

NEW AND NEWLY ASSIGNED SPECIES OF THE GENUS *DENTATISYLLIS* (POLYCHAETA, SYLLIDAE, SYLLINAE), WITH COMMENTS ON THE REPRODUCTION, TOGETHER WITH A KEY AND A SYNOPTIC TABLE OF ALL SPECIES OF THE GENUS

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SARSIA



DING, ZHIHU, FRANK LICHER & WILFRIED WESTHEIDE 1998 03 13. New and newly assigned species of the genus *Dentatisyllis* (Polychaeta, Syllidae, Syllinae), with comments on the reproduction, together with a key and a synoptic table of all species of the genus. - *Sarsia* 83:29-43. Bergen. ISSN 0036-4827.

Three new *Dentatisyllis* species, *D. hongkongensis* sp. nov. and *D. mortoni* sp. nov., each from sandy tidal beaches of Hong Kong, and *D. uebelackerae* sp. nov. from Florida are described. *D. hongkongensis* sp. nov. is distinguished from other species of the genus in having antennae, peristomial and dorsal cirri composed of numerous articles, falcigerous blades of compound chaetae with enlarged secondary tooth, and lacking spines subdistally. *D. mortoni* sp. nov. has the unique combination of compound dorsal almost pseudospinigers, simple bifid chaetae, and antennae, peristomial and dorsal cirri possessing few articles; details of the viviparous reproduction of this species are given. *D. uebelackerae* sp. nov. is the *Dentatisyllis* sp. A of UEBELACKER (1984); it differs from all other species of the genus in the high number of proventricular muscle cell rings. *Syllis inflata* MARENZELLER, 1879 and *Typosyllis (Langerhansia) kiaorensis* HARTMANN-SCHRÖDER, 1992 are assigned to the genus *Dentatisyllis*. A key to all species of *Dentatisyllis* is included, together with a table of their characters.

Drei neue *Dentatisyllis*-Arten, *D. hongkongensis* sp. nov. und *D. mortoni* sp. nov., jeweils von sandigen Gezeitenstränden von Hong Kong, und *D. uebelackerae* sp. nov. von Florida werden beschrieben. *D. hongkongensis* sp. nov. unterscheidet sich von anderen Arten der Gattung dadurch, daß Antennen, Peristomial- und Dorsalcirren zahlreich gegliedert sind, daß die Endglieder der falcigeren Borsten einen vergrößerten sekundären Zahn aufweisen, und daß subdistale Stacheln fehlen. *D. mortoni* sp. nov. besitzt zusammengesetzte pseudospinigere Borsten, einfache gekerbte Borsten und weniger gegliederte Antennen, Peristomial- und Dorsalcirren; die vivipare Fortpflanzung dieser Art wird kurz beschrieben. *D. uebelackerae* sp. nov. ist die *Dentatisyllis* sp. A in UEBELACKER (1984); sie unterscheidet sich von den anderen Arten der Gattung vor allem durch die hohe Zahl von proventrikulären Muskelzellringen. *Syllis inflata* MARENZELLER, 1879 und *Typosyllis (Langerhansia) kiaorensis* HARTMANN-SCHRÖDER, 1992 werden der Gattung *Dentatisyllis* zugeordnet. Die Arbeit enthält außerdem einen Bestimmungsschlüssel und eine Übersicht charakteristischer Merkmale der *Dentatisyllis*-Arten.

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KEYWORDS: Polychaeta; Syllidae; Syllinae; *Dentatisyllis*; *Syllis*; *Typosyllis*; *Langerhansia*; Hong Kong; South China Sea; viviparity; meiofauna.

INTRODUCTION

The generic name *Dentatisyllis* was introduced by PERKINS (1981) for species of the subfamily Syllinae having a pharynx with a denticulated anterior margin. Up to now, the taxon contained only 4 species: *D. carolinae* (DAY, 1973), *Dentatisyllis* sp. A of UEBELACKER 1984, *D. junoyi* LÓPEZ GARCÍA & SAN

MARTIN, 1992, and *D. mangalis* RUSSELL, 1995. The present paper redescribes *Dentatisyllis* sp. A (= *D. uebelackerae* sp. nov.), assigns *Syllis inflata* MARENZELLER, 1879 and *Typosyllis (Langerhansia) kiaorensis* HARTMANN-SCHRÖDER, 1992 to *Dentatisyllis* and adds two new species, for one of which details of the viviparous reproduction are described. Both of the new species were collected by the first author at the

Chinese coast off Hong Kong in 1995 during the course of a short expedition to collect meiofaunal polychaetes; they represent the first record of this genus for China.

Viviparity, a special form of internal brooding, is rare within the polychaetes. SCHROEDER & HERMANS (1975) listed only 19 viviparous species in 13 families. For most of these cases the descriptions are brief and incomplete, and SMITH (1950) had earlier shown that for some of them this kind of reproduction has not been verified. The most thorough recent analysis is that of ÅKESSON (1994) on the evolution of viviparity in the dorvilleid *Ophryotrocha* CLAPARÈDE & MECZNIKOW, 1869. A number of the species for which viviparity has been claimed belong to various syllid genera: *Typosyllis vivipara* (GOODRICH 1900; MESNIL 1901; FERRONIERE 1909; CAZAUX 1981), *Typosyllis incisa* (MESNIL 1901; AUGENER 1929), *Ehlersia nepiotoca* (CAULLERY & MESNIL 1916; GRAVIER 1923), *Exogone hebes* (POCKLINGTON & HUTCHESON 1983). The most recent description of a viviparous syllid is that of *Dentatisyllis mangalis* by RUSSELL (1995). Probably, viviparity occurs in all species of *Dentatisyllis*.

MATERIAL AND METHODS

Animals were extracted from small samples of sand by the MgCl₂ method (WESTHEIDE 1990), cursorily sorted and inspected using a dissecting microscope at the Swire Marine Laboratory, University of Hong Kong, where they were investigated in living condition. For light microscopical prepa-

rations, fixed specimens (stored in Bouin's or 10% formalin) were transferred to a mixture of alcohol and glycerine. Drawings and measurements were made in Osnabrück by means of a LEITZ Diaplan microscope with interference contrast optics and a camera lucida.

ABBREVIATIONS

AusM:	Australian Museum, Sydney
BMNH:	British Museum (Natural History), London
FIOQ:	First Institute of Oceanography, Qingdao
LACM-AHF:	Los Angeles County Museum of Natural History, Los Angeles
MNCNM:	Museo Nacional de Ciencias Naturales de Madrid
MHNG:	Museum d'Histoire Naturelle, Genève
MNHN:	Muséum National d'Histoire Naturelle, Paris
NHMW:	Naturhistorisches Museum, Wien
NSMT:	National Science Museum, Tokyo
SMF:	Senckenberg Museum, Frankfurt
USNM:	National Museum of Natural History, Smithsonian Institution, Washington, D.C.
ZMH:	Zoologisches Museum, Universität Hamburg
ZMUC:	Zoological Museum, University of Copenhagen

KEY TO THE SPECIES OF *DENTATISYLLIS*

- 1 Dorsal cirri in middle and posterior body regions irregularly wrinkled; 3 aciculae per neuropodium in middle, 1 in posterior region; up to 60 mm long *D. inflata* comb. nov.
- Dorsal cirri well articulated in all body regions 2
- 2(1) Long dorsal cirri in middle body region with more than 30 articles 3
- Dorsal cirri with fewer articles 4
- 3(2) Proventricle extending through 5-8 segments, with ca 32 muscle rings; anteriormost parapodia each with up to 5 neuroaciculae *D. carolinae*
- Proventricle extending through 2-4 segments, with 47-50 muscle rings *D. uebelackerae* sp. nov.
- 4(2) Long-bladed pseudospinigerous chaetae lacking; all parapodia with 1 neuroacicula; eyes lacking *D. hongkongensis* sp. nov.
- Long-bladed pseudospinigerous chaetae present; anteriormost parapodia with at least 2 neuroaciculae; eyes present 5
- 5(4) Dorsal cirri of median body region with 3-8 articles 6
- Dorsal cirri with more than 8 articles 7
- 6(5) Simple chaetae subdistally with several relatively long fine spines *D. mangalis*
- Simple chaetae subdistally with few short serrations; pharynx reddish brown *D. kiaorensis* comb. nov.
- 7(5) Falcigers of posterior parapodia with secondary tooth much bigger than primary tooth; dorsalmost long-bladed chaetae bifid; proventricle with about 27 muscle rings *D. junoyi*
- Falcigers of all body regions with primary and secondary tooth subequal; long-bladed chaetae pointed; proventricle with about 38 muscle rings *D. mortoni* sp. nov.

SYSTEMATICS

Family Syllidae GRUBE, 1850
 Subfamily Syllinae RIOJA, 1925
 Genus *Dentatisyllis* PERKINS, 1981

Type species: *Syllis (Typosyllis) regulata*
carolinae DAY, 1973

Diagnosis. Syllinae with body subcylindrical, integument smooth. Prostomium with 2 fleshy, simple palps and 3 articulated antennae, latter positioned on posterior half of prostomium. Usually 4 eyes in trapezoidal arrangement. Nuchal organs slitlike, located along posterior margin of prostomium. Pharynx with several small marginal teeth and papillae in addition to single middorsal tooth. Peristomium achaetous, with 2 pairs of articulated peristomial cirri. Parapodia uniramous; notopodia each with more or less articulated dorsal cirrus; neuropodia well developed, each with ventral cirrus, one or more aciculae, several compound and maximally two simple chaetae. Pygidium with two articulated anal cirri and unpaired median anal cirrus.

Dentatisyllis hongkongensis sp. nov.

Fig. 1

Material examined. South China Sea: Hong Kong (22°18'N, 114°10'E): small island in front of Cape d'Aguillar, Shek O.: intertidal sand beach, coarse sand with dead corals, 12 Jan 1995, Z. Ding leg. [SMF 5581, complete holotype]. Filtering tanks with sandy sediment of the Swire Institute of Marine Science, University of Hong Kong, 10-12 Jan 1995, Z. Ding leg. [BMNH 1996.1291, 1 paratype].

Description. Body cylindrical, slender. Holotype with 44 chaetigers and a length of 3-5 mm, not including palps and anal cirri, 195 µm wide without parapodia at proventricle level. Living specimens almost transparent, without pigment.

Prostomium subtriangular, anteriorly strongly rounded, posteriorly slightly so (Fig. 1A). Palps relatively large, swollen, 1.5-2 times as long as prostomium, with wide base, proximally fused with each other over one third of length. Eyes and ocular spots lacking. Three articulated antennae; median antenna with ca 25 articles (ca 630 µm), much thicker than lateral ones, positioned at posterior prostomial margin; lateral antennae shorter, with about 15 articles (ca 240 µm). Nuchal organs as pair of ciliated grooves, between prostomium and peristomium. Two pairs of articulated peristomial cirri; dorsal ones with ca 17 articles (ca 350 µm), extending beyond ends of palps; ventral ones with ca 10 articles (ca 210 µm).

Parapodia (Fig. 1J, K) elongate, uniramous, with blunt pre- and postchaetal lobes. Dorsal cirri articulated, those on chaetiger 1 much longer than antennae and peristomial cirri, with about 25 articles (ca 570 µm); dorsal cirri on chaetiger 2 short, with ca 8 articles (ca 150 µm); cirri of chaetigers 3 and 4 gradually increasing in size and number of articles; chaetiger 4 with ca 20 articles (ca 480 µm). Dorsal cirri of chaetigers 5, 7, 8, 10, 12, 14 much shorter, with ca 8 articles (ca 200 µm); those of chaetigers 6, 9, 11, 13 longer, with ca 18 articles (ca 460 µm) (Fig. 1A). Dorsal cirri regularly alternating in length backwards from chaetiger 9; articles 2-3 times as long as wide, proximally subquadrangular or somewhat wider than long. Ventral cirri digitiform, usually not extending beyond parapodial lobe.

Chaetation consisting of 4-6 compound subacicular bidentate falcigers per bundle; blades decreasing in length from dorsal to ventral position within bundle (Fig. 1C-F, J, K), e.g., 24 to 12 µm in chaetiger 24; blades of dorsal-most falcigers varying in length along body, from 25 to 14 µm; length of ventral-most falcigerous blades subequal, about 12 µm. Primary tooth short, secondary tooth enlarged, much bigger than primary one, long and strong serrations on cutting edge. One simple supraacicular chaeta, nearly straight, distally bifid, subdistally with fine serrations; present in middle and posterior chaetigers (Fig. 1G). One simple subacicular chaeta, strong and sigmoid, distally bidentate, primary and secondary tooth similar in shape to those in compound chaetae, with very fine serrations below secondary tooth; present from about chaetiger 24 backwards (Fig. 1H). Parapodia of all chaetigers each with 1 acicula, subdistally flame-like, with bent tips protruding through epidermis (Fig. 1I).

Pygidium rounded (Fig. 1L), with paired articulated anal cirri, each with ca 25 articles (ca 340 µm), and an unpaired median, elongate, smooth anal cirrus (ca 50 µm), ventroterminally positioned.

Pharynx relatively long (ca 570 µm); anteriorly provided with a crown of about 10 small teeth and surrounded by 10 large, ciliated, soft papillae (Fig. 1A, B); middorsal tooth oval, two times as long as wide, anteriorly rounded, close to anterior margin, not extending beyond pharyngeal opening. Proventricle two-thirds of pharyngeal length (ca 385 µm), as long as 4 segments, with about 40 rings of muscle cells.

Habitat. Intertidal beach slopes consisting of coarse sand.

Derivatio nominis. The species is named after the type locality, Hong Kong.

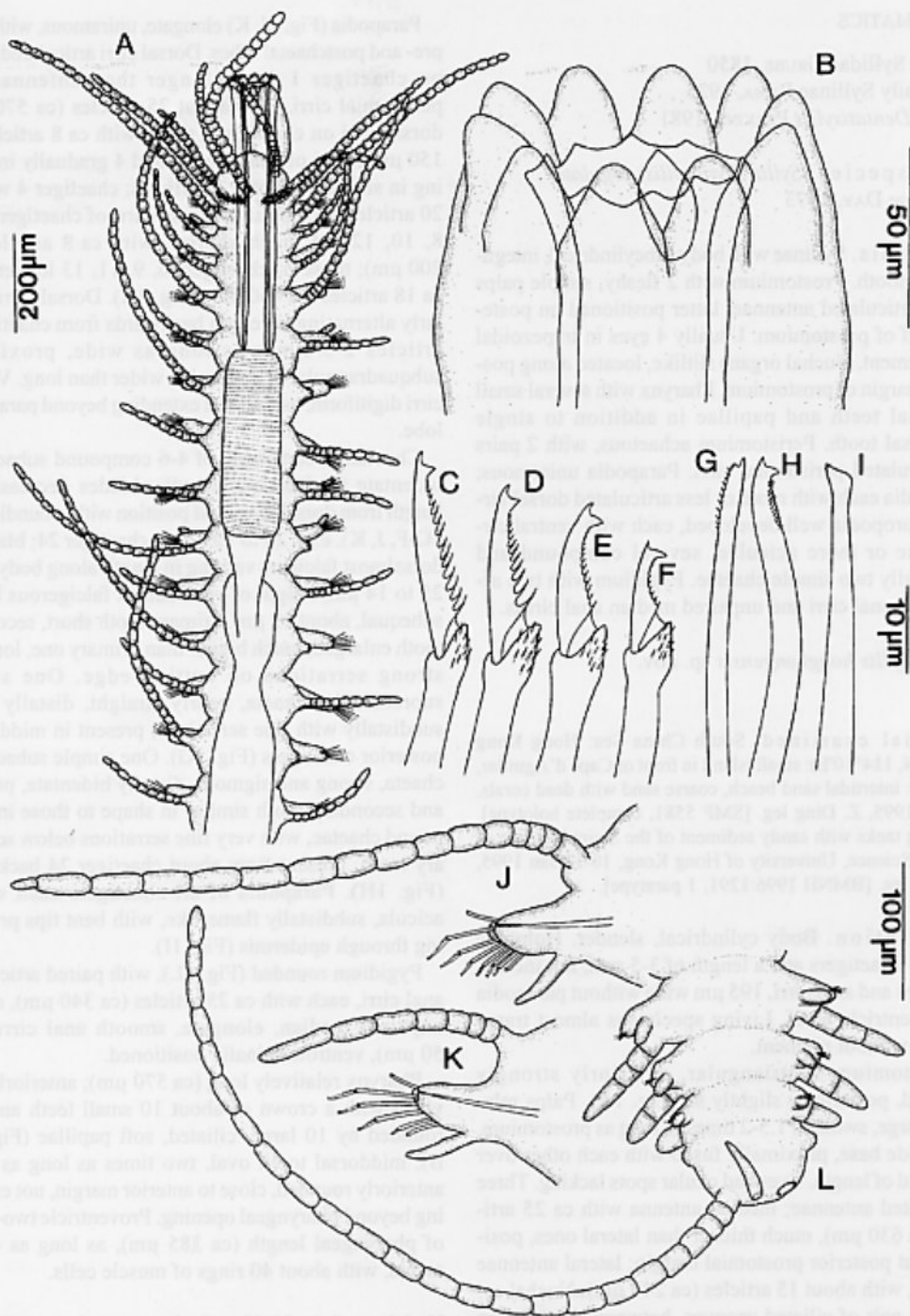


Fig. 1. *Dentatisyllis hongkongensis* sp. nov. [SMF 5581, holotype]. A. Anterior end, dorsal view. B. Pharynx (ciliation not shown). C. Dorsalmost falciger, chaetiger 24. D, E. Middle falcigers, chaetiger 24. F. Ventralmost falciger, chaetiger 24. G. Simple supraacicular chaeta, chaetiger 24. H. Simple subacicular chaeta, chaetiger 24. I. Acicula, chaetiger 6 (line across tip showing epidermis). J. Parapodium, chaetiger 25, posterior view. K. Parapodium, chaetiger 24, posterior view. L. Posterior end, ventral view.

Taxonomic remarks. *Dentatisyllis hongkongensis* sp. nov. is similar to *D. carolinae* (DAY, 1973), from North Carolina; *D. junoyi* LÓPEZ GARCÍA & SAN MARTÍN, 1992, from West Africa; and *D. uebelackerae* sp. nov. from the Gulf of Mexico, in possessing falcigerous chaetae with an enlarged secondary tooth and in having antennae, peristomial and dorsal cirri consisting of numerous articles (Table 1). However, in *D. carolinae* and *D. uebelackerae* sp. nov. these falcigers have long subdistal spines on the margin of the blade; in addition, *D. carolinae* has up to 5 aciculae in each of the anterior parapodia, and *D. uebelackerae* sp. nov. has longer ventral cirri that in anterior segments extend beyond the parapodial lobe; both of these species possess eyes. *Dentatisyllis junoyi*, *D. mangalis* RUSSELL, 1995 and *D. kiaorensis* (HARTMANN-SCHRÖDER, 1992) differ in possessing long-bladed pseudospinigers, which are completely lacking in the present species.

Dentatisyllis mortoni sp. nov.

Figs 2-4

Material examined. South China Sea: Hong Kong (22°18'N, 114°10'E): Cape d'Aguillar, Shek O.: intertidal sand beach, coarse sand, 10-12 Jan 1995, Z. Ding leg. [SMF 5583, complete holotype]. Filtering tanks with sandy sediment of the Swire Institute of Marine Science, University of Hong Kong, 10-12 Jan 1995, Z. Ding leg. [AusM W-23597, 9 paratypes]; [AusM W-23598, 1 paratype]; [BMNH 1996:1292, 1 paratype]; [BMNH 1996:1293-1301, 9 paratypes]; [FIOQ 1006, 10 paratypes]; [LACM-AHF Poly 1859, 1 paratype]; [LACM-AHF 1860, 9 paratypes]; [NSMT Pol.P 359, 10 paratypes]; [SMF 5582, 9 paratypes]; [ZMH P-23434, 1 paratype]; [ZMH P-23435, 9 paratypes]; [ZMUC Pol-888, 1 paratype]; [ZMUC Pol-889, 9 paratypes].

Additional material examined. *Syllis vivipara*: Mediterranean Sea: France: Villefranche, 1895-96 [MHNG 21340 INVE, 1 specimen].

Description. Body slender, cylindrical. Largest specimen with 42 chaetigers and a length of 4.0 mm, not including palps and anal cirri, 150 µm wide without parapodia in proventricular region. Living specimens almost transparent, without colour markings.

Prostomium transversely oval (Figs 2A; 3A), anteriorly curved, posteriorly nearly straight. Palps large, swollen with wide base, somewhat longer than prostomium, separated from each other along their whole lengths. Four rounded eyes in wide trapezoidal arrangement in posterior half of prostomium, anterior eyes about twice as large as posterior ones. Two small ocular spots at anterior margin, between lateral antennae. Three articulated antennae; median antenna with ca 15 articles (ca 280 µm), arising between posterior

eyes; lateral antennae shorter, with about 10 articles (ca 170 µm), at anterolateral margin. Distal and subdistal articles subquadrangular with rounded edges. Paired nuchal organs in form of ciliated grooves, between prostomium and peristomium. Two pairs of articulated peristomial cirri similar to antennae; dorsal ones with ca 10 articles (ca 180 µm), ventral ones with ca 6 articles (ca 110 µm), both shorter than palps.

Parapodia (Fig. 3B) uniramous, obliquely truncate, each with blunt pre- and postchaetal lobes. Dorsal cirri on chaetiger 1 longest (ca 230 µm), with about 12 articles; dorsal cirri on chaetiger 2 short, usually with 6 articles (ca 90 µm); cirri of chaetigers 3 and 4 gradually increasing in size and number of articles; chaetiger 4 with ca 10 articles (ca 190 µm). From chaetiger 4 backwards slightly longer and shorter cirri in alternation, longer ones with 7-10 articles (160-190 µm); shorter ones with 5-6 articles (100-130 µm). Distal and subdistal articles usually somewhat longer than wide. Ventral cirri short, usually not extending beyond parapodial lobe.

Chaetation consisting of 1-2 subacicular pointed pseudospinigers and 4-6 bidentate falcigers per bundle. Pseudospinigers relatively long-bladed, distally gradually becoming more slender and pointed (Fig. 3C), cutting edge near base with long and very fine serrations; blades decreasing in length from anterior to median region (50 µm in chaetiger 1, up to 95 µm in chaetigers of the middle region, 30 µm in posteriormost chaetigers). Falcigers bidentate (Fig. 3D, E); blades decreasing in length from dorsal to ventral position within the bundle of a parapodium (Fig. 3B), e.g., 22-14 µm in chaetiger 26; ventralmost falcigers subequal, about 12 µm long; primary and secondary tooth subequal or secondary tooth negligibly smaller, cutting edge with long serrations. Shafts of pseudospinigers and falcigers subequal, heterogomph, slender, subdistally with long and fine spines. One simple supraacicular chaeta, straight or slightly curved, distally bifid with rounded teeth, subdistally serrated (Fig. 3F, G), present in most of the middle and posterior chaetigers. One simple subacicular chaeta of uniform thickness, curved, subbidentate, secondary tooth very small and only slightly larger than serrations below it (Fig. 3H); present in posteriormost chaetigers. Parapodia of about 12 anterior chaetigers each with 2 slender aciculae, subdistally flame-like, with tips protruding through epidermis (Fig. 3I); parapodia of median and posterior chaetigers each with 1 thicker acicula, flame-like, more pronounced than in anterior segments, tip protruding through epidermis (Fig. 3B, J).

Pygidium (Figs 2C; 3A) short, with two paired articulated anal cirri, each with about 15 articles, one unpaired median smooth anal cirrus (ca 40 µm).

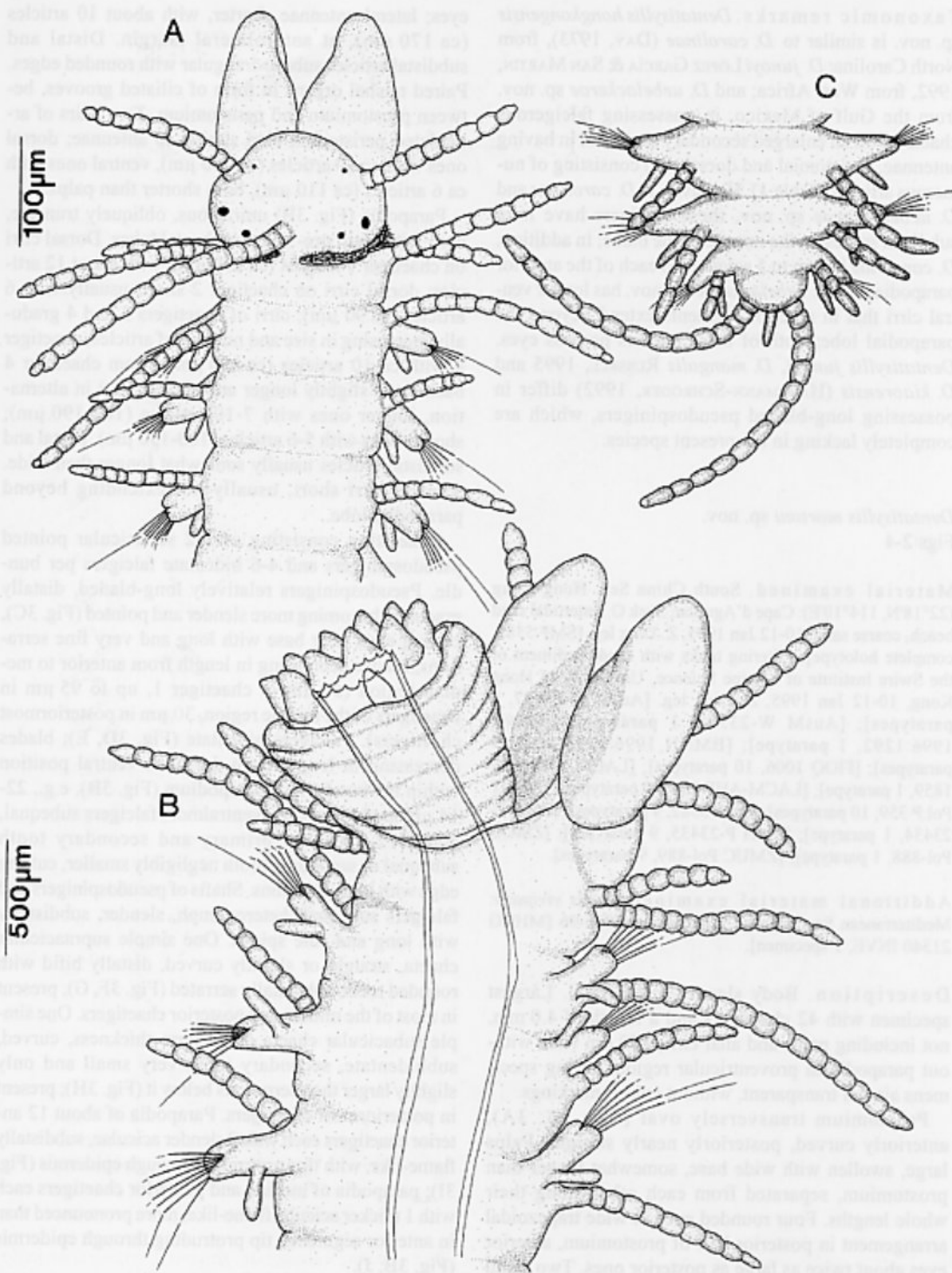


Fig. 2. *Dentatisyllis mortoni* sp. nov. [FIOQ 1006, paratype]. A. Anterior end, dorsal view. B. Anterior end, ventrolateral view. C. Posterior end, dorsal view.

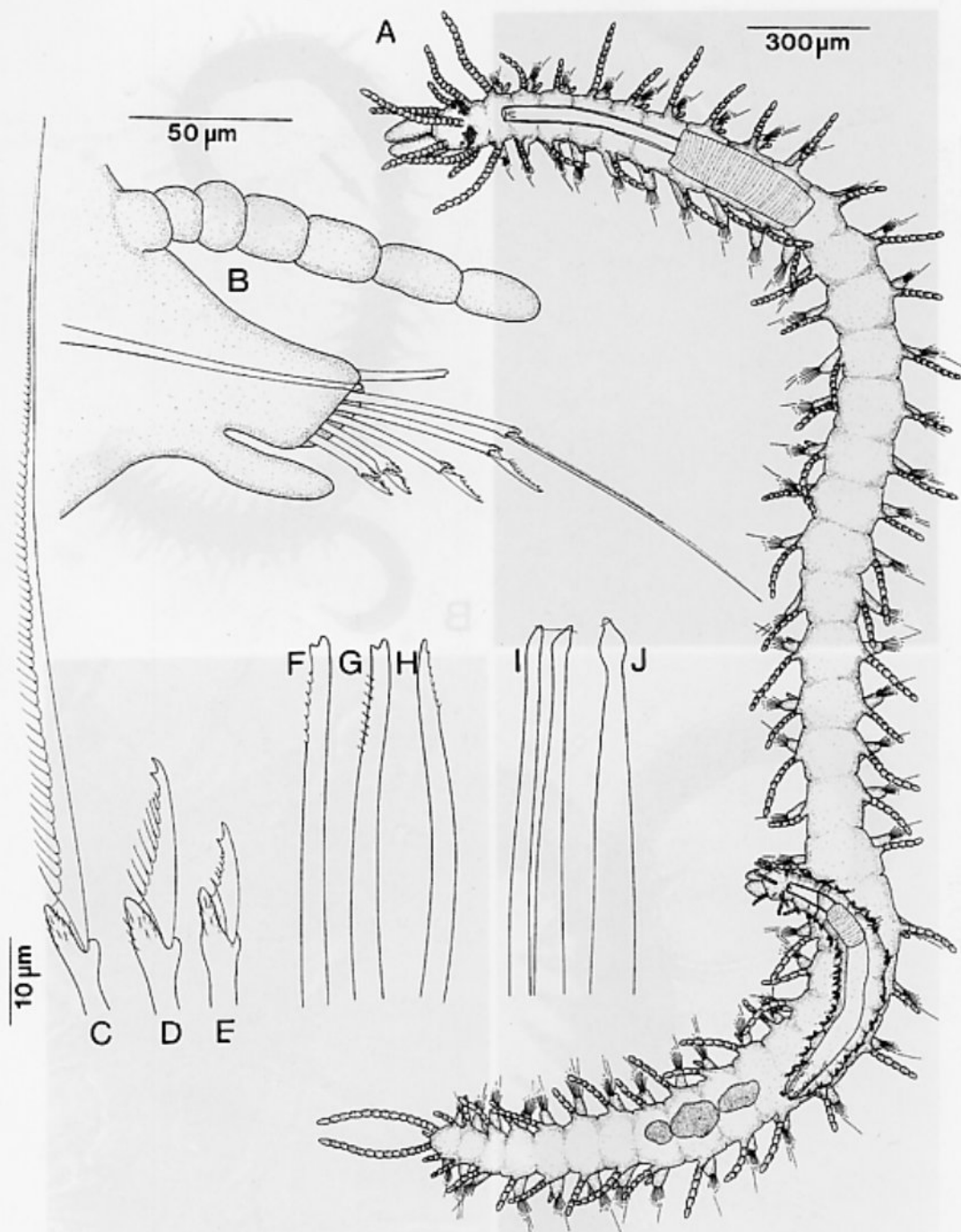


Fig. 3. *Dentatisyllis mortoni* sp. nov. [FIOQ 1006, paratype]. A. Whole mature animal, with juvenile emerging posteriorly. B. Parapodium, chaetiger 10, posterior view. C. Compound pseudospiniger, chaetiger 26. D. Dorsalmost falciger, chaetiger 26. E. Ventralmost falciger, chaetiger 24. F. Simple supraacicular chaeta, chaetiger 42. G. Simple supraacicular chaeta, chaetiger 26. H. Simple subacicular chaeta, chaetiger 42. I. Acicula, chaetiger 9. J. Acicula, chaetiger 26. (Line across tips of aciculae showing epidermis).

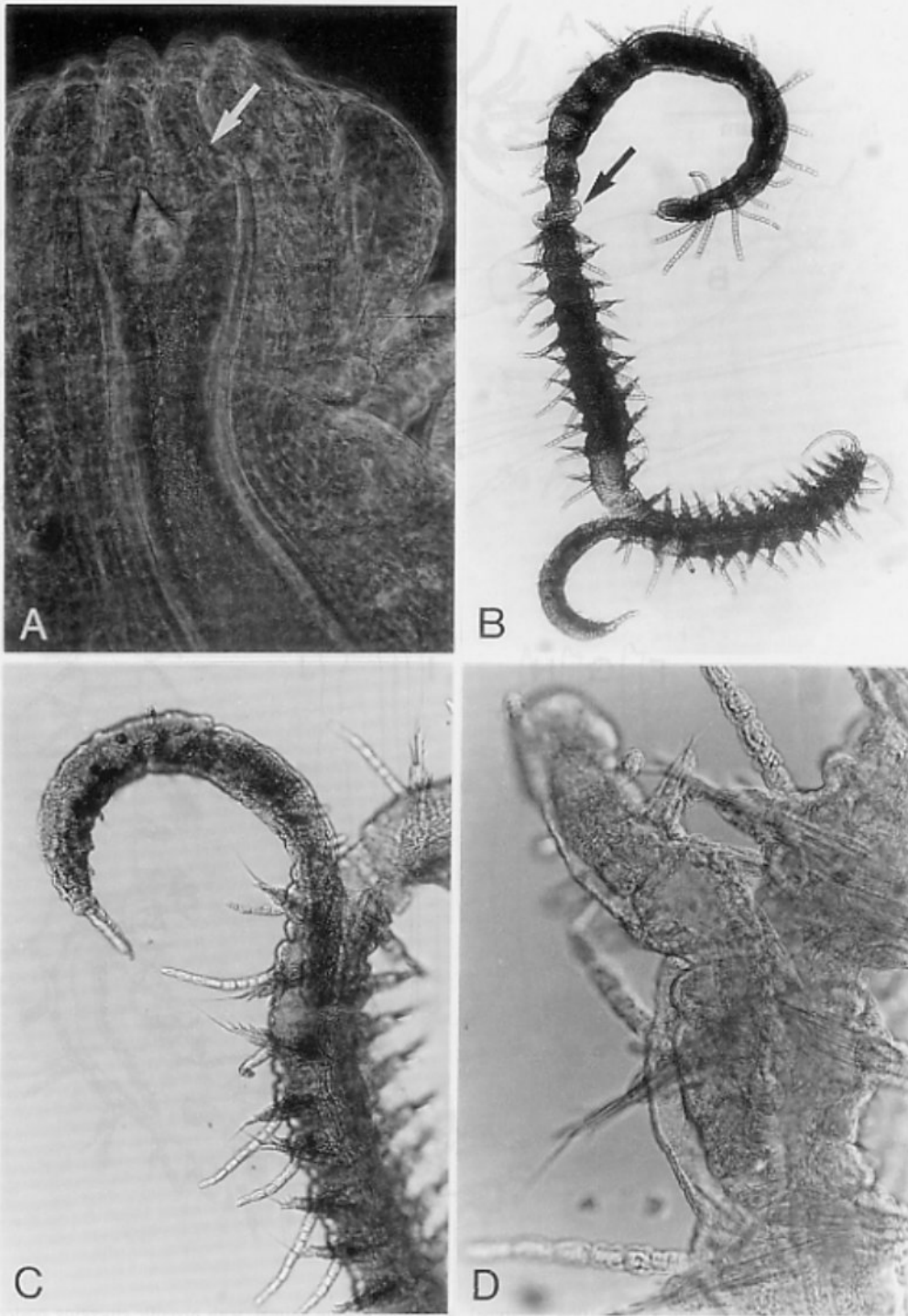


Fig. 4. *Dentatisyllis mortoni* sp. nov. A. Pharynx, anterior end (arrow showing denticulation) [FIOQ 1006, paratype]. B. Whole mature animal, with juvenile emerging posteriorly (arrow pointing to opening) [SMF 5583, holotype]. C. Emerging juvenile [SMF 5583, holotype]. D. Juvenile with proventricles and fully developed appendages [FIOQ 1006, paratype].

Pharynx long, extending through 5-6 segments (ca 560 μm) (Figs 2B; 3A), anterior margin denticulated, ca 10 distinct teeth, each rough and irregular in shape (Fig. 4A); single large middorsal tooth at anterior margin. Proventricle shorter than pharynx (ca 380 μm), with about 38 muscle rings.

Description of juveniles. In a total of 16 specimens of *Dentatisyllis mortoni* sp. nov. (including the holotype), 5 specimens were found with 2, and 11 specimens with only one juvenile in the coelom cavity, mostly in the middle and posterior body regions (Figs 3A; 4B-C); all but one of these juveniles were beginning to emerge, 4 of them protruding out of the body wall with their anterior ends, 4 with their posterior ends, while 12 had broken one or several holes in the body wall (Fig. 4B). The juveniles had up to 15 chaetigerous segments and possessed nearly fully developed palps, eyes, proventricle and parapodia (Figs 3A; 4D). They were positioned lateral to the gut, almost completely filling the coelom; where two juveniles were present, in some cases the front end of one touched the front or back end of the other. A conspicuous feature during observation of live juveniles was the vigorous movement of the cilia around the anus and in the terminal part of the gut; it looked as though the effect was to drive coelomic fluid of the mother animal into the intestinal tract of the juveniles.

The young are evidently born by various routes. Some of the juveniles break through the body wall with the anterior end (Fig. 4D), others with the posterior end (Fig. 4B-C), and some make extensive tears in the body wall (Fig. 4B). Ordinarily the young emerged only through the lateral wall in the middle and caudal parts of the mother's body.

The mothers lived for at least several days after giving birth. In some of them the tissue just ahead of the middle of the body, in the region of a segmental boundary, was distinctly degenerated; it may be that after birth the middle and caudal parts of the body become separated from the front part in this region.

Habitat. Intertidal sand slopes and shallow subtidal sand patches; in the sandy sediment of filtering tanks.

Derivatio nominis. The species is dedicated to Prof. Dr. B. Morton, Swire Institute of Marine Science, University of Hong Kong, who kindly supported the sampling activities of the first author during his stay in 1995.

Taxonomic remarks. *Dentatisyllis mortoni* sp. nov. shares most similarities with the viviparous *D. mangalis* RUSSELL, 1995 from Belize, with respect

to the possession of simple bidentate chaetae and long-bladed compound chaetae, the shape and arrangement of aciculae, and the possession of antennae, peristomial and dorsal cirri that consist only of a few articles (Table 1). However, in *D. mangalis*, the long-bladed compound chaetae are bidentate (not pointed) and antennae and dorsal cirri have fewer articles.

Dentatisyllis uebelackerae sp. nov.

Fig. 5

Dentatisyllis sp. A. – Uebelacker 1984:30-114 to 30-115, fig. 30-110.

Material examined. Gulf of Mexico: Florida: off Crystal River (28°33'59"N, 84°20'09"W), 38 m, MAFLA Stn 111-2315, Nov 1977, collected for BLM [USNM 65669, incomplete holotype].

Description. Body large, elongate. Holotype with 101 chaetigers and a length of 28.8 mm, 0.88 mm wide without, 1.15 mm wide with parapodia at proventricle level. Integument smooth, colour in ethanol brownish without pigment.

Prostomium trapezoidal, 1.5 times as long as wide, anteriorly and posteriorly slightly rounded (Fig. 5A). Palps conical, swollen, slightly longer than prostomium, separated from each other over the total length. Four rounded eyes in trapezoidal arrangement in posterior half of prostomium; anterior pair somewhat larger than posterior pair. Ocular spots lacking. Three articulated antennae; median antenna with ca 29 articles, positioned between posterior eyes; lateral antennae shorter, with 20-23 articles, positioned anterolaterally just behind the prostomial margin. Nuchal organs as pair of ciliated grooves, dorsolaterally between prostomium and peristomium. Two pairs of articulated peristomial cirri; dorsal ones with ca 35-38, ventral ones with 24-26 articles, each extending beyond ends of palps.

Parapodia long, subcylindrical, uniramous. Dorsal cirri articulated as follows: those on chaetiger 1 with about 50-60 articles; dorsal cirri on chaetigers 2 and 3 shorter, with 20-30 articles; cirri of chaetiger 4 with ca 60 articles (ca 900 μm). Dorsal cirri in middle region with 70-80 (1.7-1.8 mm) or 35-40 articles (0.9-1.0 mm). Dorsal cirri regularly alternating in length backwards from chaetiger 6; articles proximally 2-4 times as wide as long, distally subquadrangular to rounded. Ventral cirri digitiform, inserting midbasally, extending beyond parapodial lobe anteriorly.

Chaetation in anterior region consisting of 13-15, in middle and posterior region of 8-11 compound subacicular bidentate falcigers per bundle. Anterior

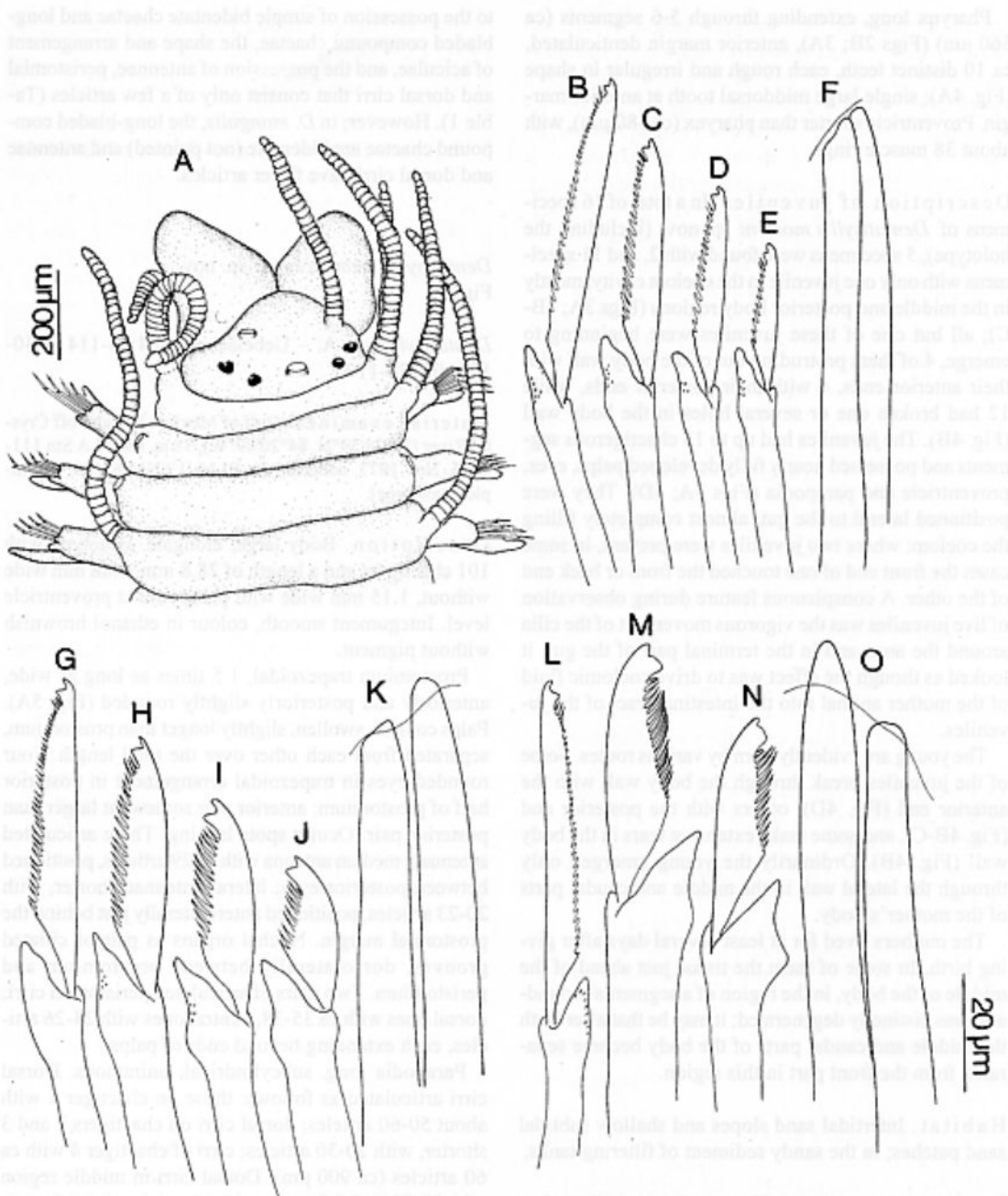


Fig. 5. *Dentatisyllis uebelackerae* sp. nov. [USNM 65669, holotype]. A. Anterior end, dorsal view. B. Compound dorsalmost falciger, chaetiger 4. C. Compound dorsal falciger below dorsalmost chaeta, chaetiger 4. D. Compound median falciger, chaetiger 4. E. Compound ventral falciger, chaetiger 4. F. Aciculae, chaetiger 5. G. Compound dorsalmost falciger, chaetiger 33. H. Compound dorsal falciger below dorsalmost chaeta, chaetiger 33. I. Compound median falciger, chaetiger 33. J. Compound ventral falciger, chaetiger 33. K. Aciculae, chaetiger 60. L. Compound dorsal falciger, chaetiger 99. M. Compound median falciger, chaetiger 99. N. Compound ventral falciger, chaetiger 99. O. Aciculae, chaetiger 96. (Line across tips of aciculae showing epidermis).

chaetae slender, blades varying in length from 25–55 µm (Fig. 5B–D), primary and secondary tooth subequal, rounded; teeth below short and truncate. In middle and posterior region dorsal chaetae slender (Fig. 5F–I, K–M), blades 55–60 µm; ventral chaetae and those in the middle of the bundle much thicker, broadened, with blades from 28–45 µm, secondary tooth enlarged, much bigger than primary one, long and relatively strong serrations on cutting edge. Simple dorsal chaetae and simple ventral chaetae lacking. Parapodia of all chaetigers each with 2 aciculae, distally rounded or diagonally truncate, with tips protruding through epidermis, becoming stouter from anterior to posterior (Fig. 5E, J, N).

Posterior end lacking.

Pharynx relatively long, through 15 segments; anteriorly surrounded by a crown of ca 20 small, low rounded teeth and 10–13 soft papillae; colour in ethanol yellowish brown. Middorsal tooth drop-like, somewhat longer than wide, anteriorly small pointed, just beyond pharyngeal opening. Proventricle two-thirds of pharyngeal length, through 8–10 segments, with 47–50 rings of muscle cells.

Habitat. In sand of a coral reef.

Derivatio nominis. The species is named after J.M. Uebelacker, who mentioned the species in a taxonomic guide to polychaetes of the Gulf of Mexico.

Taxonomic remarks. Most characters are shared with *D. carolinae* (DAY, 1973), from North Carolina, which has also falcigerous blades with an enlarged secondary tooth and a high number of articles in the peristomial and dorsal cirri. However, *Dentatisyllis uebelackeriae* sp. nov. differs in the high number of proventricular muscle cell rings from all other species of the genus, which have only 27–40 muscle cell rings (Table 1).

Dentatisyllis inflata (MARENZELLER, 1879) comb. nov.

Syllis inflata Marenzeller, 1879:131–132, Taf. 3, fig. 5. – Izuka 1912:190–191, pl. 20, figs 9–10. – Ehlers 1920:39–40. – Fauvel 1934a:267–269; 1936:60. – Okuda 1938:91. – Hartman 1959:227. – Uschakov & Wu 1960:89; 1962:58, 72; 1965:203; 1979:67. [Non: Buzhinskaja 1967:94; Fauvel 1934b:309–310 (both = *T. nipponica* sensu Buzhinskaja 1985:90; this paper)].

Syllis (Typosyllis) inflata. – Fauvel 1939:293. – Uschakov & Wu 1963:16, 24.

Typosyllis inflata. – Imajima & Hartman 1964:136 + p. 119. – Hartman 1965:35. – Daoyuan 1990:139.

Eusyllis inflata. – Imajima 1966:99–101, textfig. 32; 1970:115. – Uchida 1975:43.

Syllis kinbergiana Haswell, 1886:739–741, pl. 51, figs 1–3. – Whitelegge 1890:208.

Syllis (Typosyllis) kinbergiana. – Haswell 1920:98–99, pl. 11, figs 23–27, pl. 12, figs 1–2. – Rullier 1972:65 + p. 60. [Non: Augener 1913:197–200, pl. 3, fig. 38 (= *T. armillaris* sensu Day & Hutchings 1978:103; this paper. But = *T. augeneri* sensu Knox 1960:101; = *T. brachychaeta* sensu Augener 1927:145). – Fauvel 1917:194–195 (= *T. armillaris* sensu Day & Hutchings 1978:103; this paper. But = *T. augeneri* sensu Knox 1960:101). – Knox & Cameron 1971:27 (= *T. armillaris*, sensu Day & Hutchings 1978:103; this paper). – Pope 1943:244 (= *T. armillaris* sensu Day & Hutchings 1978:103; this paper)].

Typosyllis kinbergiana. – Hartman 1959:234.

Material examined. Pacific Ocean: Japan: Misaki, Aug 1931, collection Fauvel [MNHN A-400, 2 specimens]. Récif de Cauda: Dawydoff, collection Fauvel [MNHN A-413, 1 specimen].

Type locality. South Japan: east coast of Eno-sima island.

Type material. NHMW 618 (HT).

Taxonomic remarks. MARENZELLER (1879) described this Japanese species as *Syllis inflata* (Syllinae). Later the species was cited as *Syllis (Typosyllis)* or *Typosyllis* (FAUVEL 1939; IMAJIMA & HARTMAN 1964). IMAJIMA (1966) assigned the species to *Eusyllis* MALMGREN, 1867 (Eusyllinae) because 'the anterior margin of the inner wall of the pharynx has many minute teeth and a middorsal tooth', and he discussed the possibility that *Syllis (Typosyllis) kinbergiana* (HASWELL, 1886) is a synonym of this species. Actually it must be placed in *Dentatisyllis* PERKINS, 1981 (Syllinae), because it has marginal pharyngeal teeth and shares the general characters of the Syllinae.

Dentatisyllis inflata is similar to *D. carolinae* (DAY, 1973) from North Carolina in possessing falcigerous chaetae with an enlarged secondary tooth and in having 3 aciculae in parapodia of the median body region; however, in *D. inflata* the proventricle is shorter and the dorsal cirri are less moniliform in the median and the posterior body regions, in which respect it differs also from all other known *Dentatisyllis* species. *D. inflata* reaches a size of 60 mm (IMAJIMA 1966) and is the largest known species of the genus.

Table 1. *Dentatistylus* species. List of characters. (HT = Holotype, PT = Paratype, PTs = Paratypes)

	<i>D. inflata</i> (MARENZELLER, 1879), comb. nov.	<i>D. caroliniae</i> (DAM, 1973)	<i>D. junoyi</i> LÓPEZ GARCÍA & SAN MARTÍN, 1992	<i>D. hawaiiensis</i> (HARTMANN-SCHROEDER, 1992), comb. nov.	<i>D. mangalis</i> RUSSELL, 1995	<i>D. hongkongensis</i> sp. nov.	<i>D. mortoni</i> sp. nov.	<i>D. uebelackerae</i> sp. nov.
Type material	NHIMW 618 (HT)	USNM43147 (5 PTs)	MNCNM1601/803(PT) MNCNM1601/803(HT)	ZMHP-20698 (3 PTs), ZMH P. 20699 (3 PTs)	USNM102495(HT) USNM102496, -500, -502, -510-514, -516, -521 (all PTs)	SMF558(HT) BMNH1996.1291 (PT)	SMF5583(HT) paratypes, see p. 33	USNM65669(HT)
Palps: Length in relation to prostomium, shape	as long as	longer, fused separated to base	longer, fused basally	shorter to as long as	shorter, fused basally	much longer, fused basally	subequal, totally separated	somewhat longer
Eyes	4 eyes, no spots ca 10 / ca 8	4 eyes + spots 35 / 25	4 eyes, no spots 17-22 / 11-15	4 eyes + spots 14-16 / 7-9	4 eyes + spots 7-13 / 4-8	absent 25 / 15	4 eyes + spots 15 / 10	4 eyes, no spots 29 / 20-23
Antennae: Number of median / lateral articles	between anterior eyes	between 4 eyes	between anterior eyes	between posterior eyes	between posterior eyes	at posterior margin	between posterior eyes	between posterior eyes
Peristomial cirri:								
Number of articles (dorsal / ventral)	ca 9 / ca 6-7	? / 22	13-17 / 7	6-8 / 3-4	4-10 / 2-5	17 / 10	10 / 6	24-37 / 20-23
Dorsal cirri: Number of articles in median region (long / short)	irregularly wrinkled, 0.5 and 0.67 as long as body width	40-55 / 25-30	14-17 / 7-9	5-7	3-8	18 / 8	7-10 / 5-6	27-60
Ventral cirri: Relative length in relation to parapodial lobe	as long as	longer	longer	shorter	shorter	shorter	shorter	anteriorly longer
Pseudospinigerous chaetæ: Number ant. / med. / post. shape	-	-	2-3 / 1 / 1 bifid	1-2	1-2 / 2 / 2 knobbed bidentate	-	1-2 / 1-2 / 1-2 pointed	-
Falcigerous chaetæ: Number, shape, size of 1° and 2° tooth	bidentate, 2° tooth bigger	bidentate, 2° tooth bigger	4-6 bidentate, 2° tooth bigger	5-8 bidentate, 2° tooth smaller	bidentate, teeth subequal	4-6 bidentate, 2° tooth bigger	4-6 bidentate, teeth subequal	bidentate, 2° tooth as big or much bigger
Simple dorsal chaeta	unidentate	bifid, subdistally serrated	bifid, subdistally serrated	bifid, subdistally serrated	bifid, subdistally with spines	bifid, subdistally with spines	bifid	lacking
Simple ventral chaeta	bidentate, 2° tooth bigger	bidentate, 2° tooth bigger	bidentate, 2° tooth bigger	bidentate, 2° tooth smaller	bidentate, 2° tooth equal-sized, subdistally with spines	bidentate, 2° tooth bigger	subbidentate, 2° tooth much smaller	lacking
Aciculae: Number ant. / med. / post., shape	? / 3 / 1 acuminate to flame-like	5 / 3 / 1-2	2-3 / 1 / 1 acuminate	2 / 1 / 1 acuminate to flame-like	2 / ? / ? acuminate to flame-like	1 / 1 / 1 acuminate	2 / 1 / 1 acuminate to flame-like	2 / 2 / 2
Pharynx: Length	?	10-11 segments	6.5-8.5 segments	6 segments	7 segments	ca 8 segments	5-6 segments	15
Proventricles:								
Number of segments, number of muscle rings	3 segments ?	5-8 segments, 32 rings	4-5 segments, 27 rings	7 segments, 34 rings	7 segments, 32 muscle rings	4 segments, 40 muscle rings	5-6 segments, 38 muscle rings	8-10 segments, 47-50 rings
Length	60 mm	20 mm	5.2 mm	2.7 mm	0.8-3.9 mm	3-5 mm	4.0 mm	28.8+ mm
Number of chaetigers	160	?	54	36	19-47	44	42	100+

Dentatisyllis kiaorensis (HARTMANN-SCHRÖDER, 1992) comb. nov.

Typosyllis (Langerhansia) kiaorensis Hartmann-Schröder, 1992:57, figs 7-14.

Material examined. South Pacific Ocean: Polynesian Islands: Rangiroa: Stn 4, rockpool, green algae with sand, 08 Sep 1982, Hartmann-Schröder leg. + det. [ZMH P-20697 (holotype)]; [ZMH P-20698 (3 paratypes)]; Stn 2, 07 Sep 1982, Hartmann-Schröder leg. + det. [ZMH P-20699 (3 paratypes)].

Type locality. Polynesian Islands: Rangiroa: Stn 4.

Type material. ZMH P-20697 (holotype), ZMH P-20698 (3 paratypes), ZMH P-20699 (3 paratypes).

Taxonomic remarks. HARTMANN-SCHRÖDER (1992) placed this species in the genus *Typosyllis*. Reinvestigation of the holotype and paratypes, however, revealed that the pharyngeal opening is distinctly surrounded by several small but conspicuous teeth (HARTMANN-SCHRÖDER 1992:78, fig. 14), clearly indicating that this species belongs to the genus *Dentatisyllis*. HARTMANN-SCHRÖDER (1992) noted the presence of a further small syllid within "the alimentary tract" in the posterior part of the holotype. Actually, this is a juvenile individual situated beside the alimentary tract and within the coelom cavity, an observation that indicates viviparity for this species.

Dentatisyllis kiaorensis is similar to *D. junoyi* LÓPEZ GARCÍA & SAN MARTÍN, 1992 from West Africa and *D. mortoni* sp. nov. from Hong Kong, in possessing long-bladed pseudospinigerous chaetae (Table 1). However, in *D. junoyi* the palps are much longer than the prostomium (shorter or equal-sized in *D. kiaorensis*) and the dorsal cirri have more than twice as many articles. In *D. mortoni* sp. nov. the pharynx is transparent (reddish brown in *D. kiaorensis*), peristomial and dorsal cirri have more articles and the secondary tooth of the falcigers is subequal to the primary tooth (smaller in *D. kiaorensis*).

Dentatisyllis kiaorensis shares many similarities with the viviparous *D. mangalis* RUSSELL, 1995 from Belize, especially in the shape of prostomium and palps, length and number of articles in the dorsal cirri, shape of compound and simple chaetae, and length of proventricle and number of muscle rings. Only the subdistal serrations in the simple chaetae are slightly different; however, in *D. kiaorensis* the pharynx is atypically reddish brown (unknown in *D. mangalis* and other species of the genus). Nevertheless, similarity of *D. mangalis* and *D. kiaorensis* is high.

DISCUSSION

Over a century ago KROHN (1869) stated that juveniles of a *Syllis vivipara* (Syllinae) from the Mediterranean Sea grow within the body cavity of the parents to an advanced stage, in which they completely resemble the adults except for smaller size and smaller number of segments. GOODRICH (1900) found that all individuals of this species in the tanks of the Stazione Zoologica at Naples contained ova or embryos in various stages of development in the coelomic cavity of their posterior end. He assumed the yolk of the eggs is not enough to provide nourishment sufficient for the growth of the embryos to the large size they attain in the body cavity of the parent, and speculated that further food material must derive from the mother during development. The observation presented here, that the juveniles appear to take up coelomic fluid with their hind gut, may be consistent with this idea. Epidermal uptake of dissolved organic matter may also be very likely. Since GOODRICH (1900) did not find any specimen with spermatozoa, he suggested parthenogenetic development, an idea which was supported by MESNIL (1901). Similarly, in the two *Dentatisyllis* species described from Hong Kong not one specimen with male gametes has been observed. The same applies to the viviparous *Ehlersia nepitoca* CAULLERY & MESNIL, 1916 from the French Brittany coast.

MICHEL (1908) found a single specimen of *Syllis vivipara* which had formed a posterior stolon without obviously ceasing its viviparous reproduction. POTTS (1911) interpreted this observation as indicating that viviparity must be derived from the stolonisation process typical of the Syllinae, and that in this case stolonisation was not suppressed completely - a hypothesis, which, however, has never since been seriously followed up and cannot be supported by the description presented.

Another viviparous species is *Typosyllis parturiens* (HASWELL, 1920) of which BEN-ELIAHU (1977, fig. 7) described a specimen from the Gulf of Aqaba possessing two embryos in the body cavity. Since up to now three *Dentatisyllis* species out of eight have been found to be viviparous, the probability appears high that the entire taxon may have this kind of reproduction.

ACKNOWLEDGEMENTS

We are grateful to Prof. Wu Baoling, Qingdao, who initiated the German-Chinese cooperation in polychaete-meiofauna research and who kindly supported the activities of the authors. We thank Prof. Dr. Kristian Fauchald and Ms. Linda Ward, Smithsonian Institution, U. S. National Museum, Washington; Prof. Dr. Angelika Brandt, Zoologisches Museum,

Universität Hamburg; Dr. Claude Vaucher, Muséum d'Histoire Naturelle, Genève; and Dr. Jean-Claude Dauvin, Muséum National d'Histoire Naturelle, Paris, for loan of specimens. Especially one of us, Zhihu Ding, wishes to thank Prof. B. Morton, Swire Institute of Marine Science, University of Hong Kong, for his kind invitation to participate in a sampling expedition and provision of the necessary facilities; he also extends his thanks to the staff and the students of Prof. Morton's laboratory for their various help and support. Dr. Mary E. Petersen, Zoological Museum, University of Copenhagen, kindly reviewed a draft of this paper.

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Accepted 1 July 1997