

MUSELLIFER SUBLITORALIS, A NEW GENUS AND SPECIES OF GASTROTRICHA FROM THE SAN JUAN ARCHIPELAGO, WASHINGTON¹

WILLIAM D. HUMMON

Department of Zoology, University of Massachusetts, Amherst and Systematics-Ecology Program, Marine Biological Laboratory, Woods Hole, Massachusetts

ABSTRACT: *Musellifer sublitoralis* n. g., n. sp. is described as a marine gastrotrich. Diagnosis of the family Chaetonotidae Zelinka, 1889 is emended to include this new genus. Diagnosis of the genus *Musellifer*: Chaetonotidae with head drawn out into a muzzle; caudal furca elongate, having neither joints nor annulations; muzzle surrounded by a ciliary band; cuticle thickened into scales; oral opening terminal. The type species is characterized by subcircular dorsal scales, each bearing a short anterior keel fitted with a posteriorly directed seta, and by the persistence of scales to the furcal tips. Holotype metrics (measurements in μm): lengths—total 330, muzzle 14, pharynx 63, intestine 123, furca 101; widths—head 33.5, neck 28, trunk 50. Habitat: epibenthic mud, 10–12 m depth, Echo Bay, Seucia Island, San Juan Archipelago, Washington.

In each of two summers, 1962 and 1963, I received a single gastrotrich found by John C. Boykin in samples of sublittoral epibenthic mud from the San Juan Archipelago, Washington. Despite intensive sampling of similar habitats during both summers, only two specimens were found. Although they were collected from stations separated by 30 km of water, the two specimens were of nearly identical morphology. One specimen was collected from the mouth of Echo Bay, Seucia Island (10–12 m depth) and the other from the middle of East Sound, off Rosario Point, Orcas Island (30–32 m depth). These circumstances suggest a species of low density and sporadic occurrence. The specimens represent a new species whose taxonomic characteristics warrant the establishment of a new genus.

Order Chaetonotida Remane, 1925
Family Chaetonotidae Zelinka, 1889

EMENDED DIAGNOSIS: Head rounded, lobate, or drawn out into a muzzle; neck somewhat constricted; trunk more or less inflated and extended posteriorly into a caudal furca; body without adhesive tubes other than those associated with the posterior end. Two longitudinal bands of normal ventral cilia extend from the head or neck onto the trunk; head with one or two tufts of dorso- or ventrolateral cilia or, if a muzzle is present, with a ciliary band surrounding the muzzle; body often with one or two pairs of dorsal bristles. Cuticle smooth or variously thickened, often forming scales or spines. Oral opening terminal or subterminal.

Musellifer n. g.

DIAGNOSIS: Chaetonotidae with head drawn out into a muzzle; caudal furca

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TABLE I
Metric data for two living *Musellifer sublitoralis*, from Echo Bay,
Seucia Island (holotype) and East Sound, Orcas Island
(Measurements in μm)

	Echo Bay specimen	East Sound specimen
Length		
Total	330	324
Muzzle	14	14
Pharynx	63	62
Intestine	123	119
Furca	101	100
Width		
Head (max.)	33.5	32.5
Neck (min.)	28	28.5
Trunk (max.)	50	42
Trunk (base of furca)	32.5	30

elongate, having neither joints nor annulations. Muzzle surrounded by a ciliary band. Cuticle thickened into scales. Oral opening terminal.

ETYMOLOGY: *Musellum* (L), muzzle; *fero* (L), to bear.

Musellifer sublitoralis n. sp.
Figures 1-5

HOLOTYPE: Adult, 330 μm long; Echo Bay, Seucia Island, San Juan Archipelago, Washington, U. S. A. (lat. $48^{\circ}40'N$, long. $123^{\circ}10'W$), 10-12 m depth, in epibenthic mud; August 1962; J. C. Boykin, col.; fixed in osmic acid fumes, mounted in glycerin jelly, sealed with Lactoseal, USNM 39361.

DESCRIPTION: Holotype adult (Fig. 1), a *Musellifer* with relatively small head bearing a pronounced tapering muzzle; neck short; trunk robust with furca comprising 30% of the total body length; furcal branches taper quickly from thick bases to very thin tips. Adhesive tubes reduced in size. Metric data are included in Tables I and II.

Muzzle cilia 9-12 μm long, in a single broad dense band, uniting with the narrow ventral bands whose cilia are of similar length; ventral bands terminate just in front of the anus. Dorsal bristles absent.

Body cuticle scaled both dorsally and ventrally from the posterior muzzle border to furcal tips; dorsal scales in 13-15 longitudinal rows over most of the body, reduced to 5 rows on the proximal ends of the furcal branches, and reduced further toward the distal ends, with a total of 70-80 scales in the longest rows; ventral scales generally similar. Scales are subcircular (Figs. 2, 3a), except in portions of the ventral trunk region where they are transversely ovoid and on

TABLE II
Mid-dorsal scale, keel, and seta dimensions from various parts of the holotype
specimen of *Musellifer sublitoralis*
(Measurements in μm)

	Head at scale border	Head at max. width (Fig. 2)	Trunk at max. width (Fig. 3a)	Furca at mid-point
Scale length, total	1.8	4.2	9.4	5.8
Scale length, exposed	1.2	2.6	5.4	4.6
Scale width, total	1.6	3.8	8.0	2.0
Keel length	1.0	1.8	2.2	2.2
Seta length	2.1	3.7	4.5	—

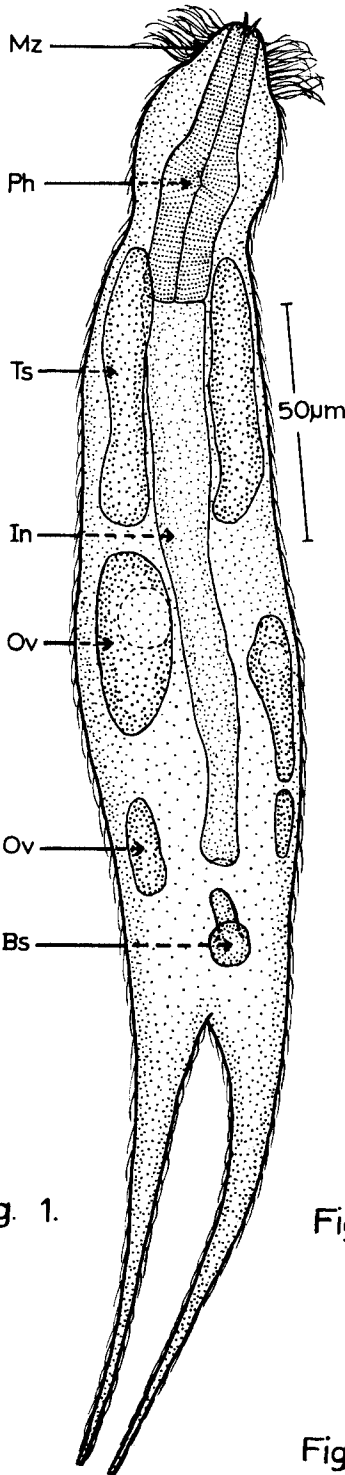


Fig. 1.

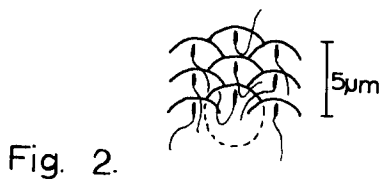


Fig. 2.

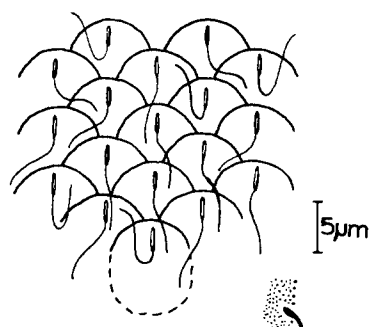
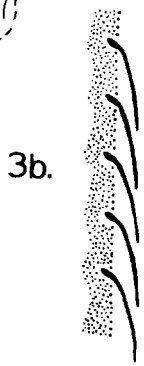


Fig. 3a.



3b.

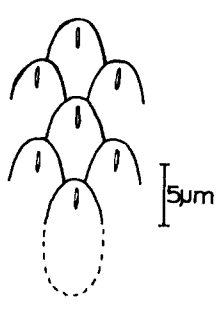


Fig. 4.

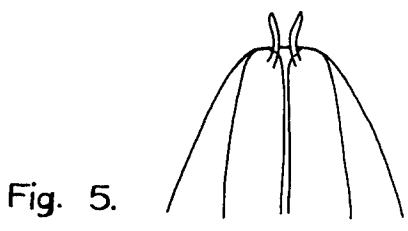


Fig. 5.

the furcal branches where they become thinner and more longitudinally ovoid (Fig. 4); arrangement quincuncial, each scale appearing to overlap the base of the one directly in front and the postero-lateral margins of those lying diagonally adjacent. Each dorsal and ventral scale bears a short anterior keel fitted with a posteriorly directed seta; setae often curved; keels reduced or absent on furcal scales; setae apparently absent from furcal scales.

Terminal oral opening bears a pair of cuticular structures (Fig. 5), protruding $2.5\ \mu\text{m}$, which insert on the interior pharyngeal wall; pharynx ca. $0.2 \times$ the total body length (ca. $0.4 \times$ the intestine length), extending posteriorly to a point beyond the neck region and possessing a slight median bulb; intestine tapers slightly along its length and terminates in a ventral anus.

Reproductive features which can be seen clearly are: four egg masses lying lateral to the posterior portion of the intestine, paired testes located laterally in the anterior part of the trunk, and a rounded seminal bursa lying posterior to the anal opening; bursa bears a ventral appendage.

ETYMOLOGY: *Sub* (L), below; *litoralis* (L) from *litus* (L), the sea shore.

DISCUSSION: Several aspects of the morphology of *Musellifer sublitoralis* require clarification. Each scale, when viewed from above, appears to overlap the scale in front of it (Figs. 2, 3a, 4). One is impressed in surface view by the prominence of anterior scale edges. This is readily, though incorrectly, attributed to the overlapping of scales from back to front. As noted by Brunson (1950) in *Lepidodermella squammata*, a lateral view clearly shows that each scale overlaps the one behind it (Fig. 3b). The attached leading-edge of the scale, while not greatly thickened in *M. sublitoralis*, inserts at an angle nearly parallel to the optical angle when viewed from above, and gives the scale its refractive definition. The free trailing-edge of the scale is difficult to discern because it lies perpendicular to the same optical angle. In lateral view, the entire scale lies parallel to the optical angle and the correct pattern of overlap is easily seen.

The cuticular structures (Fig. 5) associated with the oral opening cannot be identified at this time, though they were present in both specimens observed. It is possible that they represent pharyngeal-teeth of the sort previously reported in at least three genera of this family (Remane, 1936). Similarly the ventral appendage of the seminal bursa is functionally unclear, but could represent a protrusible penis.

Three characteristics of the animal were observed with Zeiss Nomarski differential interference contrast optics which had not been resolved under transmitted light or phase contrast: (1) the merging of muzzle cilia with those of the ventral bands; (2) the persistence of scales to the furcal tips; and (3) the presence of sperm in the testes. The latter finding is especially important, since the presence of sperm in the body cavity, a fixation artifact visible under all optical systems, does not constitute proof of hermaphroditism.

Musellifer is clearly distinguished from other genera of Chaetonotidae in possessing a muzzle and its associated characters, the surrounding band of cilia and the terminal oral opening. The genus which resembles *Musellifer* most closely is *Polymerurus* Remane, 1927, in which a robust trunk, elongated furca, and reduced adhesive tubes can typically be found. Certain species of *Poly-*

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FIGS. 1-5. 1. Optical section of *Musellifer sublitoralis*, showing Mz—ciliated muzzle, Ph—pharynx, Ts—testes, In—intestine, Ov—ova, and Bs—seminal bursa. Figures 2-4. Mid-dorsal scale, keel, and seta characteristics. 2. Surface view, head. 3. a. Surface view, mid-trunk. b. Lateral view, mid-trunk. 4. Surface view, proximal furcal branch. 5. Schematic view of cuticular structures associated with the oral opening (see text).

merurus have additional characters in common with *Musellifer*: *P. squammo-furcatus* (Preobrajenskaja, 1926) has scales extending onto a non-jointed furca; an undescribed species noted by Pfaltzgraff (1967) has keeled scales; and *P. oligotrichus* Remane, 1927 bears reduced but well-defined testes (Remane, 1936). A recently described species, *P. delamarei* Renaud-Mornant, 1968, possesses a number of characters in common with *M. sublitoralis*, namely feeble cephalization, reduced ciliary field, scales extending onto a non-jointed furca, ventral anus, and testes. *P. delamarei* is also the first member of the genus to be reported from the marine habitat. The muzzle, however, is unique to *Musellifer* of the Chaetonotidae, having more in common with the macrodasyids and the chaetonotid genus *Neodasys* Remane, 1927 than with the remaining chaetonotid genera. Only in *M. sublitoralis* of the family Chaetonotidae are the testes well-developed and located anteriorly in the trunk, a condition which is typical of other gastrotrich families in which testes occur.

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