Revision of *Therochaeta* Chamberlin, 1919 (Polychaeta: Flabelligeridae)

Sergio I. SALAZAR-VALLEJO
El Colegio de la Frontera Sur CONACYT
Chetumal, Quintana Roo (Mexico)
savs551216@hotmail.com
ssalazar@ecosur.mx

Salazar-Vallejo S. I. 2013. — Revision of *Therochaeta* Chamberlin, 1919 (Polychaeta: Flabelligeridae). *Zoosystema* 35 (2): 227-263. http://dx.doi.org/10.5252/z2013n2a7

ABSTRACT
The taxonomy of flabelligerid polychaetes has been mainly based on chaetal features; however, some confusion has occurred due to the lack of standardization of their shapes. *Therochaeta* Chamberlin, 1919 was proposed for *Stylarioides collarifer* Ehlers, 1887 because it has pseudocompound neurohooks and a collar-shaped anterior shield made of cemented sediment particles. The shield is made of particles of varying size and extends along the first three-two chaetigers, usually covering them completely. There are some species described as closely allied to *Therochaeta collarifera* (Ehlers, 1887) but without pseudocompound neurohooks and less developed anterior shields. The revision of all available material has allowed the recognition of two different body patterns, especially with regard to the type of neurochaetae present in some anterior chaetigers. As a result, *Therochaeta* is restricted and a new genus, *Paratherochaeta* n. gen., is herein proposed. *Therochaeta* includes four species besides the type species: *Therochaeta caudata* (Rioja, 1963) n. comb. and *Therochaeta pacifica* Fauchald, 1972 from the Eastern Pacific Ocean, *Therochaeta fauchaldi* n. sp. from the Gulf of Mexico, *Therochaeta flabellata* (Sars *in* Sars, 1872) from the Norwegian Sea, from the Eastern Pacific Ocean. *Paratherochaeta* n. gen., with *Therochaeta antoni* Kirkegaard, 1996 from the Bay of Bengal, Indian Ocean as the type species, includes seven other species: *Paratherochaeta africana* (Rullier, 1965) n. comb., n. stat., *Paratherochaeta augeneri* n. sp. and *Paratherochaeta scutigeroides* (Augener, 1918) n. comb. from Western Africa, *Paratherochaeta coronata* (Ehlers, 1908) n. comb. from the Western Indian Ocean, *Paratherochaeta ehlersi* n. sp. from the Southwestern Indian Ocean, *Paratherochaeta orensanzi* n. sp. from the Southwestern Atlantic Ocean, *Paratherochaeta scutigera* (Ehlers, 1887) n. comb. from the Grand Caribbean Sea.

KEY WORDS
Stylarioides, *Pherusa*, *Semiodera*, pseudocompound neurohooks, anterior shield, new combinations, new status, new genus, new species.

RÉSUMÉ
Révision du genre Therochaeta *Chamberlin, 1919 (Polychaeta: Flabelligeridae).*
La taxonomie des polychètes flabelligeriens a été basée principalement sur les caractères des soies. Cependant, par manque de standardisation de leurs formes, quelques confusions persistent. *Therochaeta* Chamberlin, 1919 a été proposé pour *Stylarioides collarifer* Ehlers, 1887 parce qu'il a des neurochètes pseudocomposées et un bouclier antérieur col-façonné composé de particules sédimentaires cimentées. Le bouclier est fait de particules de dimensions variables et s'étend le long des premiers 2-3 sétigères, en les couvrant, le plus souvent, complètement. Il y a quelques espèces décrites qui ressemblent étroitement à *Therochaeta collarifera* (Ehlers, 1887) mais sans neurochètes pseudocomposées et qui présentent des boucliers antérieurs moins développés. La révision de tous les matériaux disponibles a permis la reconnaissance de deux modèles différent du corps, surtout concernant le type de neurochètes dans quelque sétigères antérieurs. Par conséquent, *Therochaeta* Chamberlin, 1919 est redéfini et un nouveau genre, *Paratherochaeta* n. gen., est proposée ici. *Therochaeta* Chamberlin, 1919 inclut quatre espèces exceptée l'espèce type : *Therochaeta caudata* (Rioja, 1963) n. comb. de l'Océan Pacifique de l'est, *Therochaeta fauchaldi* n. sp. du Golfe du Mexique, *Therochaeta flabellata* (Sars *in* Sars, 1872) de la Mer de Norvège, et *Therochaeta pacifica* Fauchald, 1972 de l'Océan Pacifique de l'est. *Paratherochaeta* n. gen., avec *Therochaeta antoni* Kirkegaard, 1996 du Golfe du Bengale, Océan Indien comme espèce type, inclut sept autres espèces : *Paratherochaeta africana* (Rullier, 1965) n. comb., n. stat. d'Afrique de l'ouest, *Paratherochaeta augeneri* n. sp. d'Afrique de l'ouest, *Paratherochaeta coronata* (Ehlers, 1908) n. comb. de l'Océan Indien de l'ouest, *Paratherochaeta ehlersi* n. sp. de l'Océan Indien sud-ouest, *Paratherochaeta orensanzi* n. sp. de l'Océan Atlantique sud-ouest, *Paratherochaeta scutigera* (Ehlers, 1887) n. comb. de la Grande Mer des Caraïbes, et *Paratherochaeta scutigeroides* (Augener, 1918) n. comb. d'Afrique de l'ouest.

MOTS CLÉS
Stylarioides,
Pherusa,
Semiodera,
neurochètes
pseudocomposées,
bouclier antérieur,
combinaisons nouvelles,
genre nouveau,
statuts nouveaux,
espèces nouvelles.

INTRODUCTION

Chamberlin (1919: 397) proposed several genera as an attempt to "break up the manifestly heterogeneous assemblage of species that have been accumulated under *Stylarioides* delle Chiaje, 1831…". He restricted *Stylarioides* and proposed *Therochaeta* Chamberlin, 1919 with *Stylarioides collarifer* Ehlers, 1887 as the type species. The etymology was a combination of two Greek words (*thairos,* m. = hinge + *chaite,* f. = chaeta) to indicate "hinged chaetae", due to the presence of pseudocompound neurochaetae in a few anterior chaetigers; further, his key included a constriction between chaetigers 2 and 3 as an additional diagnostic feature. Ehlers (1887: 163) indicated that *S. collarifer* was named because it has a series of almost complete collars in at least chaetigers 3-5, each made by the lateral fusion of papillae and adherent sediment grains.

Pherusa was not included by Chamberlin because the name was preoccupied in the Crustacea. The revision by Støp-Bowitz (1948a: 13), however, made it clear that *Pherusa* Oken, 1807 had precedence over other generic names, including those employed in the crustaceans, or over its posterior replacement names used in polychaetes. Hartman (1959: 417) included *Therochaeta* and *Stylarioides* as junior synonyms to *Pherusa,* but later changed her mind by reinstating *Therochaeta* (Hartman

1965: 180). Fauchald (1972: 232-233) indicated that *Therochaeta* species differ by the relative development of papillae and the type of neurohooks in anterior chaetigers, and he provided a list of species (Fauchald 1972: 416). As will be shown below, these species can be divided into two discrete groups based upon the relative development of sediment cover and tubercles, and by the presence of pseudocompound chaetae. Since the type species has pseudocompound chaetae, it must be kept within the genus, whereas other species lacking these chaetae are herein transferred to a newly proposed genus.

Fauchald (1972: 225, 226, 413-415) regarding *Stylarioides,* with *S. monilifer* delle Chiaje, 1831 as type species, indicated that *Pherusa sensu lato* species could be divided into several groups by using the branchial features, and that the type species for these two genera have different branchial patterns. However, *Stylarioides* was later regarded as an invalid genus (Fauchald 1977: 117), but was reinstated by Salazar-Vallejo (2011).

There are several flabelligerid species which should be included in *Therochaeta.* In this contribution, the genus is revised, redefined, and restricted to those species provided with transitional pseudocompound neurohooks in some anterior chaetigers. Some other species, however, lack these transitional chaetae and instead have either multiarticulate capillaries or falcate hooks, and they must be included in a newly proposed genus, *Paratherochaeta* n. gen. Keys to identify all species in each genus are also included.

MATERIAL & METHODS

In order to improve the visibility of body papillae, specimens were sometimes immersed during 20-30 sec. in an oversaturated, 70%-ethanol methyl green solution. In some cases, in order to improve the visibility of some anterior papillae, illumination was made from the posterior region of the body. The observation of the neurochaetae of anterior chaetigers was made by placing the worms on their dorsal surface in a depressed or normal glass slide, in a 1:1 solution of 70% ethanol and glycerol, and scanned using a compound microscope. Some parapodia were removed for the observation of chaetal details but in those species with large sediment particles on the tunic, chaetae are easily broken and sometimes single chaetae are illustrated instead of parapodia or chaetal lobes. Figures were arranged by combining some digital photos, sometimes using HeliconFocus. The head tends to be very small, less than 1 mm across, rendering it difficult to make good photographs using a stereomicroscope, even with good illumination. The materials are deposited in several collections listed below.

Abbreviations

BMNH	The Natural History Museum, London;
CENPAT	Centro Nacional Patagónico, Puerto Madryn;
ECOSUR	Colección de Referencia, El Colegio de la Frontera Sur, Chetumal;
HDMSU	Hydrobiology Department, Faculty of Biology, Moscow State University;
LACM-AHF	Los Angeles County Museum of Natural History, Allan Hancock Foundation Polychaete Collection;
MACN	Museo Argentino de Ciencias Naturales, Buenos Aires;
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge;
MNHN	Muséum national d'Histoire naturelle, Paris;
UANL	Laborarorio de Biosistemática, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Monterrey;
UNAM	Estación Mazatlán, Universidad Nacional Autónoma de México, Mazatlán, Sinaloa;
USNM	National Museum of Natural History, Smithsonian Institution, Washington;
ZMB	Zoologisches Museum, Berlin;
ZMH	Zoologisches Museum und Institut, Universitat Hamburg, Hamburg;
ZMUB	Zoologisk Museum, Univesiteet i Bergen, Bergen;
ZMUC	Zoologisk Museum, Kopenhavn Universitet, Copenhagen.

RESULTS

Morphology

Body shape

The members of *Therochaeta* or *Paratherochaeta* n. gen. have bodies with three regions. The fore region is slightly or markedly narrower than the following or trunk region. It includes the first

two chaetigers carrying cephalic cage chaetae, which are usually covered by a crust or shield made by cementing sediment particles. The second chaetiger is often longer than the first, and can be constricted towards its posterior margin. It must be emphasized that in some species the first chaetiger is ventrally displaced such that neurochaetae are more anteriorly displaced than notochaetae, and that chaetal lobes of the second chaetiger are placed at about the same level. The median or trunk region is markedly wider than either the preceding or the posterior (cauda) regions; its relative width may be increased by the formation of large sediment tubercles, often laterally fused forming segmental collars, or by the contraction of the circular muscles resulting in a markedly swollen region. The first few trunk chaetigers (4-6, 7) may have transitional neurochaetae, as explained below, but beyond the progressive reduction in size of papillae or tubercles, there are no other differences to other trunk chaetigers. The posterior or caudal region is thinner and relatively more muscular; it terminates in a blunt pygidium with a distal anus, without anal cirri.

Second chaetiger

It must be emphasized that the second chaetiger is often relatively longer than first and subsequent ones. It may have a transverse constriction which may be enhanced by the presence of large tubercles in the following chaetigers. The relative constriction is used in the key below to separate similar species because in some species it is clearly visible whereas in some other ones it is not.

Body papillae

Body papillae usually cement sediment particles forming large single or laterally fused sediment tubercles. Papillae may be homogeneous throughout the body, or vary along the body regions; when they are homogeneous, similar species differ by their relative abundance per segment, or by the relative size of sediment particles which can adhere. In contrast, if papillae are heterogeneous, they tend to be larger along few, anterior chaetigers (3-5), often forming conical or digitate sediment tubercles. The sediment tubercles may be of about the same size in successive chaetigers, or decrease in size in following chaetigers, often markedly larger on anterior chaetigers than those present in the following segments. Median and posterior chaetigers may have larger papillae on the dorsal surface and smaller ones along the ventral surface. Only two *Therochaeta* species lack a well developed cemented sediment grains cover: *T. caudata* (Rioja, 1963) n. comb. and *T. fauchaldi* n. sp.; instead, they have large body papillae forming independent sediment tubercles throughout the body.

Sediment cover

Most species have a cortex made of cemented sediment grains along the first few chaetigers. This sediment cover, or anterior shield, extends from the first two chaetigers towards the posterior region; it often covers the flexible petaloid, anterior parts, consisting of a single middorsal lobe and two ventrolateral, smaller ones. These are only observed when the anterior end is fully everted, and the sediment grains are of the same type and size than those present in other non-flexible regions. Further, the extent of cemented sediment grains along the body is useful to separate similar species. The anterior shield may be concentrated on anterior chaetigers, forming large sediment tubercles, or forming a thin crust surrounding the body; the sediment particles may continue along few median chaetigers. Further, the relative size of sediment particles may differ between species and between the body regions; thus, most species have fine sediment particles giving a rather smooth surface, but there are some others which are capable of retaining only larger particles, resulting in a rough surface. In addition, in some species sediment particles may be of similar size throughout the body, in others either large or small particles are present and in some the anterior chaetigers are covered with large sediment particles.

TRANSITION NEUROCHAETAE

Therochaeta or *Paratherochaeta* n. gen. species have different types of chaetae in the so-called transition chaetigers (4-6, 7). *Therochaeta* species have pseudocompound hooks; the pseudoarticula-

tion consists of a single, subdistal, more or less transverse or oblique, paler thin area. On the contrary, *Paratherochaeta* n. gen. has multiarticulate chaetae, mostly hooks but capillaries can be present along the body. Nonato & Luna (1970: 92) regarded this neurochaetal difference enough to propose a new genus but none was proposed; this approach was confirmed through a phylogenetic analysis (Salazar-Vallejo *et al.* 2008), and used to distinguish *Semiodera* from *Daylithos* (Salazar-Vallejo 2012b). The observation of an anterior fragment of a small juvenile (see below), belonging to an unidentified Caribbean species of *Therochaeta* shows that pseudocompound neurohooks start in chaetiger 2 and continue to chaetiger 6. This implies that the start of these neurochaetae migrates backwards during ontogeny, since adults have multiarticulate capillaries in chaetigers 2-3 and pseudocompound neurochaetae in chaetigers 3-6 or 4-7; therefore, it may be possible that chaetigers 2-3 have these chaetae and are replaced by multiarticulate neurochaetae during growth. However, the segment on which neurohooks first appear is regarded as a specific diagnostic feature for adult specimens and has been employed to separate similar species.

Median and posterior notochaetae

The first chaetigers have very long multiarticulate chaetae, each with small, anchylosed articles throughout most of their length with slightly longer articles distally. The median and posterior notochaetae have fewer, markedly longer articles throughout the chaeta. The relative length, expressed as a relationship between article length and width may be useful to separate closely allied species, since it is a consistent feature throughout the median and posterior chaetigers.

Median and posterior neurochaetae

In *Therochaeta*, all posterior neurochaetae are anchylosed, falcate hooks. In *Paratherochaeta* n. gen., there are two types of neurochaetae: multiarticulated capillaries and anchylosed, falcate hooks. In the latter, species differ by their relative curvature from weakly curved to those which are markedly sigmoid.

SYSTEMATICS

Class POLYCHAETA Grube, 1850
Order FLABELLIGERIDA Pettibone, 1982
Family Flabelligeridae de Saint-Joseph, 1894

Genus *Therochaeta* Chamberlin, 1919

Therochaeta Chamberlin, 1919: 397 (key, etymol.). — Hartman 1965: 179-180 (emended). — Fauchald 1977: 117.

Type species. — *Stylarioides collarifer* Ehlers, 1887, by original designation.

Gender. — Feminine (ICZN 1999, Art. 30.1.1).

Distribution. — Species of the genus are found in tropical and subtropical regions, especially in shallow water but have been found down to about 1000 m depths, in mixed bottoms.

Diagnosis (emended). — Body swollen or tapered, often constricted between chaetigers 2 and 3. Chaetiger 2 elongated; chaetiger 3 with a transverse band of long papillae. Anterior margin of chaetiger 1 with a dorsal lobe. Cephalic cage made by chaetigers 1-2. Tunic generally covered with sediment grains. Chaetigers 5-7 with pseudocompound neurohooks; posterior neurohooks blunt. Four or many pairs of cirriform branchiae, sessile on a low branchial plate.

Remarks

Therochaeta has been regarded as resembling *Pherusa* because of the branchial arrangement and because some species in the latter have been described as having pseudocompound neurochaetae along few anterior chaetigers. This would explain why these two genera were regarded as synonyms, but there are consistent differences between them. Thus, although the species in both genera have distal branchiae arranged as four filaments which are not separated by the caruncle, the proximal filaments have different patterns. In *Therochaeta* the filaments are often arranged in a spiral, usually with more than four filaments per side, whereas in *Pherusa* there are only two filaments per side. Further, regarding the presence of pseudocompound or transition neurohooks, as herein restricted, the species belonging to *Pherusa* do not have any such chaetae and most of their neurochaetae are anchylosed and falcate,

whereas in the species belonging in *Therochaeta,* there are pseudocompound or transition neurohooks, at least along a few anterior chaetigers.

These two genera also differ in the sediment cover on the tunic and relative length of chaetiger 2. The species of *Therochaeta* have a sediment cover with closely packed grains, generally fused, forming a continuous cortex along the whole body, or at least over some anterior chaetigers, whereas in *Pherusa* sediment grains, even if they are abundant, are rather loosely organized and never fuse to each other to form a crust. In addition, *Therochaeta* has a marked difference in the relative length along chaetigers 1-3, with chaetiger 2 being the longest and often with a constriction in its posterior margin. This feature, however, may be misleading because the interparapodial body width is more or less the same along subsequent chaetigers. The most notorious feature is thus the elongated second chaetiger, and the fact that it is anteriorly expanded, its chaetae contributing to the cephalic cage, and the chaetiger becomes narrower posteriorly.

Therochaeta resembles *Semiodera* Chamberlin, 1919 as revised elsewhere (Salazar-Vallejo 2012b) because both genera include species having a shield made of cemented sediment particles, and pseudocompound neurohooks in some anterior chaetigers. They differ because in *Therochaeta* papillae often incorporate sediment particles and frequently form sediment tubercles, whereas in *Semiodera* papillae are usually clean, without sediment particles, and never form sediment tubercles. Their species also differ in their habits as *Therochaeta* sp. live in soft substrates, not forming calcareous structures, whereas *Semiodera* species bore in consolidated sediments or calcareous substrates and often produce calcareous layers inside them.

There are eight species currently assigned to *Therochaeta*: *Therochaeta antoni* Kirkegaard, 1996 from the Bay of Bengal, Indian Ocean, *T. caudata* n. comb. from the Eastern Pacific Ocean, *T. collarifera* (Ehlers, 1887) from the Grand Caribbean Sea, *T. coronata* (Ehlers, 1908) from two localities in the Indian Ocean, *T. flabellata* (Sars *in* Sars, 1872) from the Norwegian Sea, *T. pacifica* Fauchald, 1972 from the Eastern Pacific Ocean, *Therochaeta scutigera* (Ehlers, 1887) from the Grand Caribbean Sea, and *T. scutigeroides* (Augener, 1918) from the Eastern Atlantic Ocean. These species can be arranged into two different body patterns, especially indicated by the relative development of body papillae, and by the presence of pseudocompound neurohooks. The first group contains species with large body papillae or with thin papillae forming large sediment tubercles, and having pseudocompound hooks, whereas the second group has smaller body papillae, often with a sediment cover forming a thin layer over few anterior chaetigers, and lacking pseudocompound hooks. The first group is herein restricted to *Therochaeta* and includes *T. caudata* n. comb., *T. collarifera* (Ehlers, 1887), *T. fauchaldi* n. sp., *T. flabellata, T. pacifica,* and *Therochaeta sp.* The second group is herein recognized as a different genus, *Paratherochaeta* n. gen. with *T. antoni* as its type species, it also includes *Paratherochaeta africana* (Rullier, 1965) n. comb., n. stat. is moreover removed from *Stylarioides* delle Chiaje, 1831, *Paratherochaeta augeneri* n. sp., *P. corona* (Ehlers, 1908) n. comb., *Paratherochaeta scutigera* (Ehlers, 1887) n. comb., and *P. scutigeroides* (Augener, 1918) n. comb.

Key to species of *Therochaeta* Chamberlin, 1919, restricted

1. Anterior shield present, sometimes continued throughout the body 2
— Anterior shield missing; body papillae with fine sediment particles 5

2. Sediment particles concentrated in the anterior region or forming sediment tubercles in some anterior chaetigers; a marked constriction between chaetigers 2 and 3 3
— Sediment particles homogeneously distributed throughout the body; no marked constriction between chaetigers 2 and 3 4

3. Sediment tubercles in chaetigers 3-4 elevated, laterally fused forming complete collars; sediment tubercles in following chaetigers large, projected, but not fused laterally .... *T. collarifera* (Ehlers, 1887)

— Sediment tubercles in chaetigers 3-4 low, barely fused laterally, not forming complete collars ..... *T. pacifica* Fauchald, 1972

4. Papillae adhering fine sediment particles; grayish... *T. flabellata* (Sars *in* Sars, 1872) Norway
— Papillae adhering large sediment particles or forams; whitish .... *T.* cf. *flabellata* Mediterranean Sea

5. Papillae few per segment, dorsal ones larger ..... *T. caudata* (Rioja, 1963) n. comb.
— Papillae abundant, all of about the same size ..... *T. fauchaldi* n. sp.

Therochaeta collarifera (Ehlers, 1887) (Fig. 1)

Stylarioides collarifer Ehlers, 1887: 161-164, pl. 43, figs 2-7. — Hartman 1938: 14.

Therochaeta collarifera – Hartman 1965: 180, pl. 40 (n. comb.). — Hartman & Fauchald 1971: 121.

TYPE MATERIAL. — Grand Caribbean, Eastern Gulf of Mexico. One syntype (MCZ 775) dried-out, anterior end damaged, off SW Sand Key, Florida, Bibb Stat. 137 (24°13'30"N, 81°59'00"W), 586-595 m, 17.II.1869, L.F. de Pourtalès coll. One syntype (MCZ 778), off Boca Grande, Florida, Bibb Stat. 132 (24°11'00"N, 89°09'45"W), 673 m, 16.II.1869, L.F. de Pourtalès coll. One syntype (MCZ 784), many pieces, completely dried-out, off Carysfort Reef, Florida, Bibb Stat. 160 (25°06'30"N, 80°01'00"W), 377 m, 31.III.1869, L.F. de Pourtalès coll.

ADDITIONAL MATERIAL. — Northeastern Atlantic Ocean. 24 specimens (LACM-AHF), R/V *Atlantis*, Stat. D1 (39°54'30"N, 70°35'00"W), 466.7-508.7 m, 23.V.1962 (complete specimens 7-15 mm long, 1.5-2.0 mm wide, cephalic cage 4-6 mm long, 23-24 chaetigers). 20 specimens (LACM-AHF), R/V *Chain*, Stat. 105B (39°56.6'N, 71°03.6'W), 530 m, 5.V.1966 (complete specimens 3.5-10.5 mm long, 1.0-2.5 mm wide, cephalic cage 3.5-7.5 mm long, 17-26 chaetigers). One specimen (USNM 57061), off Delaware, R/V *Pierce*, Stat. H1 (39°12.1'N, 72°23.6'W), 390 m, 28.VIII.1976, G.R. Gaston, (7.5 mm long, 2 mm wide, cephalic cage 6.5 mm long, 27 chaetigers). Three specimens, one damaged (USNM 57060), off Delaware, R/V *Pierce*, Stat. H-1, 350-400 m, 16.III.1976, G.R. Gaston (11/10/6 mm long, 2/2.5/2 mm wide, only one has most cephalic cage chaetae left, 5.5 mm long, 24(8 in tail)/ 24(8 in tail)/ 16 chaetigers [cauda lost]). One specimen (USNM 1073350), collected in Stat. 7 (39°54.134'N, 70°35.054'W), 503 m (11 mm long, 2.3 mm wide, cephalic cage damaged, remaining chaetae 1 mm long, 26 chaetigers). Grand Caribbean, Off Cuba. One specimen (UMML unumb.), without cephalic cage nor posterior end, R/V *Gerda*, Cruise 6813, Stat. 1015 (23°34'N, 79°16'W), N off Central Cuba, 520 m, 15.VI.1968. One specimen (UMML unumb.), R/V *Pillsbury*, Cruise 6809, Stat. 810 (26°04'N, 78°58'W), 183 m, 11.X.1968 (13 mm long, 2 mm wide, cephalic cage 4 mm long, 23 chaetigers). Guadeloupe. One specimen (UMML unumb.), R/V *Pillsbury*, Cruise 6907, Stat. 943 (16°26'N, 61°36'W), W off Point-Louis, Grand Terre, 274 m, 17.VII.1969 (9.5 mm long, 2 mm wide, cephalic cage 9 mm long, 23 chaetigers).

DISTRIBUTION. — Western Atlantic Ocean, from Delaware to Florida to Guadeloupe, in soft bottoms in 274-600 m water depth.

DESCRIPTION

Syntype (MCZ 778) slightly dehydrated, whitish, depressed, anteriorly swollen, posteriorly tapered into a thin cauda (Fig. 1A); 10 mm long, 2 mm wide, cephalic cage 6 mm long, 28 chaetigers. Tunic thick, with small whitish sediment particles, including forams. Body papillae long, capitate, making large stiff tubercles, laterally continuous in chaetiger 3, discontinuous in following chaetigers, one-two transverse rows in median chaetigers (Fig. 1B), slightly smaller ventrally (Fig. 1C), decreasing in size posteriorly; cauda without large tubercles, finely covered by sediment (Fig. 1E).

Anterior end modifications observed in two non-type specimens (LACM-AHF Atlantis, Stat. D1). Cephalic tube exposed (1 mm long), rugose, made of a single ring, margin papillated. Oral siphon long (1.5 mm long), pale. Prostomium low; eyes not seen. Caruncle short, not separating branchiae into two lateral groups. Palps thick, slightly longer than branchiae; palp keels reduced. Lateral and dorsal lips fused, well developed; ventral lip reduced.

Branchiae cirriform, sessile on branchial plate, arranged in two rows, distal row with eight filaments of similar thickness, proximal row with two filaments per side (Fig. 1D). Longest branchiae

slightly shorter than palps. Nephridial lobes placed more or less between branchial rows.

Cephalic cage with many chaetae broken, chaetae as long as ⅗ body length or three times longer than body width. Chaetigers 1-2 involved in cephalic cage; chaetae arranged in short lateral groups; chaetigers 1 and 2 with two-three chaetae per bundle. Anterior dorsal margin of first chaetiger pentagonal, papillated. Anterior chaetigers probably with long papillae, eroded in syntype. Chaetiger 1-2 increasing in length posteriorly, chaetiger 2 longer, about as wide as chaetiger 1, constricted posteriorly; chaetiger 3 shorter, enhanced with sediment tubercles. Chaetal transition from cephalic cage to body chaetae gradual; pseudocompound neurochaetae in chaetigers 5-7 (those in chaetiger 4 broken), falcate neurohooks from chaetiger 8. Gonopodial lobes not seen.

Parapodia poorly-developed, lateral, chaetae emerge from the body wall; median neuropodia ventrolateral. Noto- and neuropodia with large rounded tubercles, widely separated from each other. Median notochaetae arranged in a tuft; all notochaetae multiarticulated capillaries, articles medium-sized, becoming longer medial- and distally, notochaetae as long as ⅓-¼ body width, one-two per bundle. Neurochaetae annulated capillaries in chaetigers 1-4, two pseudocompound neurohooks per bundle in chaetigers 5-7 (Fig. 1F), decreasing in size posteriorly, each with handle slightly expanded distally, with medium-sized poorly defined articles, and blade hyaline (many lost in syntype); falcate neurohooks from chaetiger 8, arranged in transverse series, three per bundle along trunk (Fig. 1G), decreasing to two in posterior chaetigers. Falcate neurohooks with medium-sized anchylosed articles, tips hyaline.

Posterior end tapered into a blunt cone; pygidium with anus terminal, without anal cirri.

Remarks

Therochaeta collarifera resembles *T. pacifica*; however they differ in the relative development of the first two chaetigers and of the sediment tubercles. Thus, *T. collarifera* has the first two chaetigers in a thinner and more swollen pattern, whereas in *T. pacifica* this region is wider and less swollen. Further, in *T. collarifera* the sediment tubercles in chaetigers 3 and 4 are more elevated than the corresponding ones in *T. pacifica* and these projected tubercles are even present in the smallest specimens examined (LACM-AHF, Stat. Ch 105B; 3.5 mm long). The record for the Northeastern Atlantic Ocean (Amoureux 1982: 192) should be assigned to the Mediterranean form of *T. flabellata* (see below). Hartman (1965: pl. 40, fig. d) provided a schematic illustration for the anterior end, but it was based on a dissected specimen and although the relative size of palp and branchiae are correct, the branchial filaments were illustrated as arranged in a single row with only eight filaments, which correspond to the distal row, but the proximal filaments as well as the nephridial lobes were not illustrated.

Therochaeta caudata (Rioja, 1963) n. comb. (Fig. 2)

Yliphagus caudatus Rioja, 1963: 191-195, figs 94, 95.

Flabelliderma caudata – Salazar-Vallejo 1981: 112, 113, fig. 12. — Hendrickx *et al.* 1997: 22, 23.

Ilyphagus caudatus – Salazar-Vallejo 1989: 52.

Material examined. — Eastern Tropical Pacific.– Four specimens, two (UNAM 4524) and two (UNAM 4549), Mazatlán Bay, Sinaloa, México (23°10'N, 106°24'W), 17 m, 8.XII.1996. Three specimens, two (UANL) and one specimen (ECOSUR), Estero de Urias (23°12'N, 106°23'W), Mazatlan, Sinaloa, Mexico, intertidal, 15.I.1979, A. Rutgers coll.

Distribution. — This is a shallow water species that has been collected in 0-24 m in the southwestern coast of the Baja California peninsula and in Mazatlan, Sinaloa.

Description

Largest specimen (UNAM 4524) cylindrical, globose, tapered posteriorly (Fig. 2A). Body cross-section oval, slightly compressed; 8 mm long, 1 mm wide, cephalic cage 4 mm long, 21 chaetigers. Tunic thin with fine sediment particles. Body papillae filiform capitate, with large amount of sediment towards its base forming tubercles of different sizes, larger dorsally, about three-four rows per segment.

Cephalic hood exposed, narrow, made by two rings (2 mm long); basal ring rugose, finely annulated, at least five times longer than distal ring;

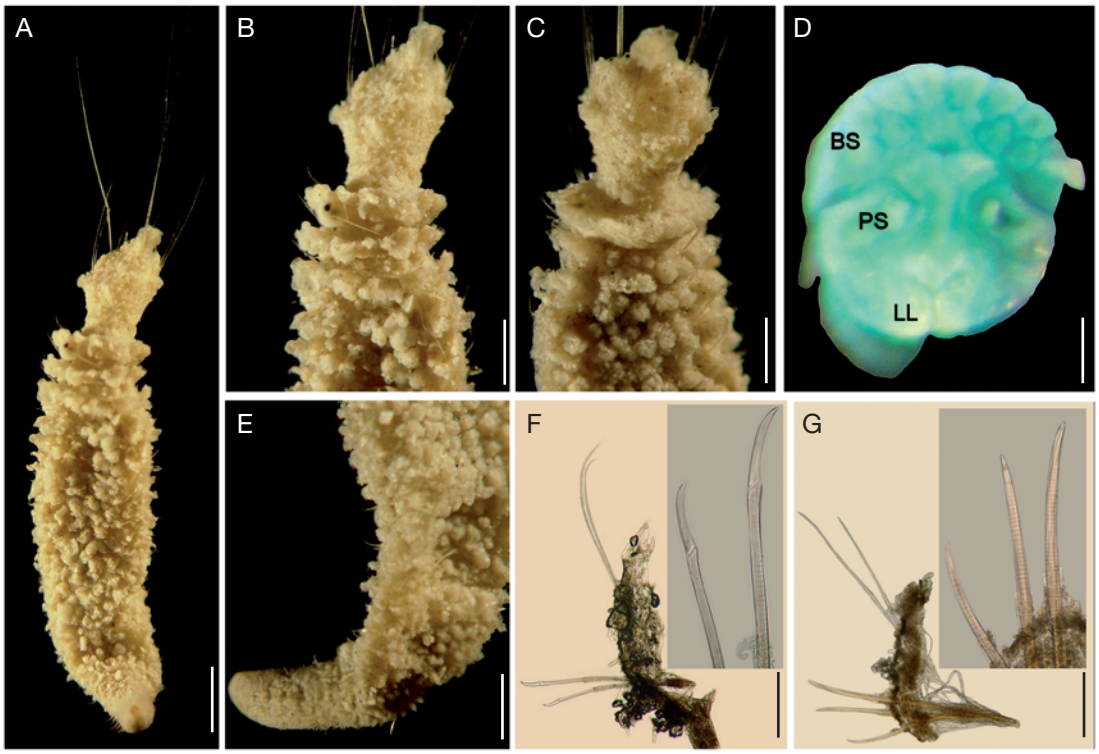

FIG. 1. — *Therochaeta collarifera* (Ehlers, 1887): **A**, syntype (MCZ 778), oblique dorsal view; **B**, same, anterior end; **C**, same, ventral view; **D**, non-type specimen (LACM-AHF, R/V *Atlantis*, Stat. D1), head, frontal view; **E**, syntype (MCZ 778), posterior region, lateral view; **F**, non-type specimen (USNM 57060), chaetiger 7, right parapodium (insert tip of pseudocompound hooks); **G**, same, chaetiger 16, right parapodium (insert neurohooks). Abbreviations: **BS**, branchial scars, **LL**, lateral lip, **PS**, palp scar. Scale bars: A, 1 mm; B, 0.7 mm; C, 0.6 mm; D, 75 µm; E, 0.5 mm; F, 350 µm; G, 450 µm.

distal ring transparent, smooth. Cephalic hood margin crenulated, with small papillae.

Anterior end observed by dissection in another specimen (UNAM 4549). Prostomium low cone with four dark brown eyes (Fig. 2A); two inner pigmented spots placed laterally to the anterior eyes. Caruncle not detected. Palps thick, corrugated; palp keels not seen.

Branchiae cirriform, arranged into two marginal dorsolateral rows, one on each side, about 20 filaments with ciliary girdles (Fig. 2B). Palps and branchiae apparently of the same size when contracted.

Cephalic cage chaetae half as long as body length, four times longer than body width. Cephalic cage made only by chaetigers 1-2, with chaetiger 2 slightly displaced dorsally. Chaetiger 3 with chaetae long but less than half those present in chaetiger 2. Cephalic cage chaetal arranged in short, lateral series. Four to five chaetae per bundle.

Anterior dorsal margin of first chaetiger papillated; papillae sessile, not placed over any projection. Chaetigers 1-2 with long papillae over chaetal lobes, longer than following chaetigers. Post-cephalic cage chaetigers not markedly elongated; only chaetiger 3 longer. No constriction behind those chaetigers forming the cephalic cage; parapodia of chaetigers 1-2 better developed than posterior ones. A dorsal, crescentic glandular pad over chaetiger 2, slightly extended forward over chaetiger 1. Chaetal transition from cephalic cage to body chaetae abrupt; pseudocompound neurohooks from chaetiger 4. Gonopodial lobes not seen.

Parapodia better developed in chaetigers 1-2; following parapodia poorly developed; chaetae emerging from body wall. Notopodial papillae longer than neuropodial ones. Noto- and neuropodia close to each other.

Median notochaetae arranged as lateral tufts. All notochaetae capillary multiarticulated, brittle, as long as about ¼ body width in middle segments, articles long throughout the chaetae. Median neuropodia ventrolateral. Neurochaetae multiarticulated capillaries in chaetigers 1-3, one-two pseudocompound hooks in chaetigers 4-8 (Fig. 2C), from chaetiger 9 falcate, anchylosed neurohooks, mostly two per bundle (Fig. 2D), to the end of body.

Posterior end thick, conical; anus terminal without anal cirri.

Remarks

Therochaeta caudata n. comb. and *T. fauchaldi* n. sp. are the only species in the genus without an anterior shield. They differ in the relative development of the sediment tubercles; in *T. caudata* n. comb. there are fewer per segment with the dorsal ones larger, whereas in *T. fauchaldi* n. sp., they are more abundant and of similar size.

Rioja (1963: 191) described *Ilyphagus caudatus* Rioja, 1963 from off Western Baja California Sur, Mexico, with specimens 10-12 mm long, 3-4 mm wide, collected in 21 m, but his type materials were lost (Salazar-Vallejo 1989). The finding of some intertidal materials collected in Mazatlán, Sinaloa, which were regarded as belonging to the same species, allowed for the transfer of the species to *Flabelliderma* (Salazar-Vallejo 1981: 112, 113); because of the presence of pseudocompound neurohooks in anterior chaetigers it keyed out in that genus. This transfer was incorrect as the species belonging to *Flabelliderma* Hartman, 1969 have multiarticulate neurohooks from chaetiger 2 to the end of the body, although those chaetae have been regarded as pseudocompound, they are actually multiarticulate with a distal piece or crest (Salazar-Vallejo 2007). The original combination was later retained; Rioja's species has been regarded as a member of *Ilyphagus* (Salazar-Vallejo 1989: 52) but that placement is also questionable due to the different development of papillae because they form large fine sediment tubercles in Rioja's species, whereas in *Ilyphagus* Chamberlin, 1919 they do not form tubercles (Salazar-Vallejo 2012a). Besides, Rioja's materials were from shallow water and *Ilyphagus* is a deep-water genus.

On the basis of body shape, papillae, and chaetal features, *I. caudatus* may fall within *Bradabyssa* Hartman, 1967. However, the species belonging in *Bradabyssa* lack a well-developed cephalic hood, and its anterior end is barely exposed. The illustrations by Rioja indicate a very long, thin cephalic hood; together with papillae and chaetal features which indicate its affinities with other *Therochaeta* species. Thus, the transitional pseudocompound neurohooks were likely overlooked in the original description; taking the other features into consideration, *I. caudatus* must be transferred to *Therochaeta,* and hence the new combination. However, because these specimens are not from the type locality, they cannot be designated as a neotype; this must wait until material becomes available.

Therochaeta fauchaldi n. sp.
(Fig. 3)

Therochaeta sp. - A Milligan 1984: 47.19-20, figs 47.13, 47.14 (diagnosis).

Type material. — Northern Gulf of Mexico.– Holotype (USNM 117637) and three paratypes (USNM 1206495), off Florida, R/V *Sofla*, Stat. 14 (25°46'01"N, 82°23'49"W), 26 m, 28.VII.1981 (paratypes 1-2 mm long, 0.5-0.7 mm wide, cephalic cage 1.0-2.5 mm long, 15-18 chaetigers; papillae less abundant).

Additional material. — Norhtern Gulf of Mexico. Three specimens (USNM 255041), off Panama City, Florida, R/V *Lash-up*, Stat. 4, 19 km offshore, 32 m, 9.IX.1959, M.L. Jones, N. Hulings & R. Waller coll. (2.0-4.5 mm long, 0.8-1.0 mm wide, cephalic cage 2.3-4.0 mm long, 15-21 chaetigers).

Etymology. — This species is named after Kristian Fauchald, in recognition of his many studies on polychaetes, and especially because of his insight about flabelligerid taxonomy and his significant support for all of my research activities.

Distribution. — Northeastern Gulf of Mexico, off Florida, in sublittoral soft bottoms, about 30 m depth.

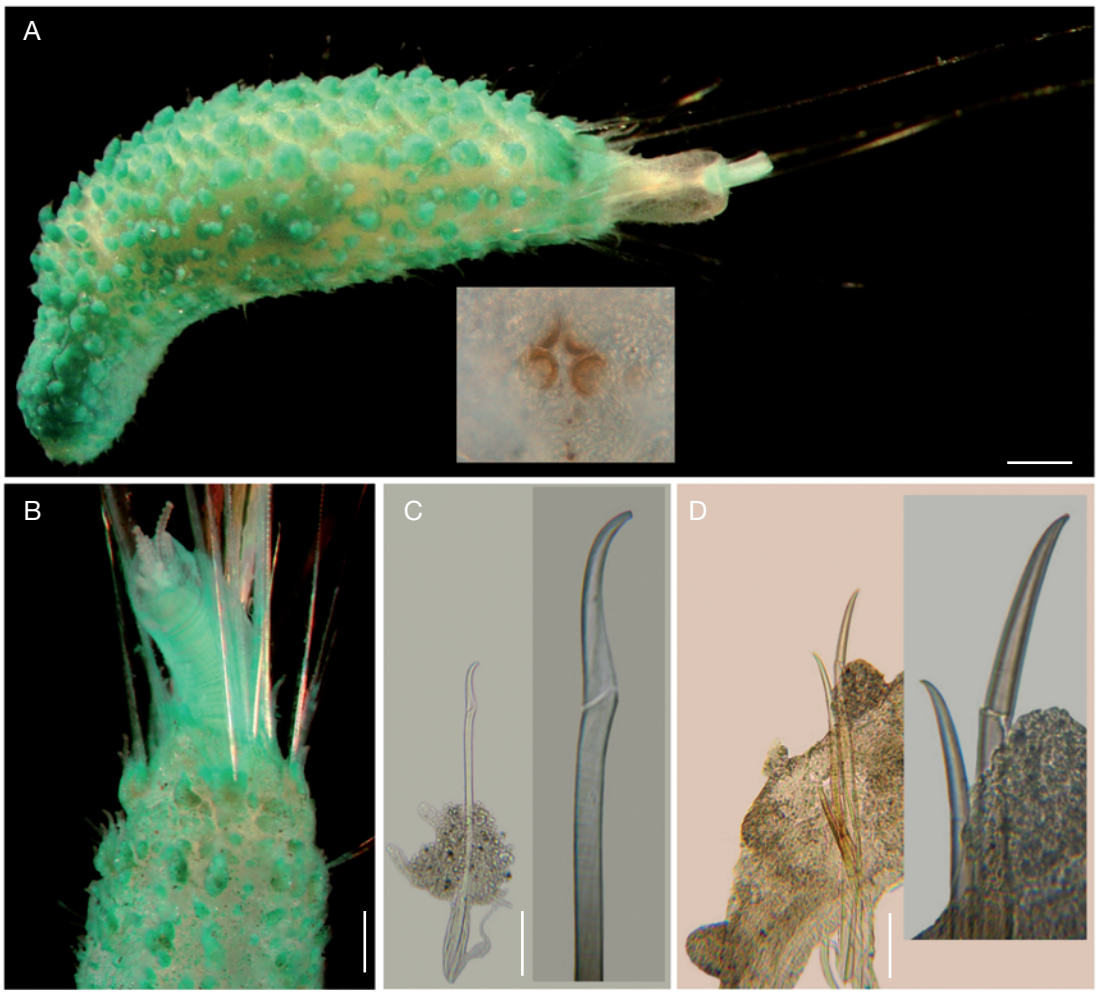

Fig. 2. — *Therochaeta caudata* (Rioja, 1963) n. comb., largest specimen (UNAM 4524); **A**, lateral view (insert: head cross section showing eyes); **B**, another specimen, anterior end, ventral view, some branchiae exposed through the cephalic hood; **C**, chaetiger 5, neuropodium (insert: pseudocompound hook); **D**, chaetiger 15, neuropodium (insert: anchylosed neurohooks). Scale bars: A, 0.7 mm; B, 0.6 mm; C, 70 µm; D, 45 µm.

Description

Holotype (USNM 117637) without posterior region (Fig. 3A). Body anteriorly swollen, tapered posteriorly, cross-section oval, slightly compressed laterally; 4.5 mm long, 1 mm wide, cephalic cage 3.5 mm long, 16 chaetigers. Tunic thin with fine sediment particles adherent over papillae. Body papillae filiform, capitate, with large amount of sediment towards its base, slightly larger dorsally, decreasing gradually in size ventrally (Fig. 3B, C), five-six rows per segment.

Cephalic hood exposed in three paratypes, narrow, apparently made by two rings, rugose; basal ring about four times longer than distal ring. Cephalic hood margin crenulated, with small papillae.

Anterior end observed in paratypes. Prostomium low, with four large black eyes. Caruncle short, not reaching the branchial plate posterior margin. Palps thick, pale, smooth (only one left in one paratype); palp keels not seen.

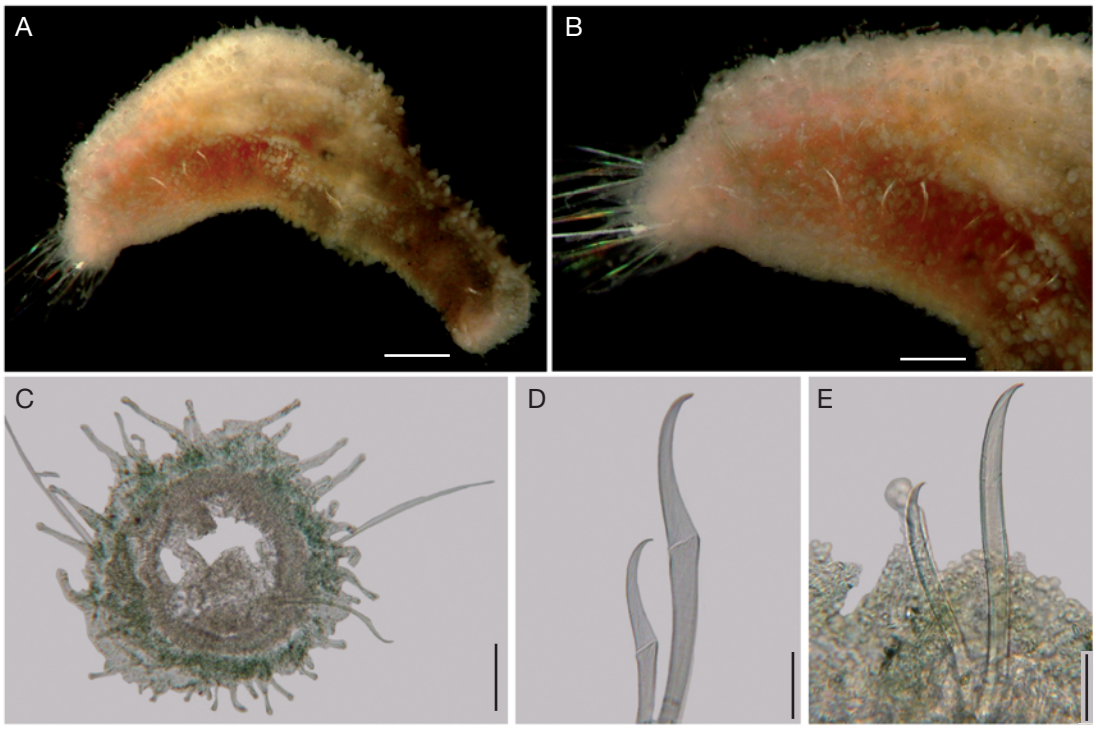

FIG. 3. — *Therochaeta fauchaldi* n. sp.; **A**, holotype (USNM 117637), lateral view; **B**, same, anterior end, lateral view; **C**, non-type specimen (USNM 255041), chaetiger 5, cross section; **D**, same, chaetiger 6, anchylosed neurohooks; **E**, same, chaetiger 12, neurohooks. Scale bars: A, 0.4 mm; B, C, 0.25 mm; D, 20 µm; E, 35 µm.

Branchiae cirriform, sessile on branchial plate, arranged as two concentric rows, posterior row continuous with about 12 branchial scars, anterior row separated in two lateral groups, each with four branchial scars, making 20 total filaments. Size relationships between palps and branchiae unknown.

Cephalic cage chaetae about as long as body length, or four times longer than body width. Cephalic cage made only by chaetigers 1-2, with chaetiger 2 slightly displaced dorsally. Chaetiger 3 with chaetae long but less than half those present in chaetiger 2. Cephalic cage chaetae arranged in short series, lateral, four-five chaetae per chaetal lobe.

Anterior dorsal margin of first chaetiger papillated. Chaetigers 1-2 with long papillae over their chaetal lobes, longer than following chaetigers. Post-cephalic cage chaetigers not elongated; only chaetiger 3 longer. No constriction behind those chaetigers forming the cephalic cage; parapodia of chaetigers 1-2 better developed than posterior ones. A crescentic glandular pad with a smaller portion on chaetiger 1. Chaetal transition from cephalic cage to body chaetae abrupt; pseudocompound neurohooks from chaetiger 4. Gonopodial lobes not seen.

Parapodia better developed in chaetigers 1-2; following ones poorly developed; chaetae emerging from the body wall. Notopodia with longer papillae than neuropodia (Fig. 3C). Noto- and neuropodia close to each other. Median notochaetae arranged as lateral tufts. All notochaetae multiarticulated capillaries, articles long throughout the chaetae or becoming shorter distally; longest chaetae as long as about ⅓ body width. Median neuropodia ventrolateral. Neurochaetae multiarticulated capillaries in chaetigers 1-3, one-two pseudocompound hooks in chaetigers 4-8 (Fig. 3E, D), from chaetiger 9 two or three falcate anchylosed hooks (Fig. 3E) to the end of the fragment.

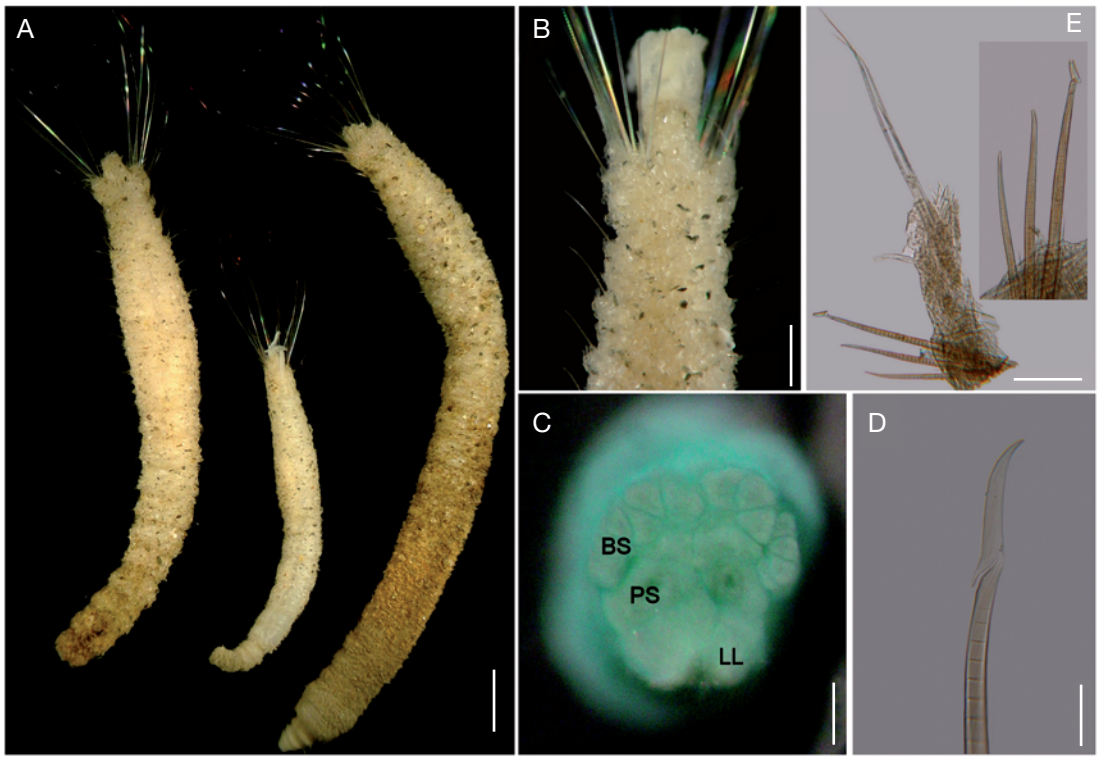

FIG. 4. — *Therochaeta flabellata* (Sars *in* Sars, 1872), non-type specimens; **A**, larger specimens (LACM-AHF), dorsal view, smaller one in ventral view; **B**, smaller specimen, dorsal view, palps and branchiae removed; **C**, non-type specimen (ZMUB 41770), head, frontal view; **D**, same, chaetiger 4, pseudocompound neurohook; **E**, same, chaetiger 25, right parapodium (insert: anchylosed neurohooks). Abbreviations: **BS**, branchial scars; **LL**, lateral lip; **PS**, palp scar. Scale bars: A, 2.4 mm; B, 0.25 mm; C, 70 µm; D, 50 µm; E, 150 µm.

Posterior end present in paratypes, tapered to a blunt cone; pygidium with anus terminal, without anal cirri.

REMARKS

Therochaeta fauchaldi n. sp. is similar to *T. caudata* n. comb. as both lack a marked constriction in anterior chaetigers; but they differ because in *T. fauchaldi* n. sp. body papillae are abundant and of about the same size, whereas in *T. caudata* n. comb. they are less abundant and dorsal ones are larger.

Therochaeta flabellata (Sars *in* Sars, 1872) (Fig. 4)

Trophonia flabellata Sars, 1869: 253 (species list, *nomen nudum*); Sars *in* Sars 1872: 409; 1873: 249-252, pl. 17, figs 1-12.

Stylarioides flabellata – McIntosh 1915: 100-102, pl. 94, fig. 1, pl. 96, fig. 4, pl. 104, figs 3-3e. — Fauvel 1927: 117, figs 41h-m.

Pherusa flabellata – Støp-Bowitz 1948a: 18-20, fig. 3; 1948b: 36. — Hartmann-Schröder 1971: 372; 1996: 420, fig. 204. — Gillandt 1979: 57, fig. 21. — Jirkov & Filippova 2001: 362, figs 1-4

Therochaeta flabellata – Fauchald 1972: 416 (n. comb.). — Castelli 1990: 15

MATERIAL EXAMINED. — Northeastern Atlantic Ocean. Six specimens (ZMUB 18602), damaged, Osterfjord, Norway, 20.I.1930 (10-13.5 mm long, 1.5-2.0 mm wide, cephalic cage 1.2-2, 16-21 chaetigers; ova 125 µm). Four specimens (ZMUB 2285), damaged, only one complete, Hardangerfjord, Norway, Danielsen coll. (complete 12 mm long, 2 mm wide, cephalic cage 4 mm long, 20 chaetigers). Two specimens (ZMUB 41770), both with anterior end everted, Bergensfjord Strait, Norway, 17.III.1924,

Appelløf coll. Two specimens (ZMUB 41771), R/V *Michael* Sars 1906 Expedition, Stat. 300, 7.VII.1906 (9.0-10.5 mm long, 1.8 mm wide, cephalic cage 5.5 mm long, 17-18 chaetigers). Three specimens (LACM-AHF), Hardangerfjorden, Stat. 13-52, 144-133 m, 23.IX.1958, K. Fauchald coll. (12.0-21.5 mm long, 1.3-2.5 mm wide, cephalic cage 6 mm long, 19-30 chaetigers). One specimen (HDMSU unnumb.), R/V *Sevastopol*, Stat. 5.1092, 250 m, 12.VII.1957 (10 mm long, 1 mm wide, cephalic cage 5 mm long, 20 chaetigers; pseudocompound hooks in chaetigers 3-8).

DISTRIBUTION. — Northeastern Atlantic Ocean, Norwegian Sea, Arctic Ocean.

DESCRIPTION

Better specimens (ZMUB 41770) with body cylindrical, tapered posteriorly, with marked constrictions in chaetiger 2 and in some posterior chaetigers, looking beaded. Body completely covered by fine sediment grains, mostly whitish or grayish, with some black particles (Fig. 4A); 13.5-16 mm long, 1.5-2.0 mm wide, cephalic cage 3.5 (broken) – 5.0 mm long, 24-25 chaetigers. Tunic thick, with fine sediment particles. Body papillae long, digitate, arranged into two transverse rows, better defined at the level of chaetal lobes, becoming three irregular rows in posterior chaetigers.

Cephalic hood tube short (Fig. 4B), margin with tiny rounded papillae. Prostomium low, without eyes. Caruncle well developed, running to the posterior margin of the branchial plate, not separating branchiae into lateral groups. Palps pale, long, rugose (ZMUB 18602), about three times thicker than branchiae. Palp keels low, rounded. Dorsal and ventral lips reduced; lateral lips thick, pale.

Branchiae cirriform, arranged into two irregular, symmetrical, discontinuous lateral rows (Fig. 4C); each row with two middorsal larger filaments, and three thinner, inferior filaments; inner row with one large filament placed between the middorsal and inferior filaments and another medium-sized inferior filament, making 12 total branchial filaments, only scars left. Banchiae longer and much thinner than palps (ZMUB 18602). Nephridial lobes 2, minute, digitate, placed between branchial groups, externally to the most middorsal filament in each side.

Cephalic cage chaetae golden (coppery in ZMUB 41771), as long as three times body width. Chaetigers 1-2 involved in cephalic cage; chaetae arranged in short lateral series, chaetiger 2 slightly dorsally displaced. Chaetiger 1 with thicker, larger chaetae; six noto- and four neurochaetae; chaetiger 2 with thinner, shorter chaetae, four per bundle. Anterior dorsal margin of first chaetiger with median, truncate anterior lobe; margin papillated. Chaetigers 1-2 with very long papillae, arranged in a postchaetal fan, with up to seven papillae per bundle. Chaetiger 1 short, chaetiger 2 longer, posteriorly slightly constricted, chaetiger 3 shorter than chaetiger 2. No post-cephalic cage chaetigers elongated. Chaetal transition from cephalic cage to body chaetae abrupt, pseudocompound neurohooks start in chaetiger 3. Gonopodial lobes not seen.

Parapodia poorly developed; only chaetigers 1-4(5) more projected from the body wall; in others chaetae emerging from the body wall. Parapodia lateral; median neuropodia ventrolateral. Noto- and neuropodia in chaetigers 1-2 with foliose chaetal lobe and five-seven elongate papillae; remaining notopodia less pronounced with one-three infrachaetal papillae per bundle; remaining neuropodia reduced with one-two papillae per bundle. Noto- and neuropodia not closely aligned.

Median notochaetae arranged in short longitudinal series; all notochaetae multiarticulate capillaries, articles medium-sized medially, elongating distally, three per bundle, as long as ⅕-⅙ body width. Neurochaetae multiarticulate capillaries in chaetigers 1-2. Chaetigers 3-8 with pseudocompound hooks, one (rarely two) per ramus (Fig. 4D), decreasing in size posteriorly; each with anchylosed, short articles basally, longer medially, blade smooth. Chaetiger 9 with yellowish, shorter, falcate simple hooks, arranged in a transverse series, two-three per ramus (Fig. 4E); each with anchylosed, short articles basally, longer medially, distally hyaline.

Posterior end slightly reddish or brownish, without sediment, tapered into a blunt cone; pygidium with anus terminal, no anal cirri.

REMARKS

Therochaeta flabellata was made a new informal combination by Fauchald (1972) and followed by

Castelli (1990). However, the Mediterranean form differs in the relative size of sediment particles, being mostly fine in the Northwestern European populations whereas they are much larger in Mediterranean ones (see below).

Therochaeta flabellata and the similar species from the Mediterranean Sea are the only two species having sediment particles covering most of the body surface, and both have a reduced sediment cover along the last few chaetigers. The nominal forms differ from those present in the Mediterranean Sea especially in the relative size of the sediment particles on their tunics; the Norwegian form has fine sediment particles whereas the Mediterranean form has larger sediment particles and is informally described below.

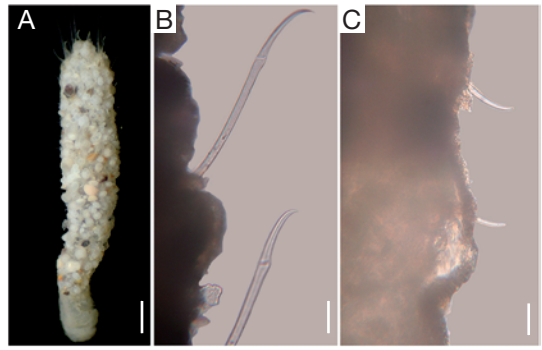

FIG. 5. — *Therochaeta* cf. *flabellata*; **A**, dorsal view, complete specimen (SMF 11284); **B**, same, chaetigers 5-6, right parapodia; **C**, same, posterior chaetigers. Scale bars: A, 0.26 mm; B, C, 20 µm.

Therochaeta cf. *flabellata* Mediterranean Sea (Fig. 5)

Stylarioides flabellata – Fauvel 1927: 117, figs 41h–m (*partim, non* Sars *in* Sars, 1w872).

Therochaeta collarifera – Amoureux 1982: 192, fig. 2Tc (*non* Ehlers, 1887).

Therochaeta flabellata – Castelli 1990: 15 (*non* Sars *in* Sars, 1872).

MATERIAL EXAMINED. — Mediterranean Sea. One specimen (USNM 299599), cephalic cage damaged, apparently made only with chaetae from chaetiger 1. One specimen (SMF 11284), Ionian Sea, Mediterranean Sea, 1008 m. Indian Ocean, Gulf of Oman. One specimen (LACM/AHF unnumb.), broken in two.

REMARKS

The Mediterranean form differs from the Norwegian one (McIntosh 1915, Støp-Bowitz 1948a, b) because its chaetigers 1-2 are not fused, it has large particles over the body (Fig. 5A), whereas the Northern form adheres fine sediment grains only. This was already stated in the original description (Sars 1872: 409): "Cutis arenulis minutis cinereis papillisque minimus conicis […]" (Transl.: "Skin with minute, grayish sand attached to minute papillae"). This species does not belong into *Pherusa*, as correctly indicated by Fauchald (1972) and Castelli (1990) because it has sediment particles covering the body, pseudocompound neurohooks in some anterior chaetigers (Fig. 5B), and falcate neurohooks in posterior chaetigers (Fig. 5C). This species has been recorded from the Mediterranean Sea by Castelli (1990); Indian Ocean specimen resembles the Mediterranean one, but the scarcity of specimens from the same locality has blocked its description for this contribution.

Therochaeta pacifica Fauchald, 1972 (Fig. 6)

Therochaeta pacifica Fauchald, 1972: 231-233, pl. 49, figs a-c.

Stylarioides collarifer Ehlers? . – Moore 1923: 221.

TYPE MATERIAL. — Eastern Pacific Ocean. Holotype (LACM-AHF 1032) and paratype (LACM-AHF 1033), R/V *Velero III*, Stat. 7047 (32°54'21"N, 117°29'33"W), 763 m, 7.V.1960, green sand, mud (8.5 mm long, 2.5 mm wide, cephalic cage 3 mm long, 20 chaetigers).

ADDITIONAL MATERIAL. — Eastern Pacific Ocean. One specimen (USNM 17386), R/V *Albatross*, Stat. 4351, off Point Loma Lighthouse (*fide* Moore 1923), or vicinity of San Diego, California (tag), 761-878 m, 14.III.1904, J.P. Moore. One specimen (LACM-AHF 4917), posterior fragment, R/V *Ancona*, Stat. 06a (44°40.7'N, 125°10.0'W), 1000 m, 5.VI.1965 (4 mm long, 1 mm wide, 11 chaetigers).

DISTRIBUTION. — Southern California to the Western Baja California, Mexico, in 600-1000 m.

DESCRIPTION

Holotype (LACM-AHF 1032) complete, previously dissected antero-ventrally, eversible anterior end exposed (Fig. 6A). Body whitish, depressed anteriorly, swollen posteriorly, distally tapered to form short cauda; 9 mm long, 2.5 mm wide, cephalic cage 6 mm long, 23 chaetigers. Tunic thick, adhering mostly white or transparent sediment grains and black sediment particles resulting in mottled appearance. Body papillae long, capitate, making large stiff tubercles, laterally continuous in chaetigers 1-2, discontinuous in following chaetigers, 3-4 in median chaetigers, larger dorsally (Fig. 6B); cauda without large tubercles.

Cephalic tube not exposed. Prostomium conical, low; eyes not seen. Caruncle short, not reaching posterior branchial plate margin. Palps fallen off, one left in vial is cylindrical, curled, whitish. Lateral and dorsal lips fused, well-developed; ventral lip reduced.

Branchiae mostly lost, short, digitate, sessile on branchial plate, arranged in three-four concentric rows with about 60 filaments (Fig. 6C), middorsal branchial scars larger. Size relationships with palps and among themselves, unknown. Nephridial lobes in branchial plate not seen.

Cephalic cage chaetae as long as ⅔ body length or more than twice as long as body width. Chaetigers 1-2 involved in cephalic cage; chaetae arranged in short lateral groups; chaetigers 1-2 with two noto- and one-two neurochaetae per bundle.

Anterior dorsal margin of first chaetiger triangular, papillate. Anterior chaetigers with long papillae in chaetal lobes. Chaetiger 2 longer than chaetiger 1, constricted posteriorly; chaetiger 3 shorter, as wide as chaetiger 2. Chaetal transition from cephalic cage chaetae to body chaetae gradual; pseudocompound neurochaetae in chaetigers 4-7, falcate neurohooks from chaetiger 8. Gonopodial lobes not seen.

Parapodia poorly-developed, lateral, chaetae emerging from the body wall; median neuropodia ventrolateral. Median noto- and neuropodia with large rounded interramal tubercles. Median notochaetae arranged in short oblique or transverse series; all notochaetae multiarticulated capillaries; articles medium-sized, becoming longer medial- and distally; notochaetae as long as ½–⅓ body width, one-two per bundle. Neurochaetae multiarticulated capillaries in chaetigers 1-3, two pseudocompound neurohooks per bundle in chaetigers 4-7, decreasing in size posteriorly, each with handle slightly expanded distally (Fig. 6D), with medium-sized feebly-defined articles and blade hyaline; falcate neurohooks from chaetiger 8, arranged in transverse series, two-three per bundle (Fig. 6E), decreasing to two in last two chaetigers, each falcate neurohooks with medium-sized anchylosed articles, slightly smaller basal- and subdistally, tips hyaline.

Posterior end tapered to blunt cone; pygidium with anus terminal, without anal cirri.

REMARKS

Therochaeta pacifica is very similar to *T. collarifera* but they differ in two main features: the relative shape of the region formed by chaetigers 1 and 2, and the relative size of the sediment tubercles in chaetigers 3 and 4. Thus, in *T. pacifica* the first two anterior chaetigers take a thicker and slightly depressed form, whereas in *T. collarifera* this region is thinner and swollen. Further, in *T. pacifica* the sediment tubercles in chaetigers 3 and 4 are not markedly projected as is the case in *T. collarifera,* a feature that as stated above is visible even in the smallest juveniles (3.5 mm long). The discrepancies between this redescription and the original one, in relation to the anterior chaetigers and their neurochaetae, may be explained by the fact that first two neuropodia are anteriorly displaced, such that to define their number the specimens must be seen laterally.

Therochaeta sp. Solarte

MATERIAL EXAMINED. — Caribbean Sea. One specimen (LACM-AHF LH03-609), anterior fragment, Panama, Bocas del Toro Archipelago, Bahia Almirante, Isla Solarte, south side, entrance (9.3°N, 82.207°W), SCUBA, 7.6 m, 6.VIII.2003.

DISTRIBUTION. — Only known from the collection site.

DESCRIPTION

Anterior fragment; anteriorly truncate, tapered posteriorly. Body cross-section oval; 1.4 mm long,

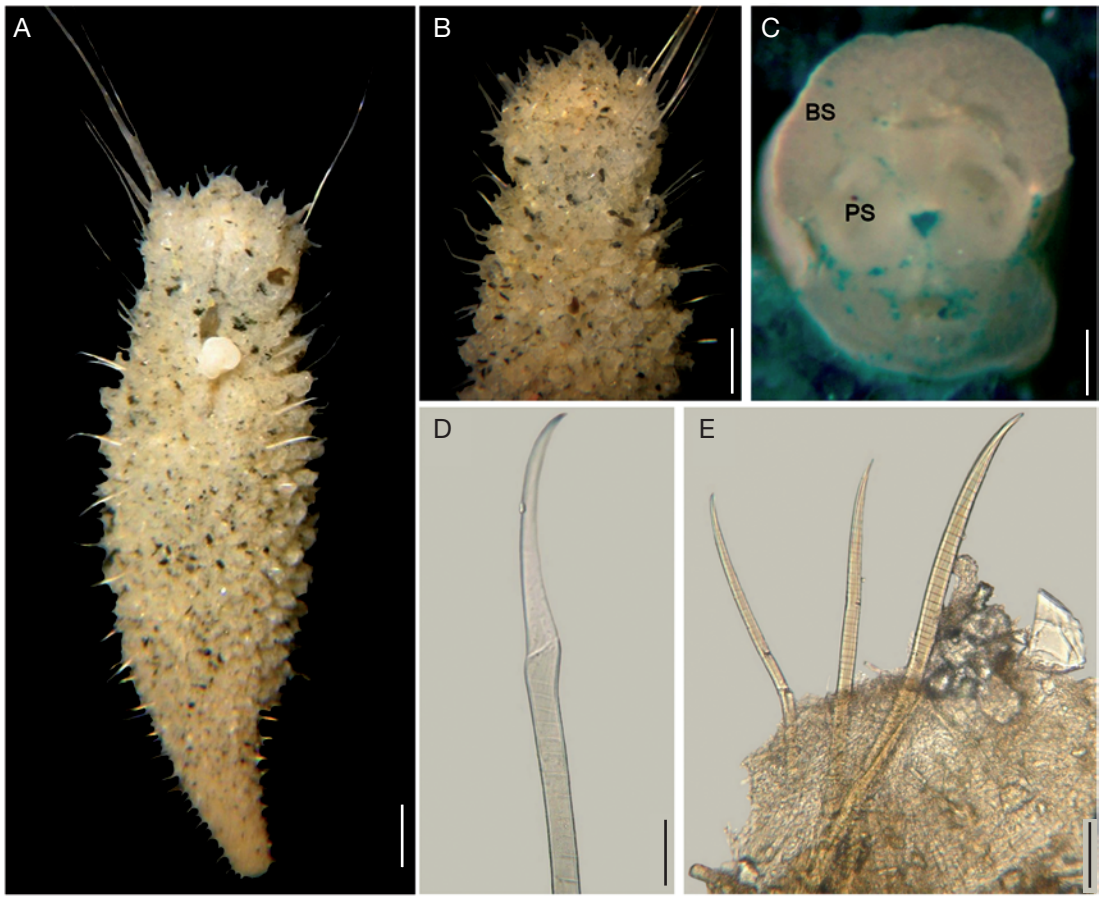

FIG. 6. — *Therochaeta pacifica* Fauchald, 1972; **A-C**, holotype (LACM-AHF 1032); **A**, ventral view, head exposed through dissection; **B**, dorsal view; **C**, head, frontal view; **D,E**, non-type specimen (USNM 17386), chaetiger 4; **D**, pseudocompound hook; **E**, chaetiger 13, neurochaetae. Abbreviations: **BS**, branchial scars; **PS**, palp scar. Scale bars: A, 0.7 mm; B, 0.6 mm; C, 70 µm; D, 45 µm; E, 100 µm.

0.4 mm wide, cephalic cage 1.4 mm long, 10 chaetigers. Body surface rugose, with few long papillae and fine sediment particles adherent throughout its surface. Body papillae cirriform, slightly capitate, with fine sediment particles, longer in notopodial bases and arranged as four longitudinal series.

Anterior end not observed. Cephalic cage chaetae three times longer than body width, made by chaetiger 1, displaced dorsally. Chaetigers 2-3 with long chaetae but not as long as those present in chaetiger 1. Chaetiger 1 with four chaetae per bundle.

Anterior dorsal margin of first chaetiger papillated. All chaetigers with very long notopodial papillae, especially in chaetiger 1; the rest about as long as ⅓ notochaetal length. Chaetiger 2 slightly longer than chaetiger 3 but without constriction on its posterior margin. Chaetal transition from cephalic cage to body chaetae abrupt; pseudocompound neurohooks from chaetiger 2. Gonopodial lobes not seen.

Parapodia poorly developed, chaetae emerging from the body wall. Notopodia with papillae longer than neuropodia. Noto- and neuropodia close to each other. Median notochaetae arranged in short transverse series. All notochaetae multiarticulated capillaries, articles long, longest chaetae as long as half body width. Neuropodia ventrolateral. Neurochaetae multiarticulated capillaries in chaetiger 1, and one

multiarticulate chaetae in chaetiger 2, two pseudocompound hooks in chaetiger 2, three pseudocompound neurohooks in chaetigers 3-4, two neurohooks in chaetiger 5 and three ones in the chaetiger 6. Pseudocompound hooks from chaetiger 2 with handle multiarticulated, whereas the following ones have a smooth, anchylosed handle with blade progressively reduced. Anchylosed neurohooks from chaetiger 7, three in chaetigers 7-8 and two in chaetigers 9-10.

Posterior end unknown.

Remarks

This juvenile specimen might belong to *T. collarifera* or to *T. fauchaldi* n. sp. although the Grand Caribbean species is the former. However, it cannot be assigned to either because it lacks the sediment tubercles found in the former and the abundant papillae found in the latter. It may belong in *T. collarifera* since there are few papillae and the sediment tubercles may start from a gradual accumulation of sediment grains, and then these tubercles continue their growth over some body papillae. On the other hand, despite the fact this specimen lacks its posterior region it may help understand some ontogenetic changes in neurochaetal patterns, because, they start earlier than in larger specimens.

Therochaeta sp. from Xcacel

Material examined. — Caribbean Sea. One specimen (ECOSUR unnumb.), Quintana Roo, Xcacel, northern reef lagoon (20°20'28"N, 87°20'35"W), 1.5 m, coral rocks, 17.IV.1996, L.F. Carrera & SISV coll.

Distribution. — Only known from the collection site.

Description

Complete specimen, wider anteriorly and medially, tapered posteriorly. Body cross-section oval; 3 mm long, 1 mm wide, cephalic cage 2 mm long, 22 chaetigers. Body surface with abundant long papillae and large sediment particles adherent, especially in anterior chaetigers. Body papillae cirriform, markedly capitate, not forming large sediment tubercles.

Anterior end exposed, appendages lost, cephalic hood broken. Cephalic cage chaetae ⅔ as long as body length, or twice as long as body width. Cephalic cage made by chaetigers 1-2, but chaetiger 2 with smaller, fewer chaetae; chaetiger 1 with six notochaetae and four neurochaetae, chaetiger 2 with two notochaetae and two neurochaetae per side.

Anterior dorsal margin of first chaetiger with flat lobe with three distal papillae. All chaetigers with very long notopodial papillae, especially in chaetiger 1; the rest about as long as ⅓-⅙ notochaetal length. Chaetiger 2 markedly longer than chaetiger 3, slightly constricted on its posterior margin. Chaetal transition from cephalic cage to body chaetae abrupt; pseudocompound neurohooks from chaetiger 3. Gonopodial lobes not seen.

Parapodia poorly developed, chaetae emerge from body wall. Notopodia with papillae longer than neuropodia. Noto- and neuropodia close to each other. Median notochaetae arranged in short transverse series. All notochaetae multiarticulated capillaries, articles short basally, medium-sized medially, longer distally, longest chaetae as long as half body width. Neuropodia ventrolateral. Neurochaetae multiarticulated capillaries in chaetigers 1-2, pseudocompound hooks, two per ramus, in chaetigers 3-8, and anchylosed neurohooks in chaetigers 9-21, two in most chaetigers, but a single one in chaetigers 20-21.

Posterior end tapered to a blunt cone; anus terminal, without anal cirri.

Remarks

This juvenile specimen was collected in shallow-water mixed bottoms. It differs from *T. collarifera* and from *T. fauchaldi* n. sp.; from the former because it lacks sediment tubercles, although both have three transverse rows of capitate papillae, and from the latter, because it has large sediment particles. It also differs from other Caribbean juveniles reported above in several features. Both may represent undescribed, shallow water species, but more and better preserved materials are needed before formally naming them.

Therochaeta sp. from Great Barrier Reef

Material examined. — One juvenile (USNM 1132083), poorly preserved, Great Barrier Reef, Orpheus Island (18°37'00"S, 146°30'00"E), Stat. JDT & OPH 2, 1-2 m, 12.II.1989, Thomas & Clark coll.

Distribution. — Only known from the type locality.

DESCRIPTION

Body complete, slightly damaged; 3 mm long, 0.7 mm wide, cephalic cage 1.3 mm long, 23 chaetigers. Sand grains over anterior end, dorsally and ventrally. Chaetiger 1 with very long papillae. Three rows of alternating papillae per segment, of two different sizes. Pseudocompound neurohooks in chaetigers 3-7, two per bundle, longest in chaetiger 3. Simple falcate hooks from chaetiger 8, three per bundle. Posterior end with an achaetous segment; pygidium with anus terminodorsal with two long dorsal papillae.

REMARKS

This juvenile specimen resembles *T. caudata* n. comb. They differ because this juvenile has falcate neurohooks from chaetiger 8 and three per bundle in following chaetigers, whereas in *T. caudata* n. comb. neurohooks start in chaetiger 9 and there are only two neurohooks per bundle.

Paratherochaeta n. gen.

TYPE SPECIES. — *Therochaeta antoni* Kirkegaard, 1996.

GENDER. — Feminine.

DISTRIBUTION. — Species of the genus thrive in tropical and subtropical regions, living in sediments from shallow waters (11 m) to deep waters (3330 m).

DIAGNOSIS. — Body anteriorly swollen or tapered, often constricted between chaetigers 2 and 3. Chaetiger 1 short, chaetiger 2 long, with a transverse constriction on its posterior margin, chaetiger 3 elongated, dorsally elevated, with a narrow transverse band of long papillae. Anterior margin of chaetiger 1 with a dorsal lobe. Cephalic cage made by chaetigers 1-2. Tunic generally covered with sediment grains. Chaetigers 5-7 with multiarticulated neurospines, rarely capillaries; posterior neurochaetae anchylosed hooks or aristate, tapered multiarticulate capillaries. Eight or more cirriform branchiae, sessile on a low branchial plate.

KEY TO SPECIES OF *PARATHEROCHAETA* N. GEN.

1. Sediment particles fine, often forming sediment tubercles throughout five chaetigers . 2
— Sediment particles large, often forming sediment tubercles throughout at least ten chaetigers 6

2. Anterior shield ventrally continuous 3
— Anterior shield ventrally discontinuous; first neurohooks from chaetiger 5 ....*P. orensanzi* n. sp.

3. Median neurochaetae aristate capillaries ..... *P. scutigeroides* (Augener, 1918) n. comb., restricted
— Median neurochaetae falcate neurohooks 4

4. Body of a single color, not markedly bicolor 5
— Body markedly bicolor, anteriorly whitish, posteriorly dirty orange or pale brownish; first neurohooks from chaetiger 7 ..... *P. ehlersi* n. sp.

5. Median and posterior neurohooks falcate, robust; notochaetae of middle or posterior regions with longest median articles 5-6 times longer than wide ..... *P. coronata* (Ehlers, 1908) n. comb., restricted
— Median and posterior neurohooks almost straight, thin; notochaetae of middle or posterior regions with longest median articles three times longer than wide *P. antoni* (Kirkegaard, 1996) n. comb.

6. Median neurochaetae aristate capillaries ..... *P. augeneri* n. sp.
— Median neurochaetae falcate neurohooks 7

7. Neurochaetae markedly sigmoid ..... *P. scutigera* (Ehlers, 1887) n. comb.
— Neurochaetae feebly falcate, almost straight *P. africana* (Rullier, 1965) n. comb., n. stat.

ETYMOLOGY. — *Paratherochaeta* n. gen. is derived from a combination of the name of its stem genus, *Therochaeta,* with the Greek prefix *para* (beside, near, by), to indicate its close resemblance to it.

REMARKS

Paratherochaeta n. gen. is closely allied to *Therochaeta* as indicated in a phylogenetic analysis using morphological features (Salazar-Vallejo *et al.* 2008). Both genera include species with a longer second chaetiger and at least the first three chaetigers may have a cover of cemented sediment grains. Their main difference is that in *Paratherochaeta* n. gen. there are no pseudocompound chaetae present, but falcate hooks or capillary chaetae.

Paratherochaeta antoni (Kirkegaard, 1996) n. comb.
(Fig. 7)

Therochaeta antoni Kirkegaard, 1996: 64-66 fig. 5.

TYPE MATERIAL. — Indian Ocean, Bay of Bengal. Holotype of *T. antoni* (ZMC 852), R/V *Galathea*, Stat. 311 (20°49'N, 88°40'E), off Ganges, India, 445 m, 2.V.1951.

ADDITIONAL MATERIAL. — Indian Ocean, Arabian Sea. One specimen (LACM-AHF 5320), collected during the International Indian Ocean Expedition, R/V *Anton Bruun*, Arabian Sea, Stat. AB 247B (25º06'N, 60º45'E), 110 m, 28.XI.1963 (13.5 (8.5+5.5) mm long, 2 mm wide, cephalic cage 6 mm long, 34 (16+18) chaetigers; first neurohooks from chaetiger 8; gonopodial papillae small, dark, low rounded lobes, in chaetiger 5).

DISTRIBUTION. — Northeastern Indian Ocean, in shelf depths (110-445 m).

DESCRIPTION

Holotype complete (Fig. 7A), slightly damaged, median region macerated, several parapodia with broken chaetae. Body subcylindrical, tapered anteriorly and posteriorly, swollen medially; 26 mm long, 2 mm wide, cephalic cage chaetae 17 mm long, 62 chaetigers. Tunic thin throughout the body. Body papillae variously covered by fine sediment particles; chaetigers 1-7 with sediment particles forming a thin, smooth crust along chaetigers 1-3, chaetigers 4-7 with sediment grains more irregularly placed covering large, subconical papillae (Fig. 7B); posterior chaetigers with individual papillae with very fine sediment particles, not blocking their individual shape. Chaetigers 3-7 with triangular sediment tubercles, larger in chaetigers 3-4, gradually decreasing in subsequently.

Cephalic tube exposed, made by two muscular rings (Fig. 7C, D); basal ring slightly wider, about as long as distal one; margin papillated. Anterior end exposed, heavily contracted, showing about 20 thin branchial filaments left, several branchial scars over lateral folds (Fig. 7D). Prostomium not seen. Palps lost. Dorsal lip short, lateral lips thicker; ventral lip reduced (Fig. 7E). Branchiae cirriform, sessile on branchial plate, arranged in two lateral groups (or spiraling rows), about 20 filaments per side. Nephridial lobes not seen.

Cephalic cage chaetae about as long as 7/10 body length, or more than ten times longer than body width. Chaetigers 1-2 involved in the cephalic cage; chaetiger 3 with long chaetae but not reaching the anterior margin of chaetiger 1. Cephalic cage chaetae arranged in short transverse rows over the body corners, four chaetae per bundle but chaetiger 1 with thicker, 2.5 times longer. Anterior dorsal margin of first chaetiger with long, blunt, rounded projection, margin finely papillated (two other ventrolateral similar, shorter, thinner lobes). Chaetigers 1-2 depressed, long papillae restricted to base of chaetal lobes. Chaetiger 1 very short, chaetiger 2 markedly longer, barely constricted towards its posterior margin, chaetiger 3 shorter, slightly wider than chaetiger 2, shorter than chaetiger 1.

Anterior shield surrounding chaetigers 1-3, smooth, in following chaetigers less well-defined, rough. Chaetal transition from cephalic cage to body chaetae abrupt; neurohooks start in chaetiger 6. Gonopodial lobes in chaetiger 5, sediment cover eroded, each rounded, short, slightly darker than sediment shield (Fig. 7F).

Parapodia well-developed in chaetigers 1-3, flat lobes with long papillae; remaining parapodia poorly developed, chaetae emerge from the body wall. Parapodia lateral, median neuropodia ventrolateral. Noto- and neuropodia short lobes, notopodia with a longer, capitate papillae; a single, smaller capitate interramal papillae. Noto- and neuropodia close to each other.

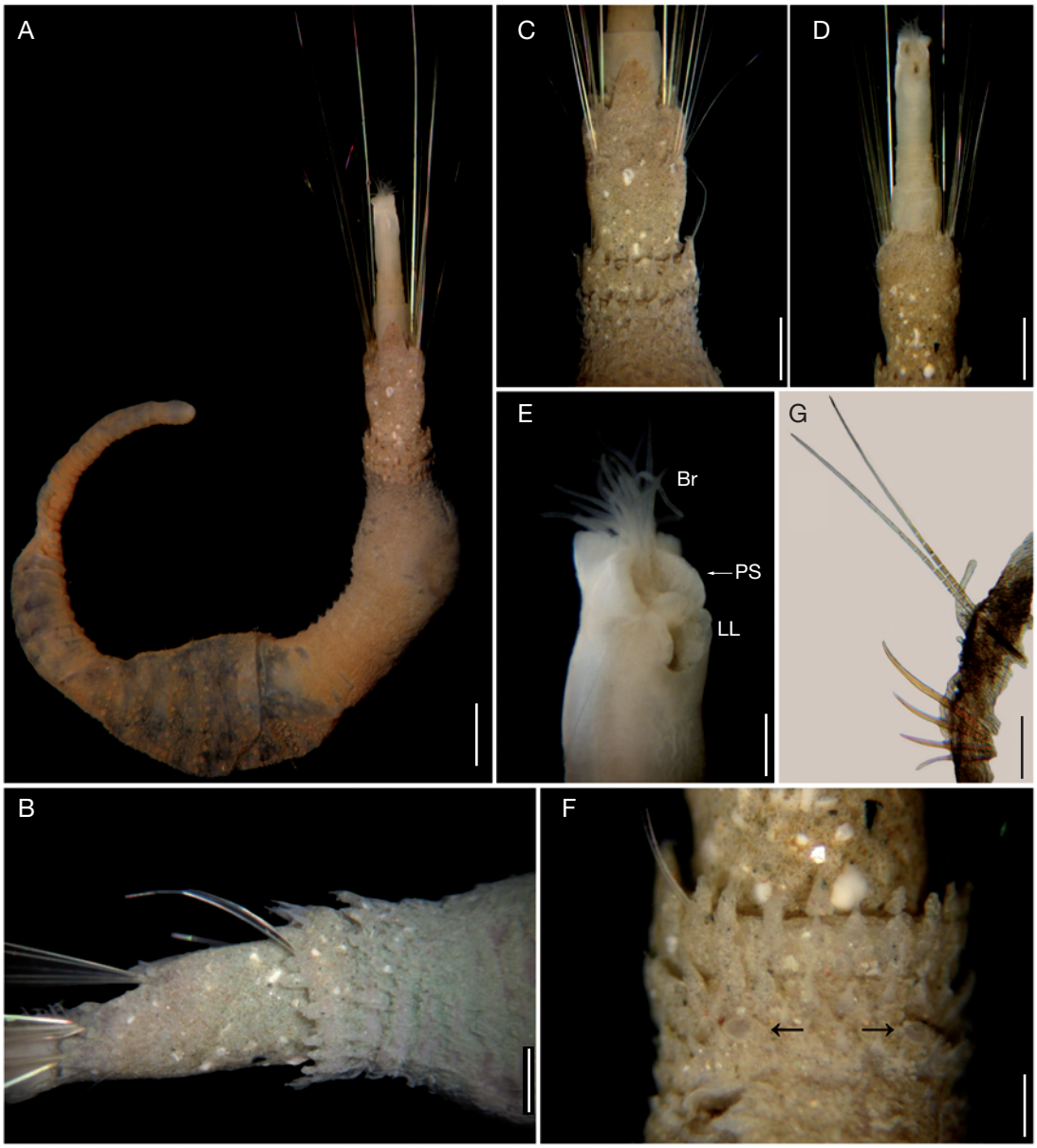

FIG. 7. — *Paratherochaeta antoni* (Kirkegaard, 1996) n. comb., holotype (ZMC 852); **A**, dorsal view, anterior end exposed; **B**, anterior end, lateral view; **C**, anterior end, dorsal view; **D**, anterior end, ventral view; **E**, head, oblique frontal view; **F**, chaetigers 3-6, ventral view, arrows point gonopodial lobes; **G**, posterior chaetiger, right parapodium. Abbreviations: **Br**, branchiae, **LL**, lateral lip, **PS**, palp scar. Scale bars: A, 2 mm; B, 0.8 mm; C, 1.2 mm; D, 1.6 mm; E, 0.35 mm; F, 0.45 mm; G, 150 µm.

Median notochaetae arranged in short transverse series; all notochaetae multiarticulated capillaries, all articles long (longest articles three times longer than wide), progressively slightly smaller distally; two-three per bundle, ⅛-1/10 as long as body width, longer in posterior chaetigers. Neurochaetae multiarticulated

capillaries in chaetigers 1-5 (seven in additional specimen), chaetiger 6 (eight in LACM-AHF 5320) with falcate simple neurospines, four-five per ramus in median and posterior chaetigers (Fig. 7G).

Posterior end tapered; pygidium rounded, colorless, with anus terminal, without anal cirri.

Remarks

Therochaeta antoni Kirkegaard, 1996 does not belong in *Therochaeta* as it lacks pseudocompound neurochaetae in anterior chaetigers; it rather belongs in *Paratherochaeta* n. gen., and hence the new combination. It was described as having neurohooks in chaetiger 6, but the neuropodia had been previously removed, and the left side ones have no chaetae left, but since the anterior parapodia are well preserved, the original statement is regarded as correct. The additional specimen was found in shallower depths and is smaller in size, have neurohooks from chaetiger 8, but they are regarded as conspecific.

Paratherocaheta antoni (Kirkegaard, 1996) n. comb. resembles *P. coronata* n. comb. They especially differ because they have a different relative size of articles in median and posterior notochaetae, and their neurohooks are different as well. Thus, in *P. antoni* the longest articles are about three times longer than wide and neurohooks are more delicate or thinner, whereas in *P. coronata* n. comb. they are 5-6 times longer than wide, and neurohooks are more robust and falcate. An additional difference refers to the depth where they occur since *P. antoni* lives in 110-445 m, and *P. coronata* n. comb. was found in about 1300 m depth.

Paratherochaeta africana (Rullier, 1965) n. comb., n. stat. (Fig. 8)

Stylarioides plumosa africana Rullier, 1965: 47, 48, fig. 9a–e. — Fauchald 1972: 413.

Stylarioides scutigerioides – Tebble 1955: 127, 128, fig. 28 (*partim*, Stat. 55, not fig. 28; *non* Augener, 1918).

Type material. — Equatorial Eastern Atlantic Ocean. Holotype of *Stylarioides plumosa africana* (MNHN 1443), off Cotonou, Benin, Stat. 33 (06°10'N, 02°08'E), 45 m, muddy sand, 3.X.1963, A. Crosnier coll. Paratype of *S. p. africana* (MNHN 1444), off Cotonou, Benin, Stat. 38 (06°07'N, 02°4.5'E), 91 m, gray mud, 3.X.1963, A. Crosnier coll. (16 mm long, 3 mm wide, cephalic cage 6 mm long, 38 chaetigers; some parapodia removed previously).

Additional material. — Eastern Tropical Atlantic Ocean. One anterior fragment (BMNH 1953.3.1.901), damaged, anteriorly depressed, dissected midventrally, off Accra, Ghana, Stat. 55, 7 km WSW Accra Lighthouse, 12 m, 15.I.1951, R. Bassindale coll. (6 mm long, 1.5 mm wide, cephalic cage 3 mm long, 13 chaetigers).

Distribution. — Western Africa, from Senegal to Angola, in 20-91 m depth.

Description

Holotype of *Stylarioides plumosa africana* (MNHN 1443) complete, swollen anteriorly, tapered caudally (Fig. 8A); 22 mm long, 3 mm wide, cephalic cage 8 mm long, 68 chaetigers. Body with cemented sand grains on anterior end forming sediment tubercles, smoother along chaetigers 1-2, constriction before chaetiger 3, large tubercles in chaetigers 3-8, reducing in size posteriorly. Median and posterior chaetigers with globular tubercles made with fine sediment particles; prepygidial region with papillae almost without adherent sediment. Tunic thin, with adherent sediment grains. Body papillae long, capitate, from chaetiger 3 making large tubercles, larger in chaetigers 3-8 with sand grains, posteriorly papillae forming individual tubercles with fine sediment particles; posterior end with almost naked papillae.

Anterior end not exposed. No dissection attempted to avoid further damage.

Cephalic cage chaetae as long as ⅓ body length, or almost three times longer than body width (Fig. 8A). Chaetigers 1-2 involved in cephalic cage; chaetiger 3 with long chaetae but not reaching anterior end, directed laterally (Fig. 8B, C). Cephalic cage chaetae arranged in short series, five-six chaetae per bundle. Anterior dorsal margin of first chaetiger with a median, long papillae making a triangular lobe, projected anteriorly, with two(-three) papillae on its tip. Chaetigers 1-2 with long papillae restricted to base of chaetal lobes. Chaetiger 1 very short, chaetiger 2 markedly longer, constricted on its posterior margin, chaetiger 3 shorter than 2, about as long as chaeti-

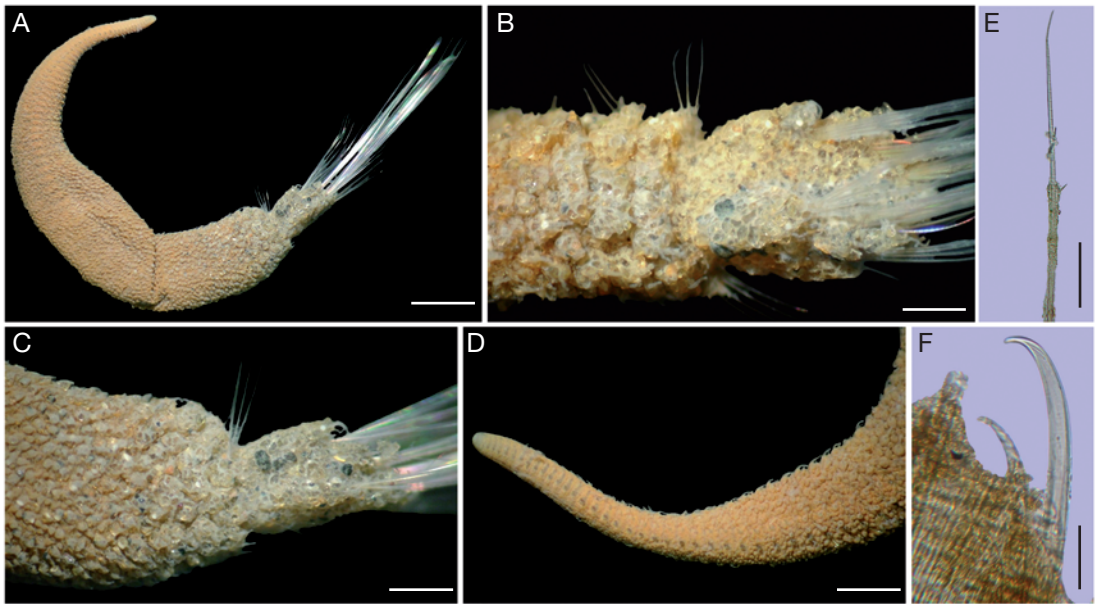

FIG. 8. — *Paratherochaeta africana* (Rullier, 1965) n. comb., n. stat.: **A-D**, holotype (MNHN 1443); **A**, lateral view; **B**, anterior end, oblique dorsal view; **C**, anterior end, lateral view; **D**, posterior region, oblique lateral view; **E, F**, paratype (MNHN 1444); **E**, chaetiger 6, right parapodium, neurochaeta; **F**, chaetiger 10, left parapodium neurochaetae. Scale bars: A, 2.5 mm; B, 0.7 mm; C, D, 1 mm; E, 120 µm; F, 60 µm.

ger 1. Sand cemented anterior shield surrounding chaetigers 1-2. Chaetal transition from cephalic cage to body chaetae abrupt; neurohooks start in chaetiger 8. Gonopodial lobes not seen.

Parapodia poorly developed, except along chaetigers 1-4, flat lobes making large tubercles, projected anteriorly, carrying five-six basal papillae in chaetigers 1-2, only two in chaetiger 3; subsequently chaetae emerge from the body wall. Parapodia lateral, median neuropodia ventrolateral. Notopodia and neuropodia without chaetal lobes, or associated papillae. Noto- and neuropodia distant to each other.

Median notochaetae arranged in short longitudinal series; all notochaetae multiarticulated capillaries, articles long, becoming shorter and less defined distally; three notochaetae per fascicle, about ⅙ as long as body width. Neurochaetae multiarticulated capillaries in chaetigers 1-7 (Fig. 8E), becoming progressively smaller, with long articles; falcate blunt neurohooks from chaetiger 8, arranged in transverse series, three-four per fascicle (Fig. 8F).

Posterior region tapered, more or less cylindrical; pygidium with anus terminal, hemispherical, no anal cirri (Fig. 8D).

REMARKS

Rullier (1965) described *S. p. africana* as a variety and as such, would not be regulated by the International Code of Zoological Nomenclature (ICZN 1999, Art. 15.2). However, because it was listed as a subspecies by Fauchald (1972) the name became available (ICZN 1999, Art. 45.6.4.1) with the original author and year.

Despite listing four main differences, Rullier decided to retain his variety under *S. plumosa africana,* resting on a previous record for this northern species (p. 48): "… a été signalé jusqu'à la latitude du Maroc" (Transl.: … has been recorded up to the Morocco latitude). This record was not cited by Rullier but corresponds to Fauvel (1936: 76). The holotype has a clear constriction after chaetiger 2, large dorsal tubercles with sand particles, but does not have pseudocompound neurohooks and con-

sequently it does not belong in *Therochaeta* but has to be transferred to *Paratherochaeta* n. gen.

Paratherochaeta africana n. comb., n. stat., resembles *P. scutigera* n. comb. because both species have sediment tubercles continued beyond chaetiger 5. They differ mainly on the relative curvature of neurohooks because they are almost straight, but distally curved in *P. africana* n. comb., n. stat., whereas they are markedly sigmoid in *P. scutigera* n. comb. Other differences must be sought once some specimens of *P. scutigera* n. comb. become available.

Paratherochaeta augeneri n. sp.
(Fig. 9)

Stylarioides scutigeroides Augener, 1918: 444-447, pl. 6, figs 155, 185 (*partim*). — Tebble 1955: 127-128 (*partim*, not Stat. 55), fig. 28. — Kirkegaard 1959: 43 (*partim*).

Stylarioides (?) *scutigeroides* – Amoureux 1973: 61 (*non* Augener 1918).

Pherusa scutigeroides – Intes & leLoeuff 1977: 236 (*non* Augener 1918).

Type material. — Tropical Eastern Atlantic Ocean. Holotype (ZMUC 1786) and paratype (ZMUC 1787), off Monrovia (06°18'48"N, 10°48'05"W), Liberia, R/V *Atlantide*, Stat. 52 (no coordinates), 11 m, 3.I.1946 (paratype is an anterior fragment, damaged, 8 mm long, 3 mm wide, cephalic cage (broken) 1.5 mm, 15 chaetigers).

Additional material. — Tropical Eastern Atlantic Ocean. Four specimens (BMNH 1953.3.1.904), damaged, partially dehydrated, two complete, off Accra, Ghana, Stat. 69, 14 km WSW Accra Lighthouse, 22 m, 22.I.1951, R. Bassindale coll. (5.0-5.5 mm long, 1.0-1.5 mm wide, cephalic cage 2 mm long, 17-19 chaetigers).

Etymology. — This species is named after Hermann Augener, who made many monographic papers on polychaetes, including the now famous one on Western Africa. In most of his publications, he attempted to examine type material to confirm previous descriptions. Regretfully, this legacy is not yet a widespread practice among polychaete taxonomists.

Type locality. — Off Monrovia, Liberia, Western Africa.

Distribution. — Tropical and subtropical Western Africa, from Morocco to Angola, in shallow water (3-50 m).

Description

Holotype and paratype completely covered by sediment grains (Fig. 9A), becoming less abundant posteriorly. Body medially swollen, anteriorly and posteriorly tapered. Tunic thick, with sediment particles forming sediment tubercles (holotype sediment cover removed). Holotype 15 mm long, 3 mm wide, cephalic cage (broken) 3 mm long, 47 chaetigers. Anterior end not dissected to avoid further damage.

Cephalic cage damaged, chaetae about as long as body width (before removing the sediment cover). Chaetigers 1-2 involved in cephalic cage; chaetiger 3 with chaetae twice as long as those in chaetiger 4, but not contributing to cage. Cephalic cage chaetae arranged in short series, surrounding anterior end. Chaetiger 1 with three noto- and two neurochaetae per bundle; chaetiger 2 with about six chaetae per bundle.

Anterior dorsal margin of first chaetiger depressed, without lobes (ventrally with two triangular blunt lobes, Fig. 9B). Anterior chaetigers with long papillae in chaetal lobes; in chaetigers 3-4 papillae arranged in single transverse bands per segment; each papillae making a large tubercle, fusing to form a crown. Chaetigers 1-2 elongating posteriorly; constriction in chaetigers 2 and 3.

Sand cemented anterior shield surrounding chaetigers 1-4, stiff; following chaetigers with sediment cover continued but flexible, not stiff. No chaetal transition from cephalic cage to body chaetae; all neurochaetae multiarticulated capillaries. Gonopodial lobes in chaetiger 4 (Fig. 9B [arrows]).

Parapodia better developed in anterior chaetigers, foliose lobes; other parapodia reduced, chaetae emerging from body wall. Parapodia lateral; median neuropodia ventrolateral. Noto- and neurochaetae low lobes; without long papillae, two interramal long papillae. Noto- and neuropodia distant to each other.

Median notochaetae arranged in short longitudinal series; all multiarticulate capillaries, five-six per bundle, about as long as ⅕ body width (with sediment cover) or about ⅓ body width (without sediment cover). Neurochaetae all multiarticulated aristate capillaries, reddish basally, articles medium-

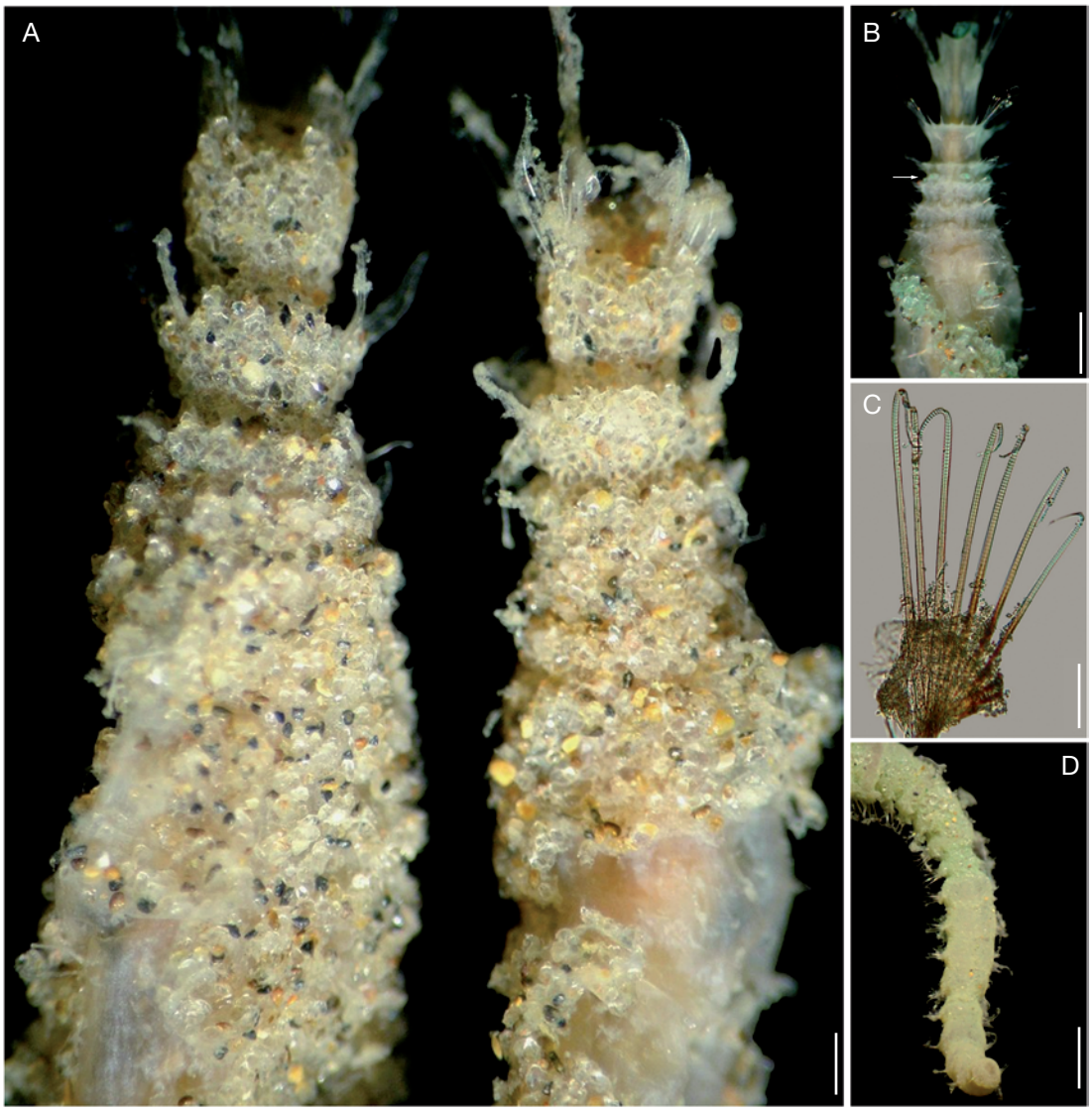

FIG. 9. — *Paratherochaeta augeneri* n. sp.; **A**, paratype (ZMUC 1787), left, and holotype (ZMUC 1786), right, dorsal views; **B-D**, holotype, sediment tubercles removed (arrow points gonopodial lobes); **C**, chaetiger 16, right parapodium, neurochaetae; **D**, posterior region. Scale bars: A, 0.5 mm; B, 1.3 mm; C, 60 µm; D, 0.8 mm.

sized continued to tip, four in anterior chaetigers, up to nine in posterior chaetigers (Fig. 9C), arranged in a U-pattern.

Posterior end with sediment particles over body wall, becoming less abundant towards pygidium; anus terminal, no anal cirri (Fig. 9D).

REMARKS

Paratherochaeta augeneri n. sp. belongs to *Paratherochaeta* n. gen. because it lacks pseudocompound hooks; *P. augeneri* n. sp. is the only species of the genus having a tunic with large sediment tubercles and multiarticulated capillaries in all

neuropodia, as originally illustrated by Tebble (1955: 129, fig. 28).

Paratherochaeta coronata (Ehlers, 1908)
n. comb., restricted
(Fig. 10)

Stylarioides coronatus Ehlers, 1908: 121-123, pl. 16, figs 3-8 (*partim*); Hartwich 1993: 93.

Stylarioides coronatus – Caullery 1944: 35, fig. 26.

Therochaeta coronate – Fauchald 1972: 416 (n. comb.).

TYPE MATERIAL. — Western Indian Ocean. Lectotype of *Stylarioides coronatus* (ZMB 6776), Deutsche Tiefsee-Expedition 1898-99, R/V *Valdivia*, Stat. 258 (02°58'N, 46°50'E), off Mogadishu (Hamar), Somalia, 1362 m, pteropod ooze.

DISTRIBUTION. — Western Indian Ocean and Java Sea, in deep water (1300-3300 m).

DESCRIPTION

Lectotype complete (ZMB 6776), slightly damaged, some portions of tunic eroded (Fig. 10A). Body medially swollen, tapered towards both body ends; 28 mm long, 2 mm wide, cephalic cage chaetae 16.5 mm long, 66 chaetigers. Chaetigers 1-7 with fine, cemented, sediment particles (Fig. 10A-C), following chaetigers without cemented particles, individual papillae with very fine sediment particles, not blocking their individual shape. Chaetigers 3-7 with triangular sediment tubercles, larger in chaetigers 3-4, gradually decreasing in following chaetigers (Fig. 10B, C).

Cephalic tube not exposed; anterior end details unknown.

Cephalic cage chaetae about as long as 4/7 body length or more than eight times longer than body width. Chaetigers 1-2 involved in cephalic cage; chaetiger 3 with long chaetae but not reaching anterior margin of chaetiger 1. Cephalic cage chaetae arranged into short series, four-five chaetae per bundle. Anterior dorsal margin of first chaetiger with a short rounded projection, margin papillated (Fig. 10C). Chaetigers 1-2 depressed, long papillae restricted to base of chaetal lobes. Chaetiger 1 very short, chaetiger 2 markedly longer, slightly constricted towards its posterior margin, chaetiger 3 shorter, slightly wider than chaetiger 2, shorter than chaetiger 1. Sand cemented anterior shield surrounding chaetigers 1-3, less well-defined in following chaetigers. Chaetal transition from cephalic cage to body chaetae abrupt; neurohooks start in chaetiger 7. Gonopodial lobes not seen.

Parapodia well-developed in chaetigers 1-3, flat lobes with elongate papillae and abundant chaetae; remaining parapodia poorly developed, chaetae emerge from body wall. Parapodia lateral, median neuropodia ventrolateral. Noto- and neuropodia short lobes, without long papillae; a single capitate interramal papillae. Noto- and neuropodia well separated.

Median notochaetae arranged in short transverse series; all notochaetae multiarticulated capillaries, all articles very long (five-six times longer than wide), progressively smaller towards tip; three-four per bundle, 1/6-1/7 as long as body width, longer in posterior chaetigers. Neurochaetae multiarticulated capillaries in chaetigers 1-3, chaetigers four-six with anchylosed thick neurospines, two per bundle (Fig. 10E); falcate neurohooks from chaetiger 7 (Fig. 10F), 4-6 per ramus in median and posterior chaetigers (Fig. 10G).

Posterior end tapered; pygidium rounded, colorless, with anus terminal, without anal cirri (Fig. 10D).

REMARKS

The type material of *Stylarioides coronatus* Ehlers, 1908 included two different species. One was illustrated as having its chaetiger 3 thicker than chaetigers 1-2, and provided with large papillae (Ehlers 1908: pl. 16, figs 5-8); it was collected from shallow water (141 m). The other one was illustrated with a thinner chaetiger 3 and having smaller papillae (Ehlers 1908: pl. 16, fig. 4); it was collected in deeper water (1302 m). Both syntypes were kept in Berlin (Hartwich 1993: 93), but the shallow water form is dried-out; some specimens which are regarded as conspecific to one of them are described below as *Paratherochaeta ehlersi* n. sp. The remaining syntype, which was collected in deep water, is herein designated as a lectotype, in order to restrict the delineation of the species. This species does not belong in *Therochaeta* because it lacks pseudocompound chaetae in anterior chaetigers.

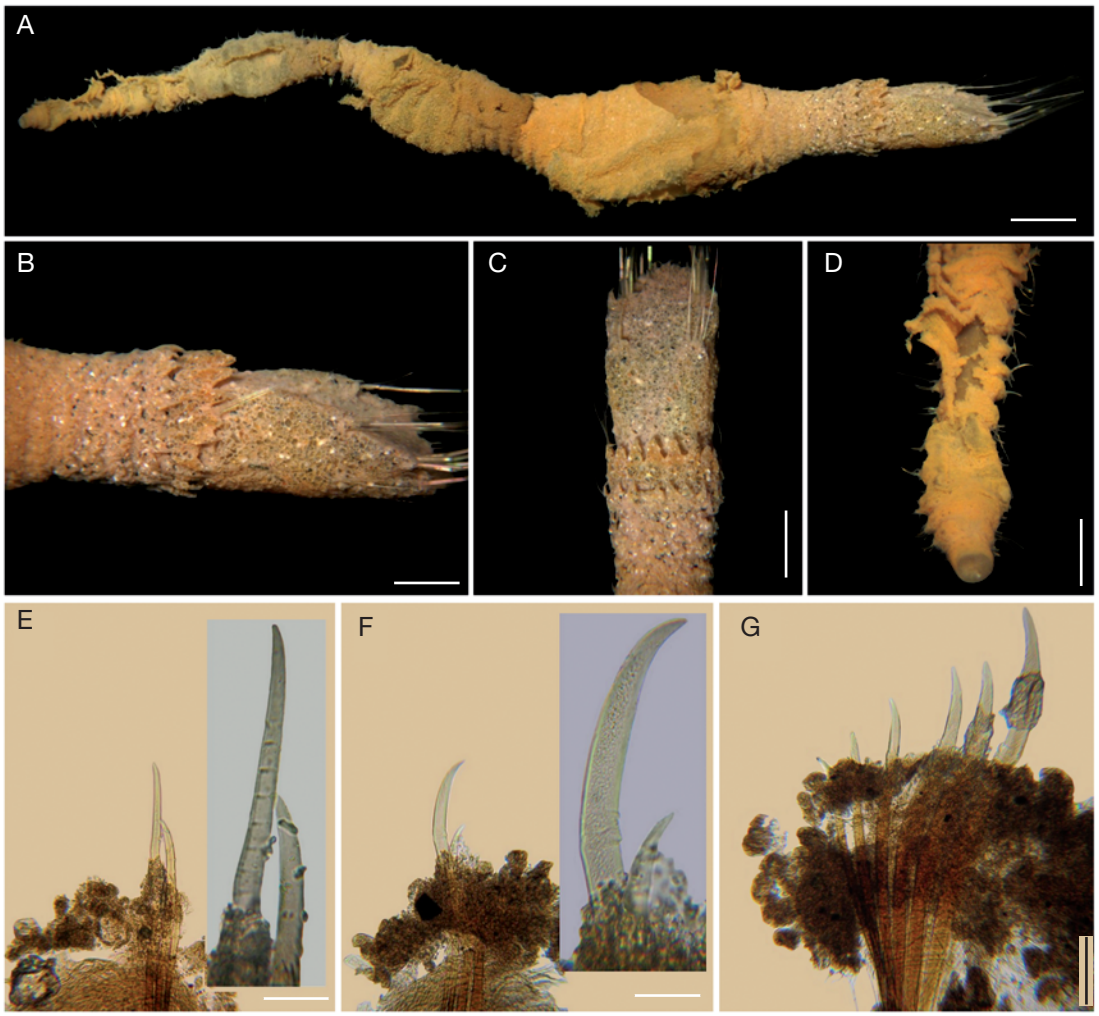

FIG. 10. — *Paratherochaeta coronata* (Ehlers, 1908) n. comb., restricted, lectotype (ZMB 6776); **A**, lateral view; **B**, anterior end, lateral view; **C**, anterior end, dorsal view; **D**, posterior region, dorsal view; **E**, chaetiger 6, right parapodium, neurochaetae (insert: neurochaetae); **F**, chaetiger 7, right parapodium, neurochaetae (insert: neurochaetae enlarged); **G**, chaetiger 41, right parapodium, neurochaetae. Scale bars: A, 2 mm; B, 1 mm; C, 0.7 mm; D, 0.6 mm; E, G, 100 µm; F, 200 µm.

Paratherochaeta coronata n. comb. resembles *P. antoni*. They differ by the relative length of notochaetal median articles, since in *P. coronata* n. comb., they are five-six times longer than wide, whereas they are about three times longer than wide in *P. antoni*. These two species live in different water depths since *P. coronata* n. comb. was found in about 1300 m, whereas *P. antoni* lives in 110-450 m.

Paratherochaeta ehlersi n. sp.
(Fig. 11)

Stylarioides coronatus Ehlers, 1908: 121-123, pl. 16, figs 3-8 (*partim*). — Hartwich 1993: 93.

TYPE MATERIAL. — Southwestern Indian Ocean, Madagascar. Holotype (SMF 15365), Stat. 11 B1, 2.V.1967, R. Plante coll. One paratype (SMF 15362), juvenile, without posterior end, 8 km off Canyon du Banc, Stat. E,

70-80 m, 29.IV.1970, R. Plante coll. (3 mm long, 1 mm wide, cephalic cage 2 mm long, 14 chaetigers; tunic thin with few sediment particles; multiarticulated neurospines in chaetigers 4-6, following chaetigers with neurospines). Two paratypes (SMF 15373), adults, Banc du Pracel, Chesterfield Island, Stat. BP9 (16°21'45"S, 43°45'00"E), grab, 32 m, 9.IV.1970, R. Plante coll. (10.0-12.5 mm long, 1.0-2.5 mm wide, cephalic cage 5-8 mm long, 44-53 chaetigers).

ETYMOLOGY. — The species name is formed after Ernst Ehlers in recognition of his many publications on polychaetes.

TYPE LOCALITY. — Off Madagascar, Western Indian Ocean.

DISTRIBUTION. — Indian Ocean, in shallow water (32-141 m).

DESCRIPTION

Holotype (SMF 15365) markedly bicolor, covered with whitish, large sediment particles anteriorly, fine rust-colored particles posteriorly (Fig. 11A). Body anteriorly swollen, posteriorly tapered; 10 mm long, 1.5 mm wide, cephalic cage 2 mm long, 52 chaetigers. Tunic thin, with large sediment particles over anterior chaetigers, posterior chaetigers with tunic poorly developed, papillae can be recognized individually.

Cephalic tube exposed, made by two muscular rings (Fig. 11A-C); basal ring wider, about as long as distal one; margin smooth. Anterior end exposed, palps and branchiae lost. Prostomium low, eyes brownish, fading. Caruncle thick, not separating branchial filaments into lateral groups. Dorsal lip short, lateral lips thicker, bent ventrally; ventral lip expanded (Fig. 11D). Branchiae sessile on branchial plate, dorsally connected, 10-11 filaments per side. Nephridial lobes lost, bases placed off upper caruncle margin.

Cephalic cage partly damaged, chaetae ⅕ as long as body length, or slightly longer than body width. Chaetigers 1-2 involved in cephalic cage; chaetiger 3 with chaetae twice as long as those in chaetiger 4, but not contributing to cage. Cephalic cage chaetae arranged in short series, surrounding anterior end. Chaetiger 1 with three notochaetae, two larger, broken, and two-three neurochaetae; chaetiger 2 with five-six notochaetae and two-three neurochaetae.

Anterior dorsal margin of first chaetiger with a short rounded lobe (ventrally rounded with two long papillae). Anterior chaetigers with long papillae in chaetal lobes; in chaetigers 3-5 papillae arranged in single transverse bands; each papillae making a large tubercle, fused laterally forming collar. Chaetiger 2 longer; constriction in chaetigers 2 and 3.

Sand cemented anterior shield surrounding chaetigers 1-6, fading posteriorly, stiff, extended dorsally and ventrally. Chaetal transition from cephalic cage to body chaetae gradual, chaetigers 1-6 with multiarticulate capillary neurochaetae; anchylosed neurohooks from chaetiger 7. Gonopodial lobes not seen.

Parapodia better developed in anterior chaetigers; remaining parapodia reduced, chaetae emerge from the body wall. Parapodia lateral; median neuropodia ventrolateral. Noto- and neurochaetae low lobes, barely noticeable; without long chaetal lobe papillae, one-two interramal papillae. Noto- and neuropodia distant to each other.

Median notochaetae arranged in short longitudinal series; all multiarticulated capillaries, two-three per bundle, about as long as ⅕ body width, in median chaetigers each with long articles throughout the chaetae, posterior chaetigers with small articles basally, medium-sized medially and longest distally. Neurochaetae multiarticulated capillaries in chaetigers 1-6 (Fig. 11E), thin falcate anchylosed hooks in remaining chaetigers, three-four in median chaetigers, each with thick hooks (Fig. 11F, insert), becoming thinner in posterior chaetigers (Fig. 11G).

Posterior end without sediment particles, tapered into rounded pygidium, anus terminal, no anal cirri.

REMARKS

As stated above, there were two different species included as syntypes of *S. coronatus.* The shallow water form having its chaetiger 3 wider than chaetigers 1-2, and provided with larger papillae is herein regarded as a different species and described as *P. ehlersi* n. sp. The species is unique among those species provided with falcate neurohooks because its body has two different colors, being anteriorly whitish, due to the presence of sediment grains, and posteriorly dirty orange or pale brown, without whitish sediment particles.

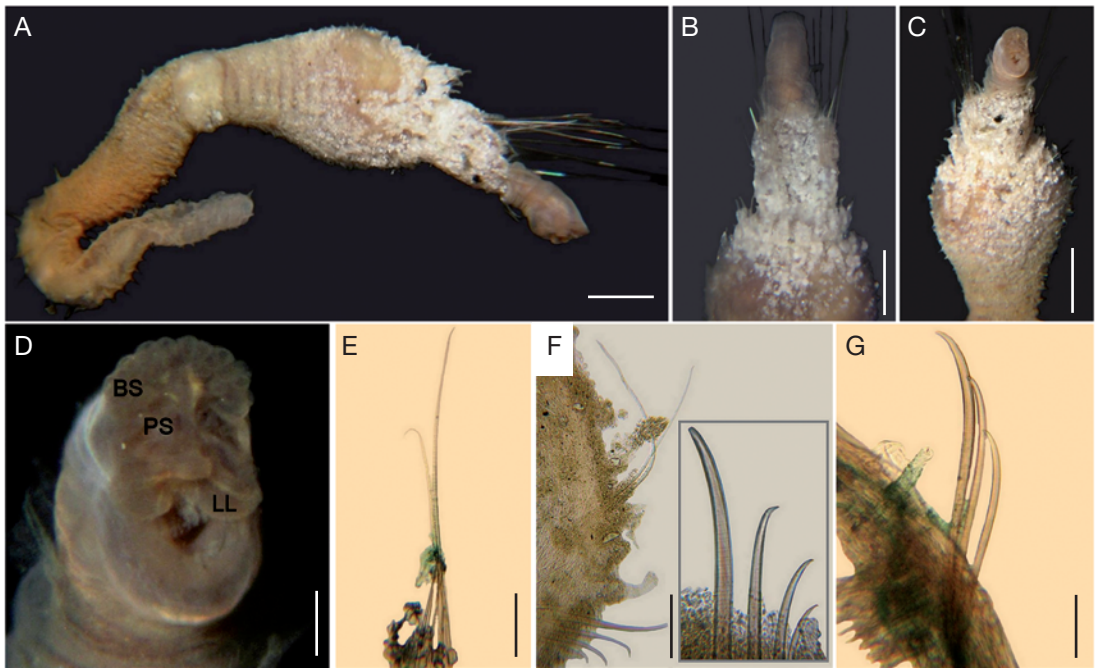

FIG. 11. — *Paratherochaeta ehlersi* n. sp.: **A-D**, holotype (SMF 15365); **A**, lateral view, anterior end exposed; **B**, anterior end, dorsal view; **C**, anterior end, ventral view; **D**, head, frontal view; **E-G**, paratype (SMF 15373), chaetiger 6, right parapodium, neurochaetae; **F**, chaetiger 11, complete, right parapodium; **G**, posterior chaetiger, right parapodium, neurochaetae. Abbreviations: **BS**, branchial scars; **LL**, lateral lip; **PS**. palp scar. Scale bars: A, C, 0.68 mm; B, 0.56 mm; D, 130 µm; E, 140 µm; F, 125 µm; G, 90 µm.

Further, *P. ehlersi* n. sp. resembles *P. scutigera* n. comb. but they differ in two features: *P. ehlersi* n. sp. has a bicolored body and neurohooks start from chaetiger 7, whereas *P. scutigera* n. comb. has a single color body and neurohooks from chaetiger 9. Further, if the drawings are accurate, then neurohooks would also differ in their relative curvature, because in *P. ehlersi* n. sp. they are not curved, whereas in *P. scutigera* n. comb. they are clearly sigmoid.

Paratherochaeta orensanzi n. sp.
(Fig. 12)

TYPE MATERIAL. — Southwestern Atlantic Ocean. Holotype (MACN 39031) and paratypes (two in MACN 39032; one in ECOSUR; one in MNHN), stomach contents of reticulated raja, *Psammobatis bergi* Marini, 1932, female, 35 cm long (L18 N3), R/V *Chiarpesca* 59, Cruise REDE 04, 105 m, X-XI.2006 (paratypes anterior fragments 28-34 mm long, 3-4 mm wide, cephalic cage chaetae broken, 18-23 chaetigers; sediment grains small; chaetiger 2 displaced anteriorly; falcate dark neurohooks from chaetiger 5; gonopodial pores in chaetiger 5).

ETYMOLOGY. — This species is named as a modest homage to Dr. José M. (Lobo) Orensanz, in recognition of his fine publications on South Atlantic and Antarctic polychaetes and as a means to thank him for providing materials from his collections.

TYPE LOCALITY. — Off Central Argentina, Southwestern Atlantic Ocean.

DISTRIBUTION. — Only known from the type locality, found in the stomach contents of a ray (*P. bergi*) caught in 105 m.

DESCRIPTION

Holotype broken posteriorly, body wall damaged (Fig. 12A), whitish anteriorly, darker in median and posterior chaetigers. Body medially swollen, tapered anteriorly, posteriorly widening; 29 mm long, 3 mm wide, cephalic cage chaetae 8 mm long,

broken, 20 chaetigers. Tunic thin, most sediment particles lost; anterior body papillae long, tapered, median papillae shorter, posterior papillae larger, medially swollen.

Cephalic hood exposed, cylindrical, made by two similar sized rings. Cephalic hood margin smooth.

Anterior end exposed, partly damaged. Prosomium projected cone, eyes not seen (Fig. 12D). Caruncle not reaching branchial plate margin. Palps and branchiae lost. Branchiae arranged into two marginal dorsolateral groups, about 36 filaments per side. Nephridial lobes placed between branchial rows.

Cephalic cage partly damaged, remaining chaetae three times as long as body width. Chaetigers 1-2 involved in cephalic cage, chaetiger 2 displaced anteriorly; chaetiger 3 with chaetae shorter, not contributing to cage. Cephalic cage chaetae arranged in short series; chaetiger 1 with seven-eight notochaetae, seven-eight neurochaetae; chaetiger 2 with seven notochaetae and five neurochaetae.

Anterior dorsal margin of first chaetiger with a short truncate lobe (papillae eroded). Anterior chaetigers with long papillae in chaetal lobes, not arranged in transverse series. Chaetiger 2 longer than chaetigers 1 or 3; constriction between chaetigers 2-3 indistinct.

Sand cemented anterior shield surrounding chaetigers 1-5, interrupted posteriorly (Fig. 12A, B), stiff, ventrally discontinuous (Fig. 12C). Chaetal transition from cephalic cage to body chaetae abrupt, chaetigers 1-4 with multiarticulate capillary neurochaetae (Fig. 12E); anchylosed neurohooks from chaetiger 5. Gonopodial lobes reduced to dark pores, in chaetiger 5, placed slightly ahead of neurohooks (or their scars).

Parapodia better developed in anterior chaetigers; remaining parapodia reduced, chaetae emerging from body wall. Parapodia lateral; median neuropodia ventrolaeral. Noto- and neurochaetae low lobes, barely noticeable; without long chaetal lobe papillae, or interramal papillae, probably eroded. Noto- and neuropodia distant to each other.

Median notochaetae arranged in short longitudinal series; all multiarticulated capillaries, most broken, two per bundle, relative length to body width unknown, in median chaetigers each with short articles basally, medium sized medially, longer towards tip. Neurochaetae multiarticulated capillaries in chaetigers 1-4, falcate dark anchylosed hooks in remaining chaetigers, one-two in median chaetigers (Fig. 12F), three-four in posterior chaetigers (Fig. 12G), arranged in transverse series.

Posterior end unknown.

Remarks

Paratherochaeta orensanzi n. sp. is unique among the species provided with a thin sediment shield and falcate neurohooks, because its sediment cover is reduced to a thin crust along chaetigers 1-5 and it is midventrally discontinuous.

Paratherochaeta scutigera (Ehlers, 1887) n. comb. (Fig. 13)

Stylarioides scutiger Ehlers, 1887: 165-168, pl. 42, figs 1-5.

Pherusa scutigera – Nonato & Luna 1970: 91, 92, figs 79-83.

Therochaeta scutigera – Fauchald 1972: 416 (n. comb.).

Type material. — Grand Caribbean Sea. The holotype and single specimen, off La Habana, Cuba, 180 m, was supposed to be deposited in Harvard, but it has not been found (A. Johnston, 2003, pers. com.). Because Ehlers indicated it was dissected, it might have been destroyed.

Distribution. — Only known from the type locality, off Northwestern Cuba, in moderate depths.

Description

Based on the original description and illustrations. Holotype posteriorly incomplete (Fig. 13A); body dark-cinnamon, clavate, wider posteriorly; 18 mm long, 3 mm wide, cephalic cage chaetae 7 mm long, 28 chaetigers. Tunic thick, forming large sediment tubercles anteriorly, with less sediment in median and posterior chaetigers.

Cephalic hood not exposed. Anterior end details unknown.

Cephalic cage chaetae about as long as half the length of the fragment (the illustration shows that

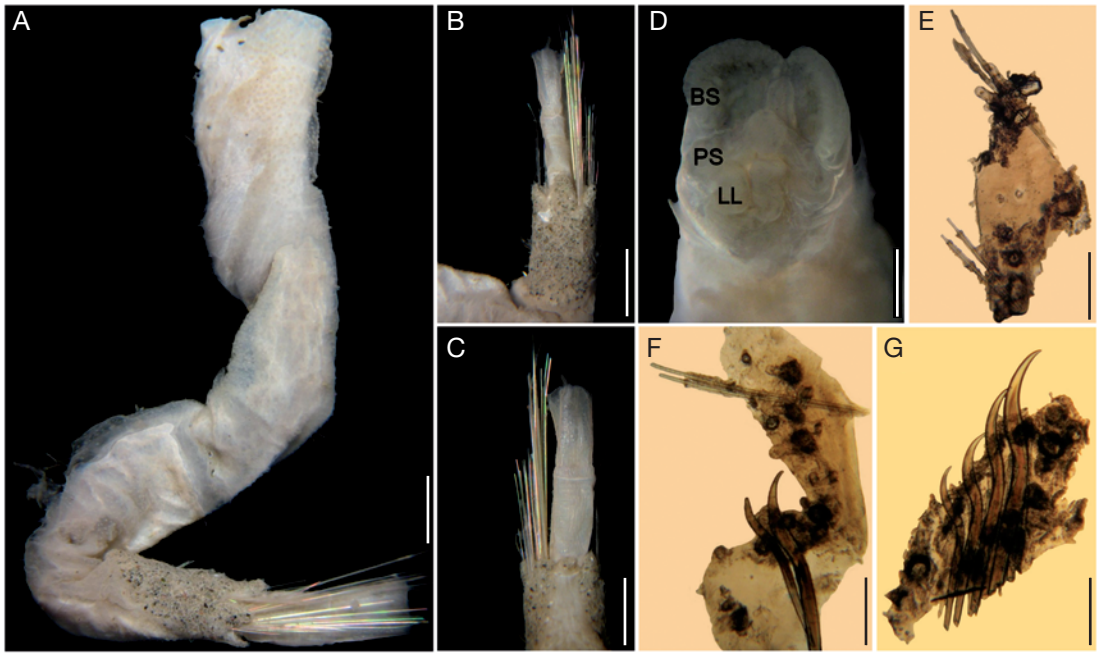

FIG. 12. — *Paratherochaeta orensanzi* n. sp., **A-C**, holotype (MACN 39031); **A**, lateral view, cephalic hood exposed; **B**, anterior end, dorsal view; **C**, anterior end, ventral view; **D**, paratype (ECOSUR), head, frontal view; **E**, same, chaetiger 4, right parapodium; **F-G**, same, chaetiger 16, right parapodium; **G**, same, posterior chaetiger, **D,** right parapodium, neurochaetae. Abbreviations: **BS**, branchial scars; **LL**, lateral lip; **PS**, palp scar. Scale bars: A, B, 1.5 mm; C, 1.9 mm; D, 44 µm; E, 0.36 mm; F, 0.26 mm; G, 110 µm.

chaetae are as long as body length) or five times longer than body width. Chaetigers 1-2 involved in the cephalic cage; chaetiger 3 with long chaetae but not reaching the anterior margin of chaetiger 1. Cephalic cage chaetae arranged in short series, about five-six chaetae per bundle.

Anterior dorsal margin of first chaetiger with papillae, but no median projections. Chaetigers 1-2 with long papillae restricted to base of chaetal lobes. Chaetiger 1 very short, chaetiger 2 markedly longer, slightly constricted towards its posterior margin, chaetiger 3 shorter than 2, about as long as chaetiger 1. Sand cemented anterior shield surrounding chaetigers 1-2, depressed, smoother dorsally (Fig. 13B), swollen, rougher ventrally (Fig. 13C). Chaetal transition from cephalic cage to body chaetae gradual; falcate neurohooks start in chaetiger 9. Gonopodial lobes unknown.

Parapodia well-developed in chaetigers 1-3, flat lobes with long papillae; remaining parapodia poorly developed, chaetae emerge from body wall. Parapodia lateral, median neuropodia ventrolateral. Noto- and neuropodia details unknown. Noto- and neuropodia distant to each other.

Median notochaetae probably arranged in longitudinal series; all notochaetae multiarticulated capillaries, articles long throughout the chaetae (Fig. 13D), three-four per bundle. Neurochaetae multiarticulate capillaries in chaetigers 1-8; falcate neurohooks from chaetiger 9 to the end of the fragment, four per bundle in median chaetigers (Fig. 13E); each neurohook blunt, anchylosed.

Posterior end unknown.

REMARKS

Paratherochaeta scutigera n. comb. has not been found since its original description. Because the presence of pseudocompound neurohooks along anterior chaetigers was not indicated, they are probably missing and consequently the species should be transferred to *Paratherochaeta* n. gen.

Because the dorsal tubercles of chaetiger 3 are larger than those present in following chaetigers, *P. scutigera* n. comb. resembles *P. ehlersi* n. sp. They differ in three attributes: the general body color, the start of neurohooks, and their relative curvature. In *P. scutigera* n. comb. the body has a single color, neurohooks start from chaetiger 9, and they are markedly sigmoid, whereas in *P. ehlersi* n. sp. the body is whitish anteriorly and dark orange or pale brownish posteriorly, neurohooks start from chaetiger 7, and the neurohooks are barely falcate and delicate.

Paratherochaeta scutigera n. comb. is similar to *P. africana* n. comb., n. stat. because both have sediment tubercles present beyond chaetiger 5. As stated above, their main difference lies in the relative curvature of neurohooks because they are markedly sigmoid in *P. scutigera* n. comb., whereas they are almost straight, distally curved in *P. africana* n. comb., n. stat. There might be some other differences but because *P. scutigera* n. comb. has not been found again, some additional materials are needed to clarify their distinction.

On the other hand, the material examined by Nonato & Luna (1970) might belong to this same species but some differences were found by the authors. First, their illustrations and description were apparently based upon a specimen without anterior shield because the chaetal lobes are well-defined, and even the larger papillae, often forming sediment tubercles, were depicted without sediment at all. Second, in the Brazilian specimen falcate neurohooks start by chaetiger 6, whereas Ehlers indicated that they start by chaetiger 9, and although these chaetae are brittle, the difference is enough for distinguishing two similar species. Other body features are similar but more specimens are needed to clarify this potential wide distribution from Cuba to northern Brazil.

The size measurements in the original description do not fit Ehlers' whole specimen illustration. The artist may have exaggerated the length for the cephalic cage chaetae because they were described as being half as long as body length, but the illustration shows chaetae at least as long as the body.

Paratherochaeta scutigeroides (Augener, 1918) n. comb., restricted (Fig. 14)

Stylarioides scutigeroides Augener, 1918: 444-447, pl. 6, figs 155, 185 (*partim*). — Fauvel 1936: 77-78. — Fauvel & Rullier 1959: 181. — Kirkegaard 1959: 43 (*partim*).

Stylarioides monilifer – Rullier 1965: 46-47 (*partim*, *non* delle Chiaje, 1831).

TYPE MATERIAL. — Tropical Eastern Atlantic Ocean. Syntypes of *Stylarioides scutigeroides* (ZMH V1593), off Nyanga River, Congo, A. Hupfer coll. (anterior fragments, damaged, 6.5-7.0 mm long, 1.0-1.8 mm wide, cephalic cage 2[broken]-4 mm long, 18-28 chaetigers; neurohooks start in chaetiger 8 in both syntypes).

ADDITIONAL MATERIAL. — Tropical Eastern Atlantic Ocean. One specimen (ZMUC 1800), off Bioko, Nigeria, R/V *Atlantide*, Stat. 113 (04°05'N, 07°09'E), 32 m, 22.II.1946. One specimen (MNHN 477), Sta. 106 (05°59'N, 01°11'E), 32 m, muddy sand, 7.X.1963, A. Crosnier coll. (11.5 mm long, 1.3 mm wide, cephalic cage 2.5 mm long, 43 chaetigers). Four specimens (MNHN 449), Moroco, Stat. 33 (33°41'15"N, 07°35'51"W), 50 m, 2.VI.1924, and Stat. 54 (33°33'40"N, 07°48'56"W), 40 m, 21.VI.1924 (damaged specimens, one with complete shield, the others without it; one with body wall broken, regenerating the posterior region; many chaetae broken).

DISTRIBUTION. — Western Africa, from Nigeria to Congo, in shallow water (up to 32 m).

DESCRIPTION

Syntypes anterior fragments, most anterior shield eroded or removed (Fig. 14A-C). Description based mainly on additional specimen (ZMUC 1800).

Body broken into two portions, orange-reddish anteriorly, paler medially and posteriorly (Fig. 14D). Body thinner along few anterior chaetigers, then swollen, continued into a paler region of about same width, cephalic hood exposed; 23(6+17) mm long, 1.5 mm wide, cephalic cage 6 mm long, 72 (18+54) chaetigers.

Tunic thin, cementing sediment particles along chaetigers 1-4, barely continued into chaetiger 5. Body papillae forming sediment tubercles, arranged in single transverse bands in chaetigers 1-4, decreasing in size and becoming more abundant posteriorly, continued to the last segment; other papillae smaller,

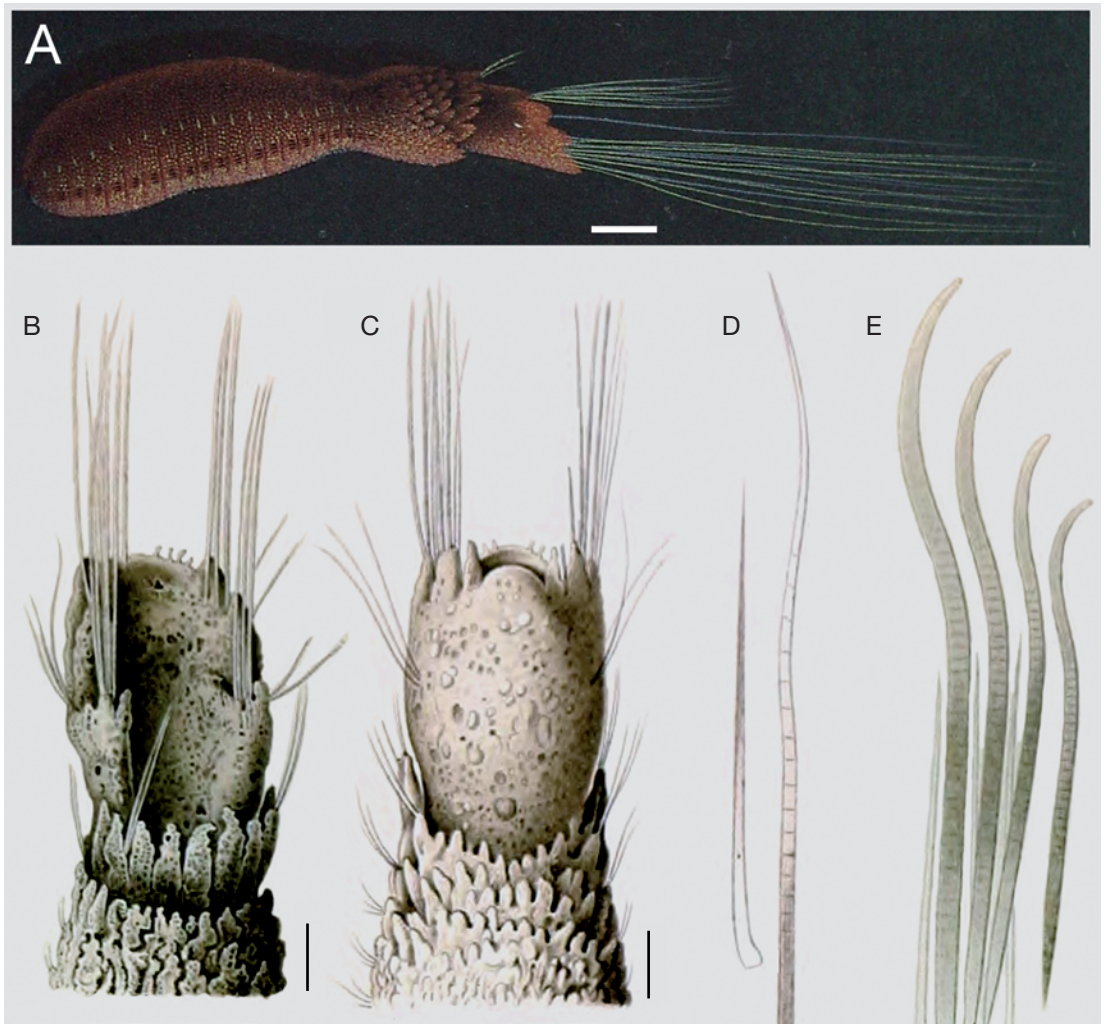

FIG. 13. — *Paratherochaeta scutigera* (Ehlers, 1887) n. comb.; **A**, lateral view; **B**, anterior end, dorsal view; **C**, anterior end, ventral view; **D**, notochaeta and companion chaeta; **E**, neurochaetae and companion chaetae from posterior chaetiger (modif. Ehlers 1887). Scale bars: A, 2.1 mm; B, C, 1.3 mm.

giving a finely granulose appearance to the body wall once temporarily stained with methyl green.

Cephalic tube partly-exposed (completely exposed in one syntype, Fig. 14A-C), long, narrow, made of two finely rugose, transparent rings, basal one wider. Anterior end not dissected to avoid further damage. Larger syntype with head exposed, palp, branchiae and other features lost (Fig. 14A, insert).

Cephalic cage chaetae as long as four times body width. Chaetigers 1-2 involved in cephalic cage, parapodia of chaetiger 2 laterally displaced, chaetae almost in a continuous series; chaetiger 3 chaetae twice as long as those in chaetiger 4, not contributing to cage. Cephalic cage chaetae arranged in short ventrolateral series; chaetiger 1 with two noto- and one neurochaetae per bundle; chaetiger 2 with five chaetae per ramus.

Anterior dorsal margin of first chaetiger with larger, median triangular lobe, and two smaller ones, all projected anteriorly (Fig. 14E); ventrally with four triangular lobes, median ones slightly larger than laterals (Fig. 14F). Chaetiger 2 with long notochaetal papillae. Chaetigers 1-3 of varying length, first and third shorter than second one, with a posterior constriction; chaetiger 4 about as long as chaetiger 1; following chaetigers shorter, much wider than long. Sand cemented anterior shield surrounding chaetigers 1-3. Chaetal transition from cephalic cage to body chaetae abrupt; aristate neurochaetae present from chaetiger 8. Gonopodial lobes not seen.

Parapodia well-developed in chaetigers 1-4, flat short lobes, with long papillae; remaining parapodia poorly developed, chaetae emerge from body wall. Parapodia lateral, median neuropodia ventrolateral. Noto- and neuropodia slightly elevated lobes, without long papillae; one-two longer capitate papillae between noto- and neuropodia. Noto- and neuropodia distant to each other.

Median notochaetae arranged in short longitudinal series; all notochaetae multiarticulated capillaries, articles long throughout the chaeta, five-six per bundle, about as long as ½ body width. Neurochaetae multiarticulated capillaries in chaetigers 1-7; aristate neurochaetae from chaetiger 8, basally annulated, reddish, articles medium sized, less defined distally; neurospines arranged in a ∪-pattern, four-five per bundle in anterior chaetigers (Fig. 14G), eight-nine in median and posterior chaetigers (Fig. 14H).

Posterior end unknown.

Remarks

For the original description of *Stylarioides scutigerioides*, Augener (1918: 446) combined two different forms under the same species. The main difference between them lies on the neurochaetae; for one of the forms, he stated: "Jedenfalls sehen die Ventralborsten, so bei meinen beiden vollständigen Exemplaren, anders aus als bei *St. scutiger,* dessen Ventralborsten als schwache Haken zu bezeichnen sind. Bei einem dritten Exemplar, einem Tier vom Nyanga-Fluss, das im Habitus, in der Färbung und in der Form des verstümmelten Hinterendes dem *St. scutiger* ganz ähnlich ist, haben die Ventralborsten mehr Ähnlichkeit mit der Ehlers'schen Abbildung dieser Borsten von *St. scutiger...*" This translates as: "Anyway, the ventral bristles in my two complete specimens are different from *St. scutiger*, whose ventral bristles are to be marked as weak hooks. With a third specimen, an animal from Nyanga River, that in the outlook, in the coloring and in the form of the mutilated rear end is quite similar to *St. scutiger*, the ventral bristles have more similarity with the Ehlers' illustration of the bristles of *St. scutiger*." The syntypes and the additional specimen that were used for the redescription have aristate neurochaetae and likely belong to the same species. It would be useful to find additional specimens to evaluate the ontogenetic changes and have a better understanding of this Western African species.

Most Augener syntypes, originally deposited in Hamburg, were lost during WWII bombing. The two syntypes available were included in the description, but had lost the sand cemented anterior cover; however, they come from the Nyanga River and have ventral aristate capillaries from chaetiger 8. Since they are the only type materials left, they have been employed to restrict the species definition. Thus, those forms provided with thin anterior ends and aristate ventral hooks remain in *T. scutigeroides,* which is therefore restricted in this diagnostic feature, whereas those with better developed sediment tubercles and neurochaetae as multiarticulated capillaries throughout the body were above transferred to another species: *P. augeneri* n. sp.

Paratherochaeta scutigeroides n. comb. is unique among the species of the genus provided with a thin sediment shield because its neurochaetae are aristate capillaries.

Acknowledgements

The kind support of many curators was extremely significant for this study through sending specimens and even helping by finding some critical references or specimens. They were Alejandro Tablado (MACN), Angelika Brandt and Gisela Wegener (ZMH), Anna Zhadan (Moscow University), Ardis Johnson (MCZ), Birger Neuhaus (ZMB), Danny Eibye-Jacobsen (ZMUC), Dieter Fiege (SMF), Emma Sherlock and Miranda Lowe (BMNH), Igor

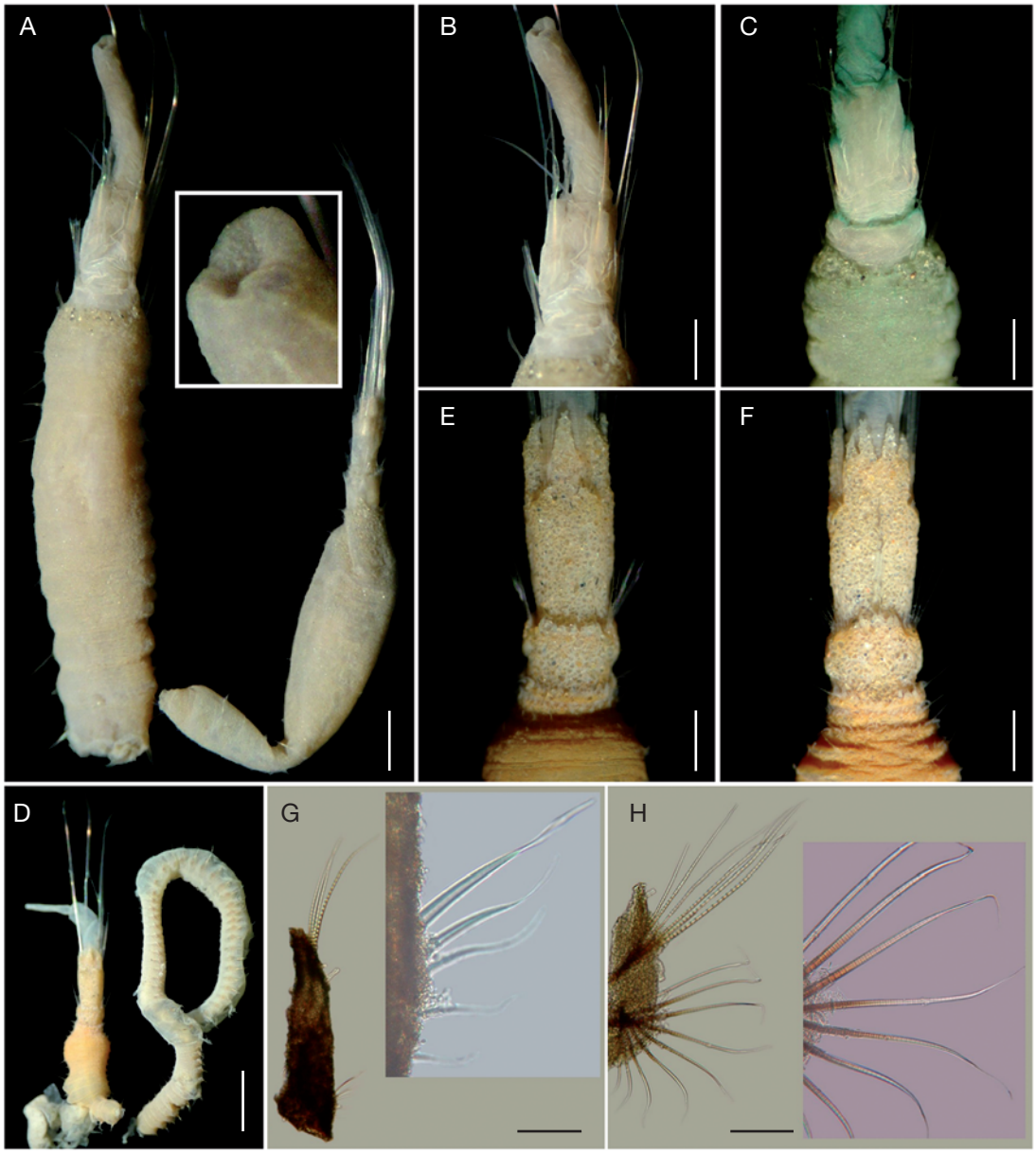

FIG. 14. — *Paratherochaeta scutigeroides* (Augener, 1918) n. comb.: **A-C**, syntypes (ZMH V1593); **A**, larger syntype in dorsal view, smaller one in oblique dorsal view (insert: head, oblique lateral view); **B**, larger syntype, anterior end, dorsal view; **C**, smaller syntype, anterior end, ventral view; **D-H**, non-type specimen (ZMUC 1800); **D**, anterior region in dorsal view, posterior region in oblique, lateral view; **E**, anterior end, dorsal view; **F**, anterior end, ventral view; **G**, chaetiger 9, right parapodium (insert: neurochaetae); **H**, chaetiger 45, right parapodium, (insert: neurochaetae). Scale bars: A, 1 mm; B, E, F, 0.7 mm; C, 0.3 mm; D, 2.4 mm; G, 70 µm; H, 100 µm.

A. Jirkov (HDMSU), J. Angel de León-González (UANL), José M. (Lobo) Orensanz (CENPAT), Kristian Fauchald and Goeff Keel (USNM), Leslie Harris, Kathy Omura and Kirk Fitzhugh (LACM-AHF), Marie-Noelle Helleout, Fredrik Pleijel and Tarik Meziane (MNHN), Norma Emilia González

(ECOSUR), Nuri Méndez (UNAM), Patrick Gillet (IRFA), Tore Hoisater and Jon Anders Kongsrud (ZMUB). My sincere gratitude goes to my colleagues who shared their knowledge and home during my studies on flabelligerids: Leslie Harris and David Ocker, Kristian Fauchald and Len Hirsch, and Patrick Gillet, Fredrik Pleijel and Tarik Meziane. The careful reading by Alexandra Rizzo, Annemarie Ohler and Pat Hutchings resulted in a much improved contribution. Funding for this research was provided mainly by the Fulbright Commision, CONACYT (61609), a sabbatical scholarship (CONACYT), and ECOSUR.

REFERENCES

AMOUREUX L. 1973. — Quelques annélides polychètes de l'Afrique occidentale et équatoriale. *Cahiers de l'Office de la Recherche Scientifique et Technique d'Outre-Mer, série Océanographie* 11: 41-65.

AMOUREUX L. 1982. — Annélides polychètes recueillies sur la pente continentale de la Bretagne à l'Irlande, Campagne 1973 de la «Thalassa» (suite et fin) avec la description de quatre nouvelles espèces pour la Science, 2. Inventaire taxonomique annoté de toutes les polychètes sédentaires. *Cahiers de Biologie Marine* 23: 279-214.

AUGENER H. 1918. — Polychaeta. Beiträge zur Kenntnis des Meeresfauna Westafrikas. Herausgegeben von W. Michaelsen, L. Friederichsen & Co. (ed.), Hamburg 2: 67-625, 6 pls.

CASTELLI A. 1990 (1989). — Censimento dei policheti dei Mari Italiani: Flabelligeridae Saint-Joseph, 1894. *Atti della Società Toscana di Scienze Naturali,* Memorie, serie B 96: 9-22.

CAULLERY M. 1944. — Polychètes sédentaires de l'Expédition du Siboga : Ariciidae, Spionidae, Chaetopteridae, Chlorhaemidae, Opheliidae, Oweniidae, Sabellaridae, Sternaspidae, Amphictenidae, Ampharetidae, Terebellidae. *Siboga-Expeditie,* 24(2 bis): 1-204.

CHAMBERLIN R. V. 1919. — The Annelida Polychaeta of the *Albatross* Tropical Pacific Expedition, 1891-1905. *Memoirs of the Museum of Comparative Zoology,* 48: 1-514.

DELLE CHIAJE S. 1831(1829). — *Memoria sulla Storia e Notomia degli Animali senza Vertebre del Regno di Napoli: Memoria III + IV*. Societa' Tipographica, Napoli, Volume 4:117-214.

EHLERS E. 1887. — Report on the Annelids. Reports on the results of dredging, under the direction of Pourtales & Agassiz in the Gulf of Mexico. *Memoirs of the Museum of Comparative Zoology,* 15: 1-335.

EHLERS E. 1908. — Die bodensässigen Anneliden aus den Sammlungen der deutsche Tiefsee-Expedition. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer "Valdivia" 1898-1899* 16: 1-167.

FAUCHALD K. 1972. — Benthic polychaetous annelids from deep waters off Western Mexico and adjacent areas in the Eastern Pacific Ocean. *Allan Hancock Monographs in Marine Biology* 7: 1-575.

FAUCHALD K. 1977. — The polychaete worms: Definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County, Science Series* 28: 1-190.

FAUVEL P. 1927. — Polychètes sédentaires & addenda aux polychètes errantes. *Faune de France* 16: 1-494.

FAUVEL P. 1936. — Contribution à la faune des annélides polychètes du Maroc. *Mémoires de la Société des Sciences Naturelles du Maroc* 43: 1-144.

FAUVEL P. & RULLIER F. 1959. — Golfe de Guinée, 6. Annélides polychètes. *Résultats Scientifiques des Campagnes de la Calypso, 4, Annales de l'Institut Océanographique* 37: 143-205.

GILLANDT L. 1979. — Zur Systematik, Autökologie und Biologie der Polychaeten des Helgoländer Felslitorals. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut* 76: 19-73.

HARTMAN O. 1938. — Annotated list of the types of polychaetous annelids in the Museum of Comparative Zoology. *Bulletin of the Museum of Comparative Zoology,* 85: 1-31.

HARTMAN O. 1959. — Catalogue of the Polychaetous Annelids of the World, 2. *Allan Hancock Foundation Occasional Papers* 23 (2): 355-628.

HARTMAN O. 1965. — Deep-water benthic polychaetous annelids off New England to Bermuda and other North Atlantic areas. *Allan Hancock Occasional Papers* 28: 1-378.

HARTMAN O. & FAUCHALD K. 1971. — Deep-water benthic polychaetous annelids off New England to Bermuda and other North Atlantic areas, 2. *Allan Hancock Monographs in Marine Biology* 6: 1-327.

HARTMANN-SCHRÖDER G. 1971. — Annelida, Borstenwürmer, Polychaeta. *Die Tierwelt Deutschlands* 58: 1-594.

HARTMANN-SCHRÖDER G. 1996. — Annelida, Borstenwürmer, Polychaeta. *Die Tierwelt Deutschlands* 58, 2nd ed., Fischer, Jena, 645 p.

HARTWICH G. 1993. — Die Polychaeten-Typen des Zoologischen Museums in Berlin. *Mitteilungen aus dem Zoologischen Museum in Berlin* 69: 73-154.

HENDRICKX M. E., ESPINOSA-PÉREZ M. C., SALGADO-BARRAGÁN J. & MÉNDEZ-UBACH M. N. 1997. — *Tercer Catálogo de la Colección de Referencia de Invertebrados, Estación Mazatlán, ICMyL, UNAM*. Instituto de Ciencias del Mar y Limnología, UNAM and Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Mazatlán, 90 p.

ICZN (INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE) 1999. — *International Code of*

Zoological Nomenclature, 4th ed. International Trust for Zoological Nomenclature (The Natural History Museum), London, 306 p.

INTES A. & LE LŒUFF P. 1977. — Les Annélides polychètes de Côte d'Ivoire, 2. Polychètes sédentaires – Compte rendu systématique. *Cahiers de l'Office de la Recherche Scientifique et Technique d'Outre-Mer, série Océanographie* 15: 215-249.

JIRKOV I. A. & FILIPPOVA A. V. 2001. — Flabelligeridae Saint-Joseph, 1894, *in* JIRKOV I. A. (ed.), *Polikhety Severnogo Ledovitogo Okeana*. Yanus-K, Moskva: 348-363.

KIRKEGAARD J. B. 1959. — The Polychaeta of West Africa, 1. Sedentary species. *Atlantide Reports* 5: 7-117.

KIRKEGAARD J. B. 1996. — Bathyal and abyssal polychaetes (sedentary species 1). *Galathea Reports* 17: 57-77.

MCINTOSH W. C. 1915. — *A Monograph of the British Annelids, 3. Polychaeta: Opheliidae to Ammocharidae*. Ray Society, London, 368 p.

MILLIGAN M. R. 1984. — Family Flabelligeridae Saint Joseph, 1894, *in* UEBELACKER J. M. & JOHNSON P. G. (eds), *Taxonomic Guide to the Polychaetes of the Northern Gulf of Mexico*. Barry A. Vittor, Mobile, 7 vols: pp 47.1-47.20

MOORE J. P. 1923. — The polychaetous annelids dredged by the USS "Albatross" off the coast of southern California in 1904, 4. Spionidae to Sabellaridae. *Proceedings of the Academy of Natural Sciences of Philadelphia* 75: 179-259.

NONATO E. F. & LUNA J. A. C. 1970. — Anelídeos poliquetas do nordeste do Brasil, 1. Poliquetas bentónicos da costa de Alagoas e Sergipe. *Boletim do Instituto Oceanografico da Universidade de São Paulo* 19: 59-130.

OKEN L. 1807. — Untitled. *Göttingische gelehrte Anzeigen* 1807(2), Stück 117 (23 Julius 1807): 1161-1168.

RIOJA E. 1963(1962). — Estudios anelidológicos, 26. Algunos anélidos poliquetos de las costas del Pacífico de México. *Anales del Instituto de Biología* 33: 131-229.

RULLIER F. 1965. — Contribution à la faune des annélides polychètes du Dahomey et du Togo. *Cahiers de l'Office de la Recherche Scientifique et Technique d'Outre-Mer* 3: 5-66.

SAINT-JOSEPH A. DE 1894. — Les Annélides polychètes des côtes de Dinard, troisième partie (Nephtydiens – Serpuliens). *Annales des Sciences Naturelles, Zoologie, 8ème série* 17: 1-395.

SALAZAR-VALLEJO S. I. 1981. — *La colección de poliquetos (Annelida: Polychaeta) de la Facultad de Ciencias Biológicas de la Universidad Autónoma de Nuevo León*. Tesis, Biólogo, Universidad Autónoma de Nuevo León, Monterrey, 155 p.

SALAZAR-VALLEJO S. I. 1989 (1988). — Enrique Rioja y su contribución al estudio de los poliquetos (Annelida: Polychaeta) en México. *Brenesia* 30: 39-65.

SALAZAR-VALLEJO S. I. 2007. — Revision of *Flabelliderma* Hartman, 1969 (Polychaeta: Flabelligeridae). *Journal of Natural History* 41: 2037-2061.

SALAZAR-VALLEJO S. I. 2011. — Revision of *Stylarioides* delle Chiaje, 1831 (Annelida: Flabelligeridae). *Italian Journal of Zoology* 78 (Supplement 1): 163-200.

SALAZAR-VALLEJO S. I. 2012a. — Revision of *Ilyphagus* Chamberlin, 1919 (Polychaeta, Flabelligeridae). *ZooKeys* 190: 1-19.

SALAZAR-VALLEJO S. I. 2012b. — Revision of *Semiodera* Chamberlin, 1919 (Polychaeta: Flabelligeridae). *Zootaxa* 3562: 1-62.

SALAZAR-VALLEJO S. I., CARRERA-PARRA L. F. & FAUCHALD K. 2008. — Phylogeny of Flabelligeridae (Annelida: Polychaeta). *Journal of Systematic Zoology and Evolutionary Research* 46: 203-215.

SARS M. 1869. — Fortsatte Bemaerninger over det dryske Livs Udbredning I Havets Dybder. *Forhandlinger i Videnskabs-Selskabet i Christiana* 1868: 246-275.

SARS O. G. 1872.– Diagnoser af nye Annelider fra Christiana-fjorden. *Forhandlinger i Videnskabsselskabet i Kristiania*, 406-417.

SARS O. G. 1873. — Bidrag til Jundskab om Christianafjordens Fauna, 3. Vaesentlig efter Prof. M. Sars's efterladte Manuskripter. *Nyt Magazin for Naturvidenskaberne* 19: 201-281.

STØP-BOWITZ C. 1948a. — Les Flabelligériens norvégiens. *Bergens Museums Arbok* 1946 (2): 1-59.

STØP-BOWITZ C. 1948b. — Sur les polychaetes arctiques, des familles des glicériens, des ophéliens, des scalibregmiens et des flabelligériens. *Tromsø Museums Årshefter* 66 (2): 1-58.

TEBBLE N. 1955. — The polychaete fauna of the Gold Coast. *Bulletin of the British Museum (Natural History), Zoology* 3: 61-148.

Submitted on 18 October 2012;
accepted on 8 February 2013;
published on 28 June 2013.