

***Cabira rangarajani* n. sp. (Polychaeta: Pilargidae) from the Goa coast,
central west coast of India**

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Abstract

Cabira rangarajani n. sp., is described from the Goa coast, in central west coast of India. It differs from *C. brevicirris* (Rangarajan, 1964), by having a single type of neurochaetae while the other species has three types. The new species also differs from the type species, *C. incerta* Webster, 1879 with regards to the relative length of the fused prostomium and peristomium, size of the palps and antennae and in having relatively smaller anterior appendages. A key to identify all species in the genus is also included.

Keywords: Polychaete, Pilargidae, *Cabira rangarajani* n. sp., systematics, taxonomy, Goa coast, India.

Introduction

The family Pilargidae was originally proposed as an independent group (de Saint-Joseph, 1899), but was not recognized as such and its species were placed in Hesionidae (Fauvel, 1920), but its independent status has since been recognized by Hartman (1947) and Pettibone (1963, 1966). Pilargids are found in sandy to muddy-sands from intertidal to deep water, and have a wide distribution (Hartman, 1947; Day, 1963; Pettibone, 1982). However, they are considered as an enigmatic family and are rarely abundant (Salazar-Vallejo & Orensanz, 1991). Hence, no dominance in terms of abundance or richness is observed (Salazar-Vallejo, 1987). Pilargids are not tube builders and due to their eversible muscular pharynx are considered as carnivores or omnivores (Fauchald & Jumars, 1979).

A recent paper by Marks & Hocknull (2006) referred to the generic composition of the family but it deserves updating; thus, the revised generic composition and the recent most publications dealing with them are as follows. The family Pilargidae de Saint-Joseph, 1899 includes two subfamilies, 13 genera and about 70 species. The subfamily Pilarginae de Saint-Joseph, 1899 contains *Ancistrostylis* McIntosh, 1879 (including *Ancistargis* Jones, 1961; Fiege & Bögemann, 1999), *Antonbruunia* Hartman & Boss, 1965; *Cabira* Webster, 1879; *Glyphohesione* Friedrich, 1951 (Licher, 1994), *Otopsis* Ditlevsen, 1917; *Paracabira* Britayev & Saphronova, 1981; *Pilargis* de Saint-Joseph, 1899 (Salazar-Vallejo & Harris, 2006), and *Sigambra* Müller, 1858 (Licher & Westheide, 1997), while the subfamily Synelminae Salazar-Vallejo, 1987 includes *Litocorsa* Pearson, 1970 (Darbyshire & Mackie, 2003), *Loandalia* Monro, 1936 (includes *Parandalia* Emerson and Fauchald, 1971 (Salazar-Vallejo, 1998), *Pseudexogone* Augener, 1922 (Ruiz-Ramirez & Salazar-Vallejo, 2001; Salazar-Vallejo et al., 2007), *Synelmis* Chamberlin, 1919 (Salazar-Vallejo, 2003), and *Talehsapia* Fauvel, 1932 (Salazar-Vallejo et al., 2001). *Glyphohesione* is being included in Pilarginae due to the shape of cephalic ganglion, as suggested by Fitzhugh & Wolf (1990). The family has been revised by Hartman (1947), and later by Pettibone (1966). Subsequently additional new species were described by Emerson & Fauchald (1971), Wolf (1984), and Salazar-Vallejo & Orensanz (1991).

In India, only *Cabira brevicirris* Rangarajan, 1964 has been described and recorded from Palk Bay, southeastern coast of the country (Rangarajan, 1964), but has not been recorded after its original description. A different species of *Cabira* was collected in the subtidal region off

Marmagoa and Betul, Goa, central west coast of India, and is described as a new species *Cabira rangarajani*.

Materials and methods

The material comes from six locations, sampled during the benthic survey cruises SASU-89, and SASU-100, aboard the CRV Sagar Sukti, made during March, 2005 and October, 2005 respectively, under the Project Ballast Waters Control and Management. Description is based on holotype. Type material of the other Indian species, *Cabira brevicirris*, Rangarajan, 1964, and a non-type specimen of *C. pilargiformis japonica* Imajima, 1987, were examined. A key to all species in the genus is included. The following abbreviations have been used in the figures:

ac: anal cirri

dc: dorsal cirrus

dt: dorsal tentacular cirri

nc: neurochaetae

nh: notopodial hook

pc: proboscis

ps: palpostyle

The specimens have been deposited in the museum of the National Institute of Oceanography, India. Holotype (NIO-GLBMUR1) and paratype (NIO-GLBMUR2).

Systematics

Class Polychaeta Grube, 1850

Order Phyllodocida Dales, 1962

Suborder Nereidiformia Glasby, 1993

Superfamily Nereidoidea Johnston, 1845

Family Pilargidae de Saint-Joseph, 1899

Subfamily Pilarginae de Saint-Joseph, 1899

***Cabira* Webster, 1879**

Cabira Webster, 1879:67; Hartman, 1947:510; Pettibone, 1966:177; Britayev & Saphronova, 1981:1319; Wolf, 1984:29.5.

Diagnosis (Following Wolf, 1984): Prostomium small. Palps biarticulate, palpophore large, palpostyle minute. Lateral antennae papilliform; median antennae absent. Peristomium fused to prostomium. Tentacular cirri minute, two pairs. Parapodia poorly-developed, sub-biramous; notopodia with small dorsal cirri and large dorsal hooks, present from anterior chaetiger onwards, with granulose tips; neuropodia with ventral cirri in most chaetigers, neurochaetae long or short capillaries, sometimes bifid. Pygidium bilobed; anal cirri small, or absent. Proboscis eversible, with denticles or papillae.

Remarks: Licher & Westheide (1994) described *Cabira* as having jaws. However, the only pilargid genus possessing jaws is *Talehsapia* (Salazar-Vallejo et al., 2001); *Cabira* has only denticles on its proboscis.

Britayev & Saphronova (1981) revised *Cabira*; and they transferred *Loandalia capensis* Day (1963), into their new genus *Paracabira*. The body of *L. capensis* is very simplified, since it lacks several diagnostic features such as lateral antennae, notopodial cirri, and its proboscis has papillae instead of denticles. Although the relative number of antennae is not diagnostic, the other differences might be relevant to separate different genera. However, the type material of *C. capensis* has not been studied since the original description; thus, these diagnostic features deserve confirmation. Pettibone (1966) disregarded these differences and included *L. capensis* in *Cabira*. We, just like Wolf (1984), follow her approach with hesitation, pending the revision of the type material for *P. capensis*. The species can be identified with the key below.

***Cabira rangarajani* n. sp.**

Figures 1-3

Type material: Arabian Sea. Holotype (NIO-GLBMUR1) (16.5 mm long and 0.5 mm wide by chaetiger 10 with 59 chaetigers) and paratype (NIO-GLBMUR2) (14.1 mm long and 0.4 mm wide by chaetiger 10 with 55 chaetigers) collected in SASU-100, October 2005, cruise to the Goa coastal waters. Two complete specimens, collected off Marmugoa, 15° 25'00" N, 73° 43'00" E, 20 m, muddy-sand, October 2005.

Additional material: *Cabira rangarajani* n. sp., 8 anterior fragments were also collected at stations off Marmugoa, 15°29'00" N, 73°43'30" E; fine sand, 18 m; 15°24'03" N; 73°48'11" E; silty clay; 14 m; 15°24'46" N; 73°47' 03" E; silty clay; 13 m, off Betul, 15°04'55" N, 73°51'74" E, silty clay, 23 m; 15°08'26" N, 73°51'11" E, silty clay, 20 m, salinity 33-34‰ in SASU100, October 2005. At station 15°25'00" N, 73°43'00" E, 20 m, muddy-sand, apart from two complete specimens, 9 incomplete specimens collected at SASU100, October 2005, cruise. In SASU89, March 2005, cruise only one incomplete specimen was collected at the same station (15°25'00" N, 73°43'00" E, 20 m, muddy-sand). The specimens have also been deposited at the National Institute of Oceanography, India museum, under the registration number (NIO-GLBMUR), with consecutive station numbers and collection date of the specimens.

Additional type material: India. Syntype of *Ancistargis brevicirris* Rangarajan, 1964 (CMFRI-73), another incomplete specimen collected at the same locality (Palk Bay, South India), 7 m, August 22, 1962. K. Rangarajan, collected July 12, 1961; it is 4.9 mm long, 0.5 mm wide, 27 chaetigers (other syntypes not available).

Cabira pilargiformis japonica Imajima, 1987, an anterior fragment (ECOSUR-PILA 27), collected in Stat. 9-1, Ariake (33°08' N, 130°08' E), Japan, coll. E. Nishi.

Description: Holotype with body subcylindrical, dorso-ventrally flat (depressed); up to about chaetiger 16 dorsoventrally compressed, slightly rigid compared to remaining part of the body. Posteriorly flaccid, globular with large number of dark chromatophores from chaetiger 7, dispersed along the dorsal and ventral surfaces.

Prostomium bilobed, connected by smooth thin dorsal membrane. Two antennae, minute, conical, inserted on the lateral margin of the prostomium. Palpi short, flattened, arising from anterolateral margins of prostomium; palpostyle short, ventro-lateral (Figs 1a-c, 2a-b). Dorsal surface of palps, prostomium and peristomium covered with minute papillae, each almost square in shape (Fig. 2c). Proboscis everted, globular, thin; its surface covered by abundant short, conical, soft papillae. Eyes absent.

Peristomium anteriorly fused to prostomium, carrying two pairs of tentacular cirri, each short, conical, placed ventro-laterally; posteriorly demarcated from first chaetiger. First chaetiger smaller than subsequent ones (Fig. 2d).

Parapodia with short, conical dorsal and ventral cirri, each with one or two minute papillae, located near their base. Dorsal cirri present from chaetiger 1 and on all subsequent ones; ventral cirri present in chaetiger 1, small, conical bud. Dorsal and ventral cirri similar in size and shape throughout body.

Parapodia sub-biramous; notopodia with short, conical dorsal cirri, and single notopodial hooks (Figs 1d, 3a-b), similar in size throughout body. Neuropodia with short, capillaries. Notopodial hooks (Fig. 1e) emerge slightly ahead of dorsal cirrus. Notopodial hooks first appear at chaetiger seven. Neurochaetae of single type, 4-5 per ramus, long, slender, non-limbate, with entire tips (Figs 1f, 3c-d).

Pygidium tapering to conical lobe, with two lateral anal cirri, each digitate, covered with minute square papillae (Figs 1g, 2e-f). There was no variation in diagnostic characters between type and additional material examined.

Remarks: *Cabira rangarajani* n. sp., differs from *C. brevicirris* in the type of neurochaetae; however, in the original description, Rangarajan (1964:124-125) described three types of simple chaetae: a) non-limbate capillary chaetae, b) short chaetae with single row of minute teeth along cutting edge, and c) chaetae with cutting edge crenulated. *Cabira rangarajani* n. sp. has only a single type of non-limbate capillaries. The syntype was examined and its features were adequately detailed in the original description although it is brittle and difficult to examine. It has three types of neurochaetae, which is one of the important characters distinguishing *Cabira rangarajani* n. sp., from *C. brevicirris*. In addition *C. rangarajani* n. sp., differs from *C. incerta* Webster, 1879 in the relative size of the fused prostomium and peristomium and of the anterior end appendages such as palps and antennae. In *C. rangarajani* n. sp., the fused prostomium and peristomium is longer, about as long as the first 4 chaetigers, while it is about 2-3 chaetigers in *C. incerta*. In *C. incerta* the antennae are short, arising from swollen bases or ceratophores, indistinctly set off from prostomium, while in *Cabira rangarajani* the antennae are bud-like, inserted on the lateral sides of prostomium.

In the North-eastern Atlantic Ocean, there are apparently two different morphs of *C. incerta*; one was described by Pettibone (1966) as having dorsal hooks, always present from chaetiger 7, and a single type of neurochaetae; the other morph was reported by Wolf (1984) with dorsal

hooks present from chaetigers 7-8, and with two types of neurochaetae. As stated in the key below, this is an important difference to separate species and the Gulf of Mexico specimens must be described, but that is beyond the scope of this paper.

Ecological notes: This species live in fine sand to silty clay at depths of 18-23 m, in a salinity range of 33-34 ppt.

Etymology: This species is being named after K. Rangarajan in recognition of his publications on Indian polychaetes, and especially because he described the first species of *Cabira* from India.

**Key to species of *Cabira* Webster, 1879
(after Pettibone, 1966)**

1 Without dorsal cirri or lateral antennae; dorsal hooks from chaetiger 8; integument papillated . . . *C. capensis*

- With dorsal cirri and lateral antennae; integument smooth or papillated . . . 2

2(1) Neurochaetae of two types: long capillaries, and short ones with slightly curved tips; dorsal hooks from chaetigers 6-8 . . . 3

- Neurochaetae of single type, smooth capillaries . . . 4

3(2) All neurochaetae tapering, without subdistal enlargement . . . *C. pilargiformis japonica*

- Anterior neurochaetae (chaetigers 4-6) with subdistal enlargement, not tapering . . . *C. brevicirris*

4(2) Dorsal hooks from chaetiger 7 . . . 5

- Dorsal hooks from chaetiger 6 . . . *C. pilargiformis*

(?probably includes *C. bohajensis*).

5(4) Prostomium and peristomium as long as the first 2-3 chaetigers . . . *C. incerta*

- Prostomium and peristomium as long as first 4 chaetigers *C. rangarajani* n. sp.

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The main differentiating characters of *Cabira brevicirris* and *Cabira rangarajani* **n. sp.**

Characters	<i>C. brevicirris</i> (Based on literature and syntype examined)	<i>Cabira rangarajani</i> n. sp.
Shape of papillae	Short, square	conical
First ventral cirrus	Chaetiger 3 (on first chaetiger in one specimen)	Chaetiger 1
Pygidium	Not known	A pair of papillated anal cirri
First notopodial hooks	On chaetigers 6-8	On chaetiger 7
Neurochaetae	Three types: 1. Non-limbate capillary; 2. Short chaetae with single row of minute teeth along cutting edge; 3. Chaetae with cutting edge crenulated	Only one type: non-limbate capillaries.

* *C. incerta* was redescribed by Pettibone (1966) and re-examined by Wolf (1984). We follow their observations and remarks.

Figure 1. *Cabira rangarajani* **n. sp.** Holotype NIO-GLBMUR1 a) Anterior end, dorsal view; b) paratype NIO-GLBMUR2, anterior end, dorsal view; c) holotype, anterior end, ventral view; d) holotype, chaetiger 8 with dorsal hooks and non-limbate capillary chaetae; e) holotype, dorsal hooks from chaetiger 7; f) holotype, neurochaetae from chaetiger 2; g) holotype, posterior end, dorsal view with two anal cirri (papillated) (scales.- a, c: 260 μ m; b, g: 130 μ m; d, e: 30 μ m; f: 20 μ m).

Figure 2. *Cabira rangarajani* **n. sp.** Holotype NIO-GLBMUR1 a) Anterior end, dorsal view ; b) anterior end, ventral view, c) anterior end, dorsal view (enlarged) showing papillae ; d) chaetigers 1-2 ; e) posterior end, dorsal view showing anal cirri (papillated) ; f) posterior end (enlarged) (scales.- a,e: 260 μ m, b, d: 130 μ m; c, f: 65 μ m).

Figure 3. *Cabira rangarajani* **n. sp.** Holotype NIO-GLBMUR1 a) Chaetiger 7 with dorsal hook and non limbate capillary neurochaetae ; b) dorsal hooks from chaetiger 10 ; c-d) non-limbate capillary neurochaetae from different chaetigers (scales.- a-d : 20 μ m).

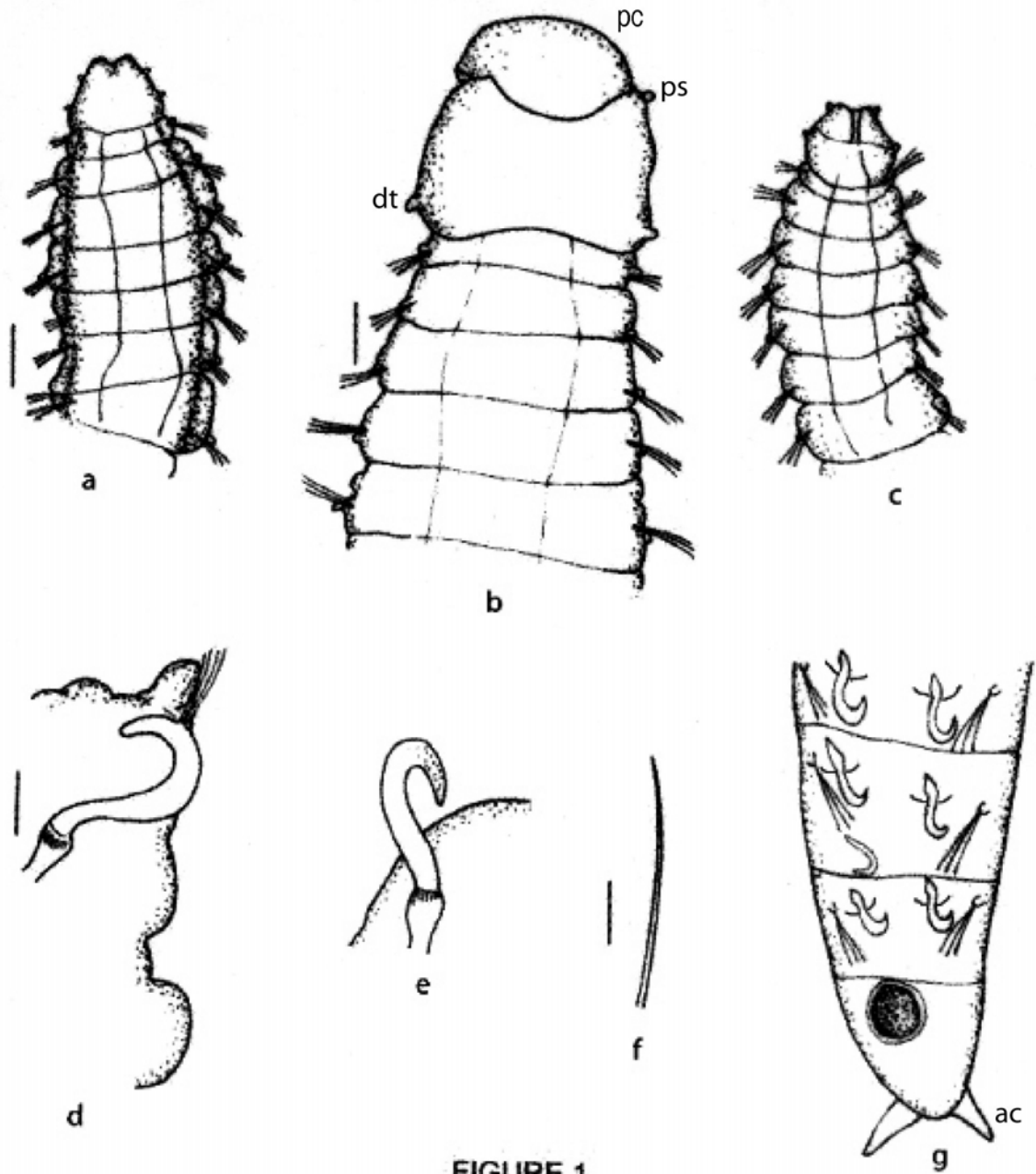


FIGURE 1

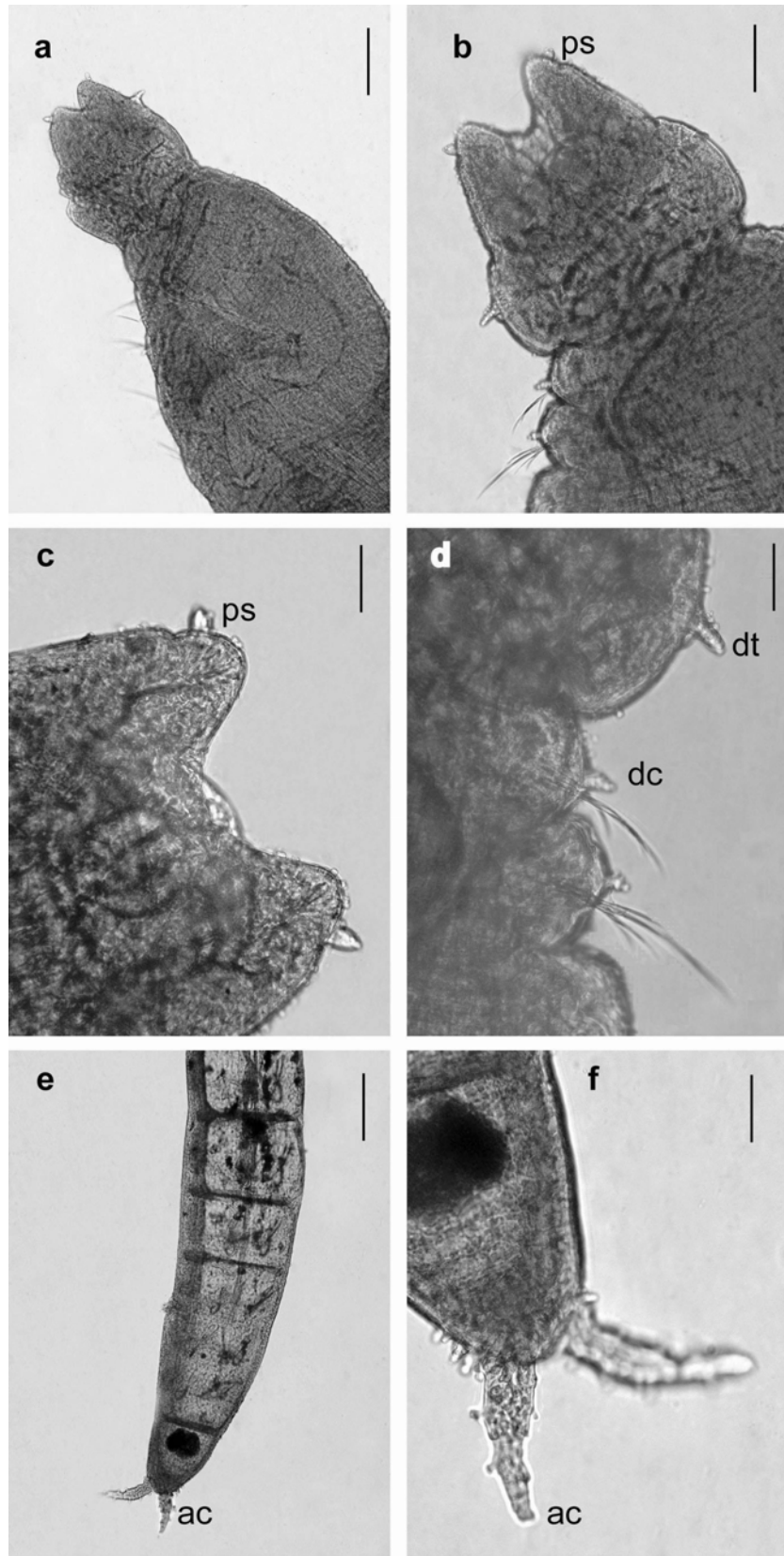


FIGURE 2

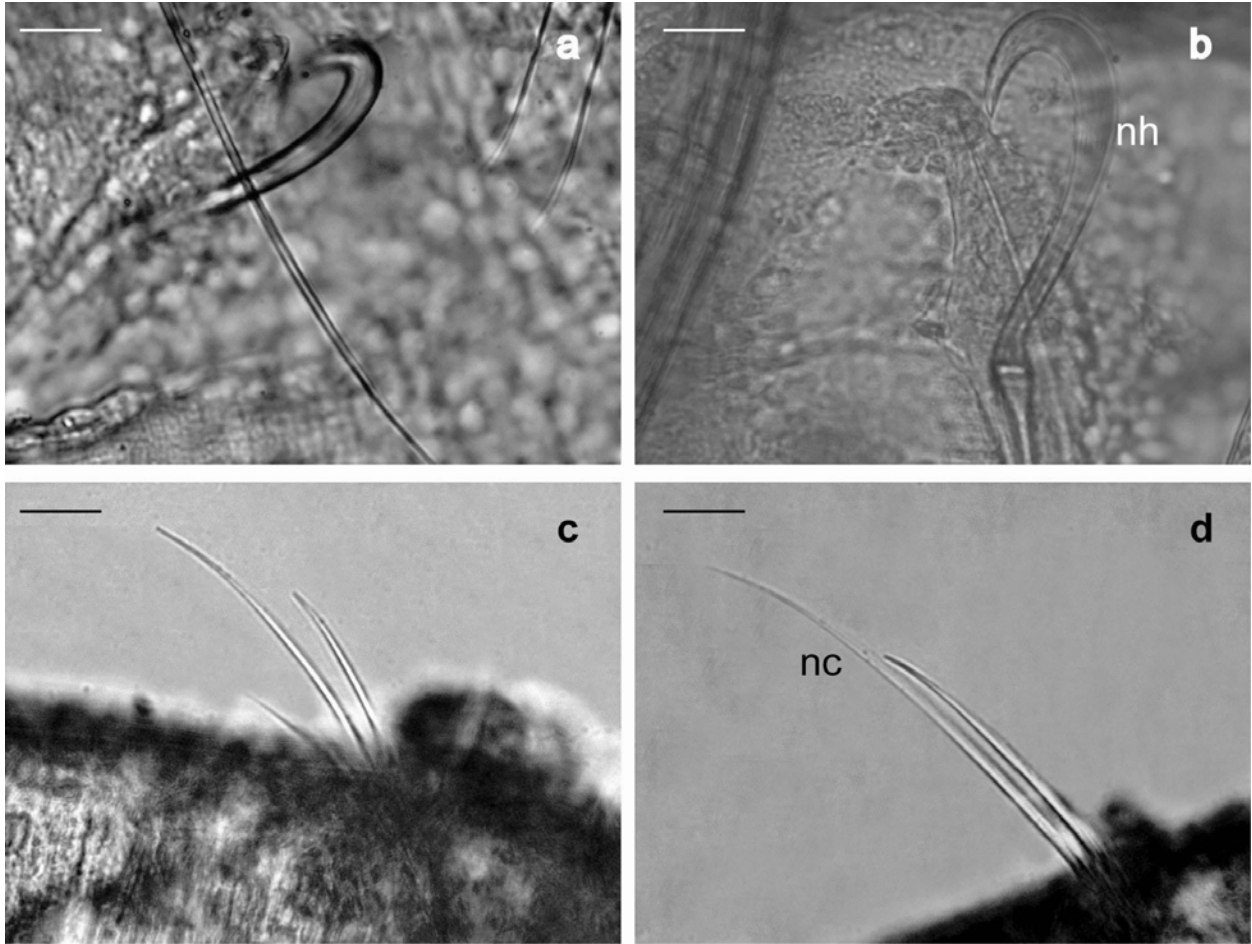


FIGURE 3