer fang-shaped papillae decreasing in length, bases becoming slender and tips less curved; unidentate papillae; bidentate papillae with decreasing distance between distal and subdistal tooth, 3) one row of small, rectangular papillae with narrow base and more or less developed short lateral beaks 4) one row of duckfoot-shaped papillae 5) one row of straight conical papillae, tip sometimes appears to be separated 6) without papillae; double row of more globular papillae without cilia in dorso-basal part below prostomium. Macrognaths tri- to quinquedentate, 4 small dorsal and 0 ventral micrognaths, with globular bases. Chevrons absent.

Anterior chaetigers with one conical to digitiform neuropodial prechaetal lobe and one slightly shorter rounded to conical postchaetal lobe. Anterior region with 19–30 uniramous chaetigers, following parapodia biramous with conical notopodial prechaetal lobes and distinctly shorter rounded postchaetal lobes. From 21–51st chaetiger parapodia slightly enlarged and with separated noto and neuropodia, with lobes of about same shape. In posterior parapodia notopodial prechaetal lobes and neuropodial postchaetal lobes shorter and slender neuropodial prechaetal. Dorsal cirri on anterior chaetigers digitiform, about as long as neuropodial postchaetal lobes or slightly shorter. In biramous parapodia, dorsal cirri is conical and slightly longer than notopodial prechaetal lobes. In posterior parapodia dorsal cirri is slender, elongated and digitiform. Ventral cirri in anterior parapodia digitiform, about as long as neuropodial prechaetal lobes or slightly shorter. In biramous parapodia, ventral cirri is conical, shorter than neuropodial postchaetal lobes. In posterior parapodia, ventral cirri is slender, elongated and digitiform, slightly longer than neuropodial postchaetal lobes. Notochaetae stout, hooked at tip and with terminal pointed hood. Neurochaetae compound spinigers with blades of different lengths.

Distribution: Australia, Madagascar, India - Arabian Sea, Andaman and Nicobar Islands

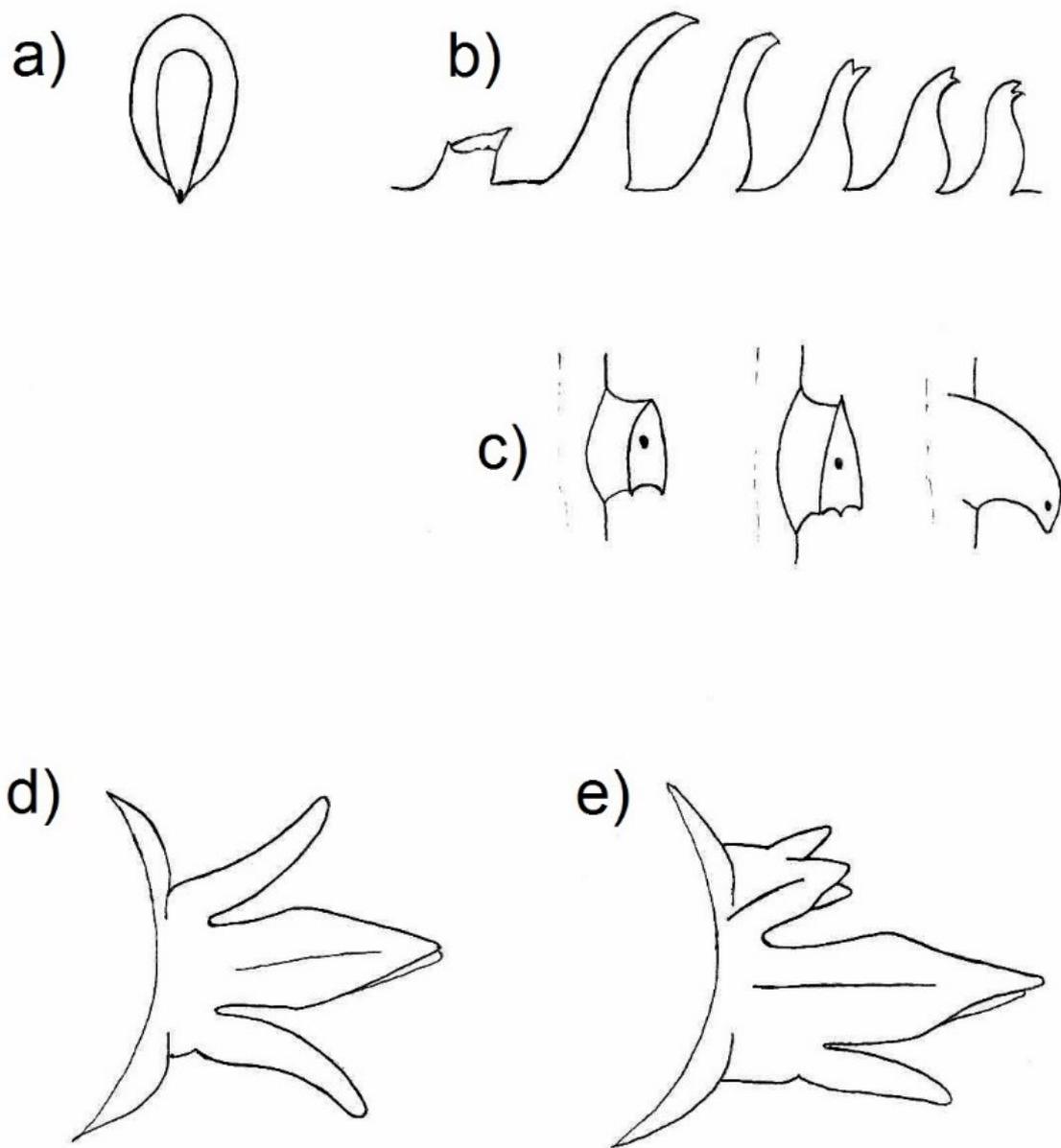


Fig.22. a, b, c,) Proboscideal papillae, d) anterior parapodia, e) posterior parapodia

Family: Paralacydoniidae

***Paralacydonia paradoxa* Fauvel, 1913**

Type locality: Monaco, Mediterranean Sea

Description: Prostomium subconical with 4 small subequal frontal antennae. Peristome reduced and without parapodia. Peristomium without appendages, ventrally forming funnel-shaped mouth. First chaetiger uniramous with bilobed prechaetal lobe and conical postchaetal lobe, with compound spinigerous chaetae and few simple chaetae. Ventral cirrus present. All other chaetigers bears biramous parapodia. The parapodium of 2nd chaetiger with a well separated dorsal and ventral rami, with dorsal ramus being shorter than ventral one. Middle parapodium with elongate notopodium with shorter rounded postchaetal lobe and unequally bilobed prechaetal lobe with upper part short, rounded and lower part longer, papilliform, extending ventrally. Notopodium with a well-developed chaetigerous lobe with a low, rounded chaetal lip and a larger, notched postchaetal lamella. Notopodia and neuropodia well separated. Neuropodium larger than the notopodium with a low rounded prechaetal lip, a fan of neurochaetae and a large notched postchaetal lamella and a digitiform ventral cirrus. Dorsal cirri short, digitiform, emerging midway dorsally on notopodia and ventral cirri cylindrical, extending distally to end of neuropodial lobe. Notochaetae are all simple capillaries. Neurochaetae are mainly compound chaetae mainly heterogomph spinigers with one side of stem-head produced as a spine and the blade serrated on one margin along with 1-2 simple capillaries inferiorly.

Distribution: Australia, Sumatra, India - Arabian Sea, Andaman and Nicobar Islands

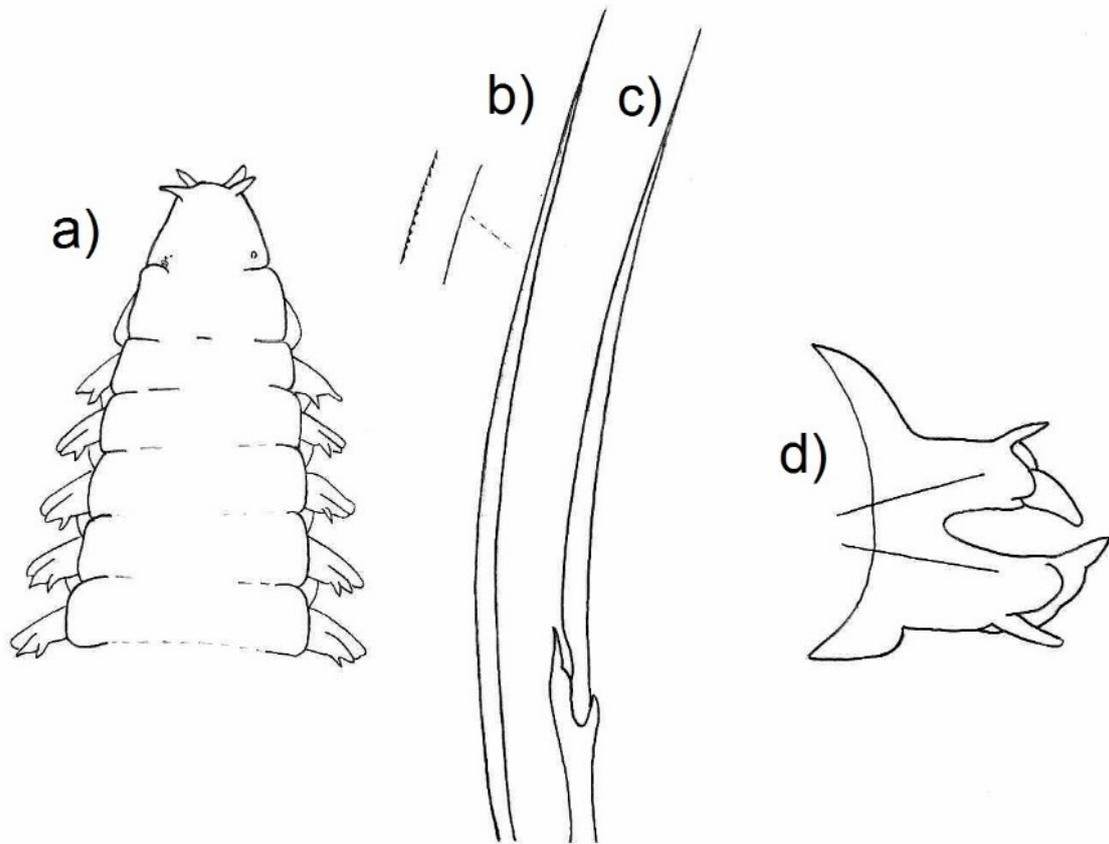


Fig.17. a) Anterior end of the body, b) notochaetae, c) neurochaetae, d) parapodia

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