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Typosyllis tyrrhena (Polychaeta, Syllidae, Syllinae), a new species from the island Elba, Tyrrhenian Sea

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ABSTRACT

A new *Typosyllis* species, *T. tyrrhena* (Polychaeta, Syllidae, Syllinae), from subtidal sediments off the island Elba, Tyrrhenian Sea is illustrated and described through light-microscopical and SEM investigations. *T. tyrrhena* sp. nov. is distinguished from other *Typosyllis* species by possession of (i) only a very few compound falcigerous chaetae, (ii) dorsal cirri of chaetiger 1 that are not longer and no more numerously articulated than the dorsal cirri of the following chaetigers, and (iii) a very short proventricle with only a few muscular rings.

KEY WORDS: Polychaeta - Syllidae - Syllinae - *Typosyllis* - Mediterranean Sea - Tyrrhenian Sea - Morphology - Meiofauna.

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INTRODUCTION

During a revision and cladistic analysis of the polychaete genus *Typosyllis* Langerhans, 1879 (Licher, 1998) and ultrastructural investigations on reproduction within the Syllidae (Kuper, in prep.), a new *Typosyllis* species was found. It was collected subtidally in mixed sand of different grain-size by students of the University of Osnabrück on a diving expedition at the island Elba, Tyrrhenian Sea in July 1997.

The name *Typosyllis* was introduced by Langerhans (1879) for those species of the subfamily Syllinae having a single pharyngeal tooth anteriorly and compound falcigerous chaetae in all chaetigers. Langerhans (1879) placed *Typosyllis*, together with three additional new subgenera – *Syllis*, *Ehlersia*, and *Haplosyllis* – in the genus *Syllis* Savigny, 1812. Since Müller (1771), more than 360 descriptions of new species being positioned to this group ("*Syllis* Komplex" *sensu* Licher, 1998) have been counted, of which approximately 120 are synonyms, 67 must be interpreted as nomina dubia, nomina oblita or nomina nuda, and 70 have to be assigned to other distinct taxa of the family (Licher, 1998). The species described in the present paper, however, does not fit any of the known distinct species and has to be regarded as new to science.

Typosyllis is the species-richest taxon within the Syllidae and one of the species-richest taxa within the Polychaeta. In this paper, it is interpreted as a genus including species commonly placed in *Ehlersia* Langerhans, 1879 (except for *E. ferrugina* Langerhans, 1881, see San Martín, 1984) or its synonym *Langerhansia* Czerniavsky, 1881; therefore, by accepting the generic view of Hartmann-Schröder (1971, 1996). *Typosyllis* species live either epibenthically (zooepibenthically or phytoepibenthically) or interstitially in coarse, fine, or slicky sediments; they are found from tropical to Arctic and Antarctic waters, and have been cited from localities all over the world.

MATERIALS AND METHODS

Animals were extracted from small samples of coarse sand by the $MgCl_2$ method (Westheide, 1990). For light microscopical preparations, fixed specimens (stored in 4% formalin) were transferred to a mixture of alcohol and glycerine. Drawings and measurements were made by means of a LEITZ Diaplan microscope with interference contrast optics and a camera lucida (see Westheide & Purschke, 1988). For SEM investigations, 8 specimens were dehydrated via graded series of ethanol, critical point dried with CO_2, coated with gold and examined with a ZEISS DSM 962.

The following abbreviations for collections are used: Natural History Museum [formerly: British Museum (Natural History)], London [BMNH]; Departamento de Zoología, Universidad de La Laguna, Tenerife, Spain [DZUL]; Zoological Museum, Hebrew University of Jerusalem, Jerusalem, Israel [HUJ]; National Centre for Marine Research, Institute of Oceanography; Athen-Hellenikon, Greece [NCMR]; Senckenberg Museum, Frankfurt [SMF]; Zoologisches Institut und Museum, Universität Hamburg [ZMH]; private collection of Prof. Dr. Guillermo San Martín, Madrid [pc-GSM]; private collection of Dr. Jorge Núñez, La Laguna [pc-JN].

TAXONOMIC ACCOUNT

Typosyllis Langerhans, 1879

Diagnosis – Syllinae with subcylindrical body, integument smooth (rarely papillated). Prostomium with 2 fleshy, simple palps and 3 articulated antennae; paired lateral antennae positioned anterolaterally, unpaired median antenna positioned on posterior half of prostomium. Usually 4 eyes in trapezoidal arrangement, sometimes accompanied by small ocular spots positioned anteriorly. Nuchal organs slitlike, located along posterior margin of prostomium. Pharynx with single middorsal tooth, marginally surrounded by 10 papillae. Peristomium achaetous, with 2 pairs of articulated peristomial cirri. Parapodia uniramous; notopodia each with articulated dorsal cirrus; neuropodia well developed, each with ventral cirrus, 1 to 7 aciculae, 4-28 compound and maximally 2 simple chaetae. Pygidium with 2 articulated anal cirri and unpaired median anal cirrus.

Typosyllis tyrrhena sp. nov.
Figs 1-4

Material examined – TYRRHENIAN SEA: southwest coast of island Elba: Punta di Fetovaia, wreck below the village Pomonte

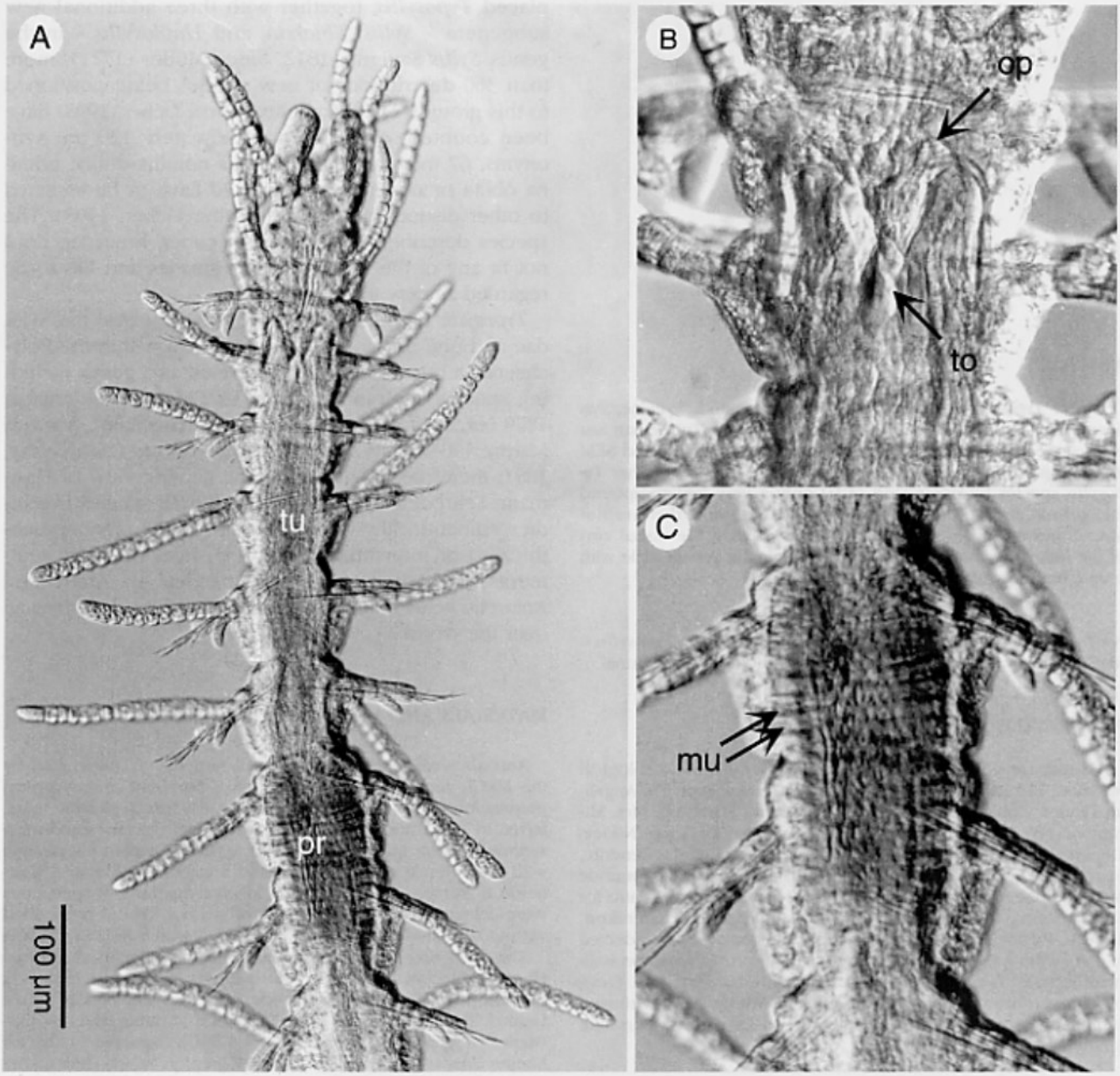

Fig. 1 - *Typosyllis tyrrhena* [SMF 8373, Holotype]. LM-micrographs. **A**. Anterior end with pharyngeal tube (tu) and proventricle (pr), ventral view. **B**. Anterior part of pharyngeal tube with marginal papillae at pharyngeal opening (op) and pharyngeal tooth (to). **C**. Proventricle showing muscle rings (mu).

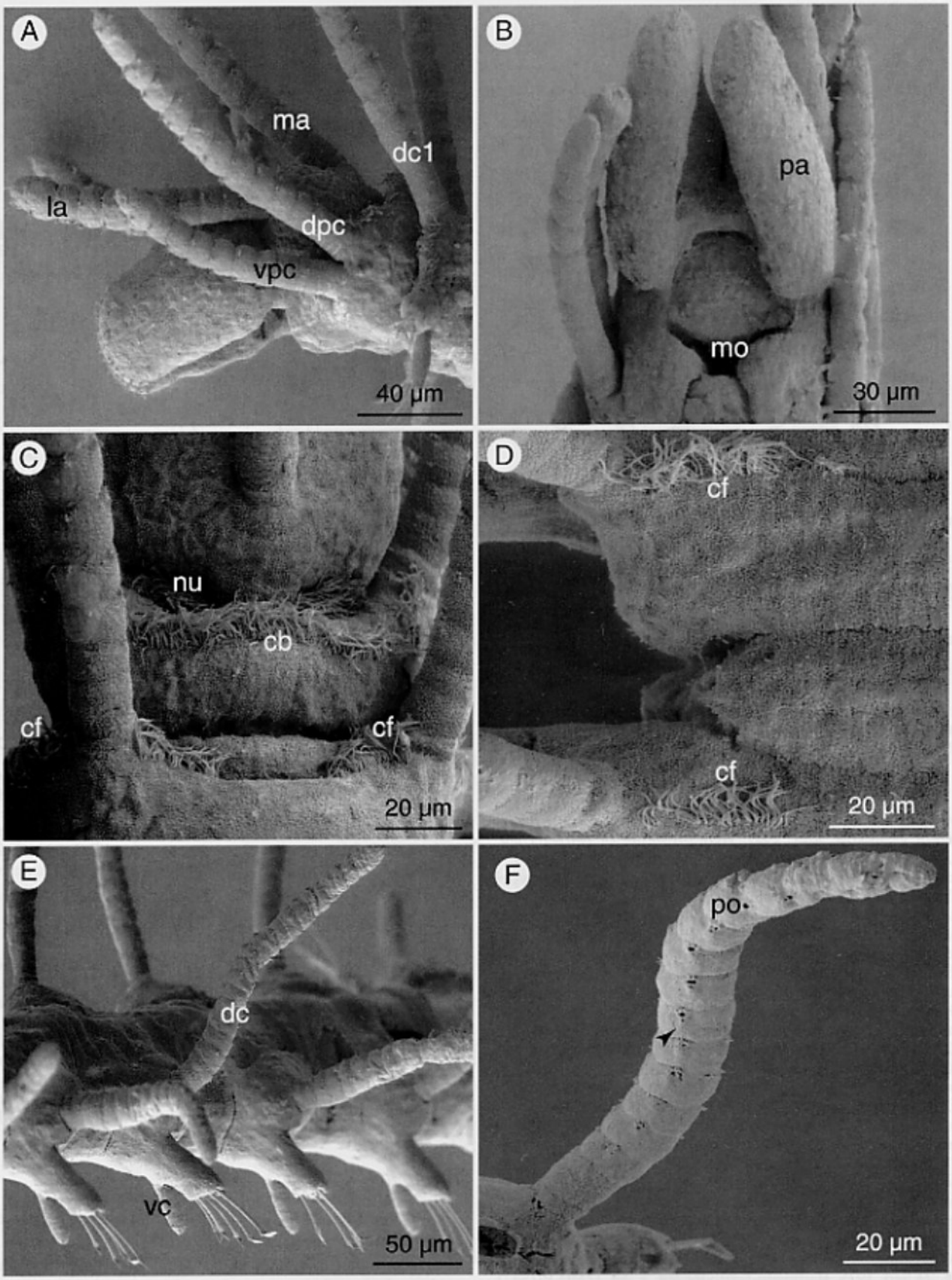

Fig. 2 - *Typosyllis tyrrhena* [SMF 8374, Paratype]. SEM-micrographs. **A**. Anterior end with median antenna (ma), lateral antennae (la), dorsal and ventral peristomial cirri (dpc, vpc), and dorsal cirrus of chaetiger 1 (dc1), lateral view. **B**. Anterior end showing palps (pa) and mouth opening (mo), ventral view. **C**. Prostomium, peristomium and chaetiger 1 with nuchal organ (nu), peristomial ciliary band (cb) and ciliary fields (cf), dorsal view. **D**. Chaetiger 2 and 3 with ciliary fields (cf), dorsal view. **E**. Chaetigers of median region showing dorsal cirri (dc) and ventral cirri (vc), lateral view. **F**. Dorsal cirrus of median body region with pairs of different sized pores (po) per article (arrow head showing smaller pore).

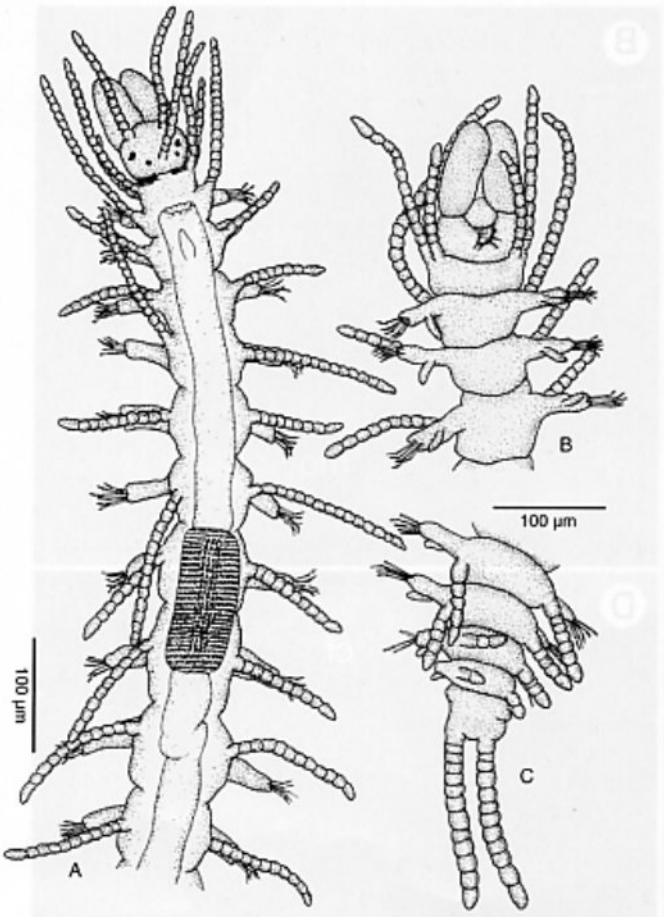

Fig. 3 - *Typosyllis tyrrhena* [SMF 8373, Holotype]. **A**. Anterior end, dorsal view. **B**. Anterior end, ventral view (antennae not drawn). **C**. Posterior end, dorsal view.

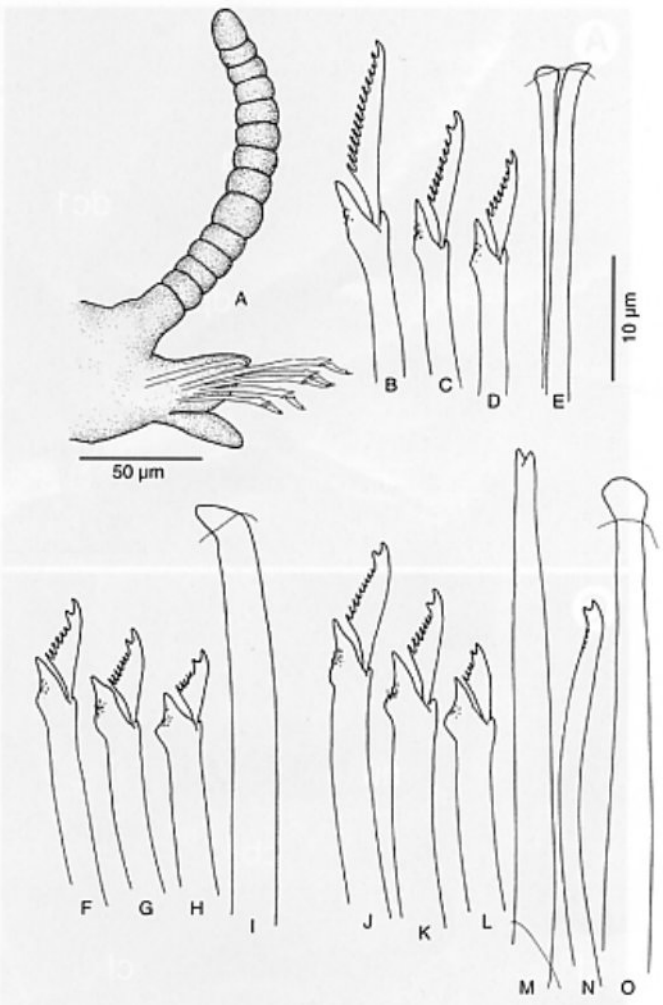

Fig. 4 - *Typosyllis tyrrhena* [SMF 8373, Holotype]. **A**. Parapodium, chaetiger 28. **B-D**. Dorsal, median and ventral falciger, chaetiger 4. **E**. Aciculae, chaetiger 4. **F-H**. Dorsal, median and ventral falciger, chaetiger 36. **I**. Acicula, chaetiger 36. **J-L**. Dorsal, median and ventral falciger, chaetiger 50. **M**. Simple dorsal chaeta, chaetiger 53. **N**. Simple ventral chaeta, chaetiger 55. **O**. Acicula, chaetiger 50.

"Elviscott" (42°44'35"N, 10°07'09"E), 6-13.5 m, mixed sand of different grain-size, Aug. 1997, Hydra-Institute of Fetovaia leg., F. Licher det. [SMF 8373, complete Holotype]; [SMF 8374, 4 Paratypes, SEM-stub]; [ZMUC Pol-923, 1 complete Paratype]; [ZMUC Pol-924, 4 Paratypes, SEM-stub].

Additional material examined - *Typosyllis (Langerhansia) botosaneanui*. CARIBBEAN SEA: Cuba: Playa Juraguá: Sta. 6; fine sand with coral rubble, G. Hartmann-Schröder leg. + det. [ZMH P-16510, Paratype]; Ascension Island: English Bay, coarse sand, groundwater of 50 cm depth, 03 Nov. 1889, Stock & Vouk leg., G. Hartmann-Schröder det. [ZMH P-20664, 2 spcm.]. – *Typosyllis curticirris*. ATLANTIC OCEAN: Big Meteor Bank, 29°58.6'N, 28°25.1'W, "Meteor-Expedition", Sta. 136, 300-330 m, 19 Feb. 1970, G. Hartmann-Schröder det. [ZMH P-16463, 2 Paratypes]. – *Typosyllis gerlachi*. RED SEA: Sarso, Schab Anbar + Ghardaqa, 24 Mar. 1956, 06-07 Nov. 1957, 22 Nov. 1957, Gerlach, Remane & Schulz leg., G. Hartmann-Schröder det. [ZMH P-14490, 1 Paratype]. – *Typosyllis heterocirrata*. RED SEA: Sarso, 16 Nov. 1957, Gerlach leg., G. Hartmann-Schröder det. [ZMH P-14665, Holotype in 3 fragments]. – *Typosyllis nuchalis*. RED SEA: Ghardaqa, 18 Mar. 1956, Remane & Schulz leg., G. Hartmann-Schröder det. [ZMH P-14473, Holotype in 3 fragments]. – *Typosyllis pharynxcircumfusata*. INDIAN OCEAN: NW-Australia: Broome, mudflats in front of the city, from cavity of calcareous crust, 23 Sep. 1975, Hartmann-Schröder leg. + det. [ZMH P-15471, Holotype]. – *Typosyllis pulvinata*. E-ATLANTIC OCEAN: Spain: Tamaduste (Hierro), J. Núñez leg. + det. [DZUL PO-118A]; Spanish Mediterranean Sea: Almería: Los Genoveses, *Posidonia*-bed, 2 m, Jan. 1987, G. San Martín leg. + det. [pc-GSM, 1 spcm.]; E-Spain: Cabo de Palos, *Posidonia*-bed, G. San Martín leg. + det. [pc-GSM, 1 spcm]; Mallorca: Porto Cristo, algae, 17 Aug. 1979, G. San Martín leg. + det. [pc-GSM, several spcm.]; Ensenada de Jacomar, 19 Sep. 1982, M. Jzquierdo leg., J. Núñez det. [pc-JN]. – *Typosyllis truncata cryptica*. RED SEA: Wadi Kabila, 30 Apr. 1971, in *Dendropoma*, M.N. Ben-Eliahu leg. + det. [BMNH 1976.361, Holotype]; [BMNH 1976.362-368, Paratypes]; [HUJ AN.11.95, Paratypes]. MEDITERRANEAN SEA: Greece: Kalymnos Island, 14 m, *Posidonia*-bed, Nov. 1992 leg., G. San Martín det. [NCMR, 1 spcm.].

Description

Body slender, cylindrical, of small size; segments relatively long (Figs 1A, 3A). Largest specimen with 57 chaetigers and a length of 6.6 mm, not including palps and anal cirri, 100 µm wide without, and 200 µm with parapodia in proventricular region. Approximate proportion of width and length of anterior and posterior segments ca. 1:1, in median body region 1-2:1. Living

animals almost transparent, without pigmentation; fixed specimens opaque.

Prostomium rounded or transversely oval (Fig. 3A), anteriorly convex, posteriorly nearly straight. Palps large, longer than prostomium, bean-shaped (Figs 2A-B, 3B), separated from each other along their whole length. Four rounded, dark-brown eyes in trapezoidal arrangement in posterior two thirds of prostomium; anterior eyes kidney-shaped, posterior ones rounded and about half as big as the anterior eyes. Ocular spots not visible. Three articulated antennae; median antenna with ca. 17 articles (ca. 200 µm), arising between posterior eyes; lateral antennae shorter, with about 11-12 articles (ca. 160 µm), at anterolateral margin. Antennae distinctly articulated over their whole lengths, articles subquadrangular with rounded edges, most distal articles often up to twice as long as wide (Fig. 2A). Paired nuchal organs in form of ciliated grooves, between prostomium and peristomium (Fig. 2C).

Peristomium with two pairs of articulated peristomial cirri resembling antennae; dorsal ones with ca. 12 articles (ca. 200 µm), ventral ones with ca. 8-9 articles (100-120 µm), dorsal ones extending beyond palps. Ciliary band dorsally in anterior half of peristomium reaching from each of the dorsal peristomial cirri (Fig. 2C). First three chaetigers dorsally each with paired ciliary fields: on chaetiger 1 beginning dorsally of dorsal cirri bases and extending to dorsal parts of neuropodial lobes; on chaetiger 2 and 3 smaller, just dorsally of dorsal cirri bases (Fig. 2D).

Parapodia (Figs 2E, 4A) uniramous, conical, about half as long as body width in anterior third of body. Dorsal cirri similar in shape to antennae and peristomial cirri (Fig. 2A, E), articulated as follows: dorsal cirri 1 with about 12, dorsal cirri 2 with 8-9, dorsal cirri 3 with 7-9, dorsal cirri 4 with ca. 16, dorsal cirri 5 with 9-10, dorsal cirri 6 with 15-17 articles. From chaetiger 6 backwards slightly longer and shorter cirri in alternation, in median region with 13-16, posteriorly with 10-14 articles. Dorsal cirri of all chaetigers with two different sized pores per article (visible only by SEM) positioned in distal part of article (Fig. 2F). Ventral cirri short, thumb-shaped, anteriorly extending beyond parapodial lobe ca. one fourth of its length, as long as parapodial lobe in median and posterior body region (Fig. 2E).

Chaetation consisting only of subacicular bidentate falcigers: anteriorly 6-7, in median region 5, posteriorly 4-5 per bundle. Anterior blades longest, 9-16 µm (gradation ca. 1.8; Fig. 4B-D), in median region shortest, sickle-shaped, 6-9 µm (gradation ca. 1.4; Fig. 4F-H), posteriorly 6-12 µm (gradation ca. 2; Fig. 4J-L). Primary and secondary tooth of about same size, rounded; small teeth below of about same lengths and shapes over whole length of blade. Shafts heterogomph, slender anteriorly (especially in dorsal chaetae), stronger in median and posterior regions, ventrally in median region backwards squared, hatchet-shaped, subdistally each with fine, very tiny spines. Simple dorsal chaetae strong, straight, distally deeply bifid, subdistally smooth (Fig. 4M); from chaetiger 53 backwards. Simple ventral chaetae slender, sigmoid, bidentate; primary and secondary tooth of about same size, subdistally with very fine serration (Fig. 4N); from chaetiger 55 backwards. Two aciculae anteriorly (1 pistil-shaped, 1 bent; Fig. 4E), in median region one (bent; Fig. 4I), posteriorly one (pistil-shaped; Fig. 4O); from median region backwards each about twice as strong as anteriorly.

Pygidium with paired articulated lateral anal cirri, each with 12-14 articles (Fig. 3C), one unpaired median smooth conical anal cirrus ventroterminally.

Pharyngeal tube extending over ca. 6 segments (ca. 400 µm; Figs 1A, 3A), anterior margin smooth, surrounded by 10 globular papillae. Single large middorsal tooth, about half of tooth's length beyond pharyngeal opening (Fig. 1B). Proventricle barrel-shaped, half as long as pharynx (ca. 200 µm), between chaetigers 7 and 9, with about 21-22 muscle rings (Fig. 1C).

Habitat

The specimens were found in mixed sand of different grain-size (interstitial?).

Derivatio nominis

The species has been named after the Tyrrhenian Sea.

DISCUSSION

Typosyllis tyrrhena sp. nov. differs from most other *Typosyllis* species in the possession of maximally 6 chaetae per bundle. Only *T. heterocirrata* Hartmann-Schröder, 1960 (emend.), *T. nuchalis* Hartmann-Schröder, 1960, *T. botosaneanui* Hartmann-Schröder, 1973 and *T. curticirris* Hartmann-Schröder, 1981 possess an identical number of chaetae per bundle (Table I). But in none of these species is the proventricle as short as in *Typosyllis tyrrhena* sp. nov. and nor does it have such a small number of muscle rings. Apart from this, in *T. heterocirrata* antennae, peristomial and dorsal cirri of chaetiger 1 are much stronger than the following dorsal cirri; *T. nuchalis* possesses paired nuchal epaulets; in *T. curticirris* dorsal cirri have only 3-4 articles and the secondary tooth in the blades of the falcigers is much stronger than in the species described here; *T. botosaneanui* has both falcigerous and pseudospinigerous chaetae.

With respect to the shape of the falcigerous chaetae and number and shape of aciculae, *Typosyllis tyrrhena* is similar to *T. pulvinata* Langerhans, 1881 from the Canary Islands, *T. gerlachi* Hartmann-Schröder, 1960 and *T. truncata cryptica* (Ben-Eliahu, 1977) both from the Red Sea, and *T. pharynxcircumfusata* Hartmann-Schröder, 1979 from Australia (Table I). But in none of these species do chaetal bundles possess such small numbers of chaetae and of proventricular muscle rings

TABLE I -Typosyllis *species with only few chaetae per chaetal bundle:* T. heterocirrata *Hartmann-Schröder, 1960,* T. nuchalis *Hartmann-Schröder, 1960,* T. botosaneanui *Hartmann-Schröder, 1973,* T. curticirris *Hartmann-Schröder, 1981 and* T. tyrrhena *sp. nov. (n = number).*

	T. heterocirrata	*T. nuchalis*	*T. botosaneanui*	*T. curticirris*	*T. tyrrhena*
Circulation	Red Sea	Red Sea	Cuba	West Africa	Tyrrhenian Sea
Length	1.3+ mm	3.3+ mm	6.5 mm	5 mm	6.6 mm
Chaetigers (*n*)	26+	26+	70	61	57
Articles in antennae (*n*)	median 15, lateral 10	median 16, lateral 10	median 10, lateral 5-6	median 15, lateral 8-9	median 17, lateral 11-12
Insertion of median antenna	in front of anterior eyes	in the middle of four eyes	in the middle of prostomium	between posterior eyes	between posterior eyes
Articles in dorsal cirri of chaetiger 1 (*n*)	22-23	25	up to 26	11-14	12
Articles in dorsal cirri of median region (*n*)	6 or 9	18-19 or 16	10-12 or 6-8	3-4	13-16
Pseudospinigerous chaetae	–	–	+	–	–
Falcigerous chaetae (anterior, median, posterior region) (*n*)	5-6 / 5-6 / 4-5	6-7 / 5-6 / 5-6	up to 7	6 / 5-6 / 4-6	6-7 / 5 / 4-5
Aciculae (anterior, median, posterior region) (*n*)	1 / 1 / 1	2 / 1 / 1	1 / 1 / 1	2 / 1-2 / 1	2 / 1 / 1
Length of pharynx	5 segments	3 segments	5 segments	5-6 segments	6 segments
Colour of pharynx	transparent	transparent	?	reddish brown	light brown
Length of proventricle	3 segments	3-4 segments	5-6 segments	4-5 segments	1-2 segments
Proventricular muscle rings (*n*)	24-25 rings	27-28 rings	35-44 rings	ca. 30 rings	21-22 rings

as *Typosyllis tyrrhena*. Apart from this, *T. pulvinata* possesses two aciculae in the median and two in the posterior body region; in *T. gerlachi* and *T. truncata cryptica* chaetigers are three to four times wider than long, the pharynx has a reddish-brown colour and the proventricle is longer; *T. pharynxcircumfusata* has a characteristic clasp around the pharyngeal region and the proportion of dorsalmost to ventralmost blade lengths is much higher anteriorly.

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