



Marine gastrotrichs from the Tuscan Archipelago (Tyrrhenian Sea): I. Macrodasysida, with description of three new species

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ABSTRACT

The sediments from 16 localities (8 from the Island of Elba, 3 from the Island of Giglio, and 5 from the Island of Capraia) yielded several hundreds of specimens, all identified. They belong to 28 species in 13 genera in 5 families. Of the three islands, Elba, with 25 species, proved to be the richest, followed by Capraia, with 18 species, and finally by Giglio with only 8 species. *Diplodasys meloriae*, *Tetranchyroderma quadridentaculatum*, and *T. sanctaecaterinae* are new to science. *Tetranchyroderma cirrophora* is new for the Italian fauna.

KEY WORDS: Gastrotricha - Macrodasysida - Marine meiofauna - Italian fauna - Island of Elba - Island of Capraia - Island of Giglio.

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INTRODUCTION

This research on the Gastrotricha Macrodasysida of the Tuscan Archipelago coasts is a part of a larger programme of biogeographic and faunistic surveys whose goal is the enlargement of our knowledge about the nature, origin, and distribution of the Italian fauna (see Hummon *et al.*, 1992). These surveys fall within the framework of projects of national interest and are made possible by financial support from the Consiglio Nazionale delle Ricerche, and Ministero dell'Università e della Ricerca Scientifica e Tecnologica.

The description of Gastrotricha Chaetonotida from the same localities is provided elsewhere (Balsamo *et al.*, 1992).

MATERIALS AND METHODS

Sample collections were carried out according to the methods suggested for marine interstitial environment (Higgins & Thiel, 1988). Two samples were collected at each site, one littoral (L), digging a pit in the intertidal zone, and the second sublittoral (SL) at a water depth of 1.5 m some times down to 10-15 m. The collecting sites are listed below, and illustrated in Figure 1. The maximum water depth of sublittoral samples, and the characteristic of the substratum at the collecting site are given in parentheses.

- ELBA: 1. Nisporto (coarse sand with abundant detritus), 2. Cavo (-2 m, very fine sand), 3. Zuccale (-4 m, medium coarse sand), 4. Lacona (medium sand with detritus), 5. Marina di Campo (medium coarse sand), 6. Fetovaia (-2 m, fine-medium sand), 7. S. Andrea (-2 m, medium coarse sand with gravel and detritus), 8. Biodola (-3 m, fine sand).

- GIGLIO: 9. Arenella (fine sand with abundant detritus), 10. Campese (-4 m, from fine to medium sand with detritus), 11. Cannelle (-2 m, fine sand with abundant detritus).

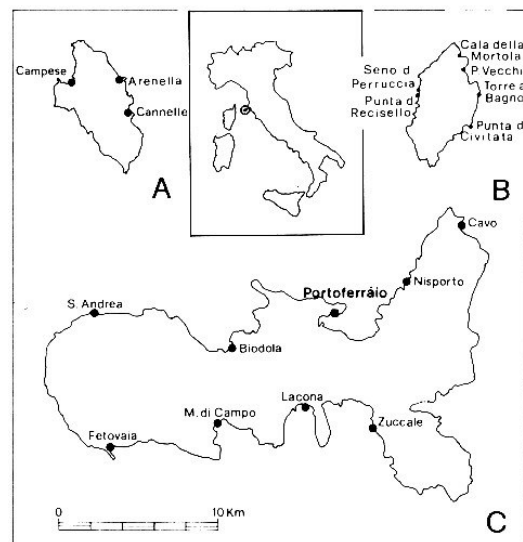


Fig. 1 - Location of sampling sites. A, island of Giglio; B, island of Capraia; C, island of Elba.

- CAPRAIA: 12. Porto Vecchio (-5 m, medium coarse sand with detritus), 13. Cala della Mortola (-2 m, fine sand), 14. Seno della PERRUCCIA (-5 m, fine gravel with detritus), 15. Punta del Recisello (-5 m, coarse sand and gravel) 16. Torre al Bagno (from -3 to -8 m, medium coarse sand with abundant detritus), 17. Punta della Civitara (-12 m, coarse sand with abundant detritus).

Gastrotrichs were isolated from large-volume sand samples by decantation after narcotization with 7% MgCl₂. The morphological study was performed mainly on living specimens, using a Leitz Dialux Microscope equipped with phase-contrast and Nomarski interference-contrast optics. Some specimens were fixed in 10% neutralized formalin, dehydrated through an ethanol series, dried with a critical point dryer (BALZERS CPD 010) using CO₂, sputter coated with gold-palladium, and observed with a Philips 500 scanning electron microscope.

Due to the variability of morphometric characters reported in the literature for many gastrotrich species, and since the weight of the intraspecific variability in defining taxa has not yet been definitely established, we believe it is useful to give the main morphometric features of the specimens observed.

Photographic negatives of holotypes and paratypes are deposited at the Museo Civico di Storia Naturale of Verona (Italy).

TAXONOMIC ACCOUNT

The sediment from 16 localities (8 from island of Elba, 3 from island of Giglio and 5 from island of Capraia) yielded 28 species belonging to 13 genera in 5 families. The island of Elba has been found the richest with 25 species, followed by the island of Capraia with 18 species, and the island of Giglio with 8 species only.

Three species, *Diplodasys meloriae*, *Tetranchyroderma quadritentaculatum* and *T. sanctaecatherinae*, proved to be new to science. *Tetranchyroderma cirrophora* is reported along the Italian coastline for the first time.

Family DACTYLOPODOLIDAE Strand, 1929

Genus *Dactylopodola* Strand, 1929

Dactylopodola thyble (Remane, 1927)

Localities - ELBA: Zuccale, V.1990, SL, 2 ind. CAPRAIA: Cala della Mortola, IX.1990, SL, 24 ind.

Geographic distribution and ecology - Common species known from Baltic Sea (Forneris, 1961), North Sea (Remane, 1927; Zaneveld, 1938; Forneris, 1961; Atlantic coasts of France (Levi, 1950; Swedmark, 1956b; Dragesco, 1960; d'Hondt, 1965, 1966, 1970; Renaud-Mornant & Jouin, 1965; Renaud-Mornant, 1971). In the Mediterranean Sea, it is recorded from the coasts of Marseilles (Swedmark, 1956a), Algeria (d'Hondt, 1973) and Greece (Hummon & Roidou, in press). In Italy, it is present throughout the entire peninsula (Remane, 1927; Wilke, 1954; Luporini *et al.*, 1973; Todaro & Balsamo, in press; Hummon, Todaro & Tongiorgi, unpubl. data).

It inhabits *Amphioxus* sediment or coarse to fine shelly sand, from the lower level of the beach down to more than 170 m water depth (cf. Renaud-Mornant, 1971).

Remarks - Total length 326-390 µm; trunk width 56 µm in the anterior third and 16 µm at the base of the caudal lobes (Fig. 2). Pentagonal head, about 56 µm wide. Margins of the head surrounded by numerous sensory bristles, the longest ones arising from the lateral lobes. An evident narrowing (38.4 µm) divided the head from the trunk. Each caudal foot ended with 4-6 adhesive tubes: two median, two central and two lateral. The central tubes were the longest, 13.7 *vs.* 7.7-9.0 µm.

The adhesive apparatus in our specimens was constructed as follows: 5 tubes on each side of the head, two of which external and longer, 7.0-8.8 µm, and three more internal, 4.8-6.8 µm; 5 ventrolateral tubes on the trunk, with 1,1,1,2 pattern in one specimen and 1,1,3 pattern in the other. Both animals from Elba had anterior tubes longer (18 *vs.* 13.4 µm) than the three posterior ones. Pharynx length 50-71 µm.

The taxonomic status of *D. thyble* Remane and *D. weilli* d'Hondt is controversial. According to Luporini *et al.* (1970) the two species belong to the same taxon, whereas Kisielewski (1987), on the basis of the arrangement of the anterior tubes, keeps the two species distinct. The morphology of animals from Elba and Capraia matches the description of the Tuscan specimens given by Luporini *et al.* (1973), the sole difference being the arrangement of the anterior tubes, a feature however sometimes difficult to discern. The distribution of the

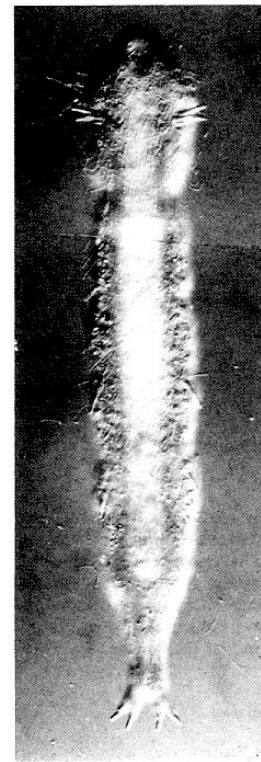


Fig. 2 - *Dactylopodola thyble*. Habitus. Nomarski optics, $\times 300$.

tubes is controversial (Remane, 1927; d'Hondt, 1965; Luporini *et al.*, 1973; Kisielewski, 1987). Indeed the new taxon *D. weilli* was created for the specimens from Archacchon, which are distinguished from *D. typble* essentially by the different pattern of the lateral tubes (1,1,1,2 instead of 1,1,3) and of the anterior ones (d'Hondt, 1965). The relative distance of the third tube depends, as pointed out by Luporini *et al.* (1973), on the degree of stretching that the specimen is submitted to during observation, and thus it does not hold taxonomic significance: the pattern in a non compressed animal is 1,1,3. Considering that the number of adhesive tubes depends on the age and size of the animal and that their lay-out may be influenced by the methods of observation, the taxonomic characters employed to distinguish *D. typble* from *D. weilli* are unreliable. Further supported by d'Hondt's (1967) data and microphotographs and in agreement with Luporini *et al.* (1973), we consider the two species a single taxon.

Genus *Dendrodasys* Wilke, 1954

Dendrodasys sp.

Locality - ELBA: Zuccale, V.1990, SL, 1 ind.

Geographic distribution and ecology - The genus *Dendrodasys* currently contains five species, all identified only once from a single locality: *D. affinis* Wilke, 1954 and *D. gracilis* Wilke, 1954 were collected in fine sand along the coastline of Naples; *D. pacificus* Schmidt, 1974 was described from the Galapagos islands; *D. ponticus* Valkanov, 1957 from the Black Sea and *Dendrodasys* sp. Valbonesi & Luporini, 1984 from the coasts of Somalia.

Remarks - The arrangement of the ventral locomotory cilia was not discernable in the single specimen examined, and so we cannot attribute it either to *D. affinis* or *D. gracilis*, the only two species of the genus with which it can be compared. The sexually mature specimen of this rare species measured 252 μ m in total length, with caudal appendages of 52 μ m and pharynx 48 μ m long. The two characteristic anterior adhesive tubes were 14 μ m in length, the pair of tubes at the base of the tail 16 μ m, and the tubes at the end of the caudal feet 7 μ m.

Family LEPIDODASYIDAE Remane, 1927

Genus *Mesodasys* Remane, 1951

Mesodasys laticaudatus Remane, 1951

Localities - ELBA: S. Andrea, V.1990, SL, 1 ind; Zuccale, XI.1989, SL, >10 ind; V.1990, SL, >10 ind. CAPRAIA, IX, 1990: Porto Vecchio, SL, 1 ind; Torre al Bagno, SL, 2 ind.

Geographic distribution and ecology - Species with a rather wide distribution: Baltic Sea (Remane, 1951; Forneris, 1961); North Sea (Boaden, 1960; Forneris, 1961;

Teuchert, 1968; Schmidt & Teuchert, 1969; Potel & Reise, 1987), English Channel (Kisielewski, 1987), coasts of Ireland and Isles of Scilly (Boaden, 1963, 1966; Hummon & Warwick, 1990), Massachusetts (Hummon, 1974a) and Florida (Thane-Fenchel, 1970; Hummon, 1974a; Decho *et al.*, 1985). Reported for the Mediterranean Sea along the Tyrrhenian and Ionian coasts of Italy (Wilke, 1954; Todaro, 1992; Hummon, Todaro & Tongiorgi, unpubl. data).

Generally found in medium or coarse sediment mixed with detritus, or in fine shell gravel of the sublittoral zone.

Remarks - Only four specimens were measured. Total length 1053-1445 μ m; caudal lobe 50 \times 75 μ m; maximum trunk width 80-100 μ m. About 20 postoral adhesive tubes arranged in 2, 3, or 4 transverse series. On the trunk, 3 longitudinal columns of tubes (dorsal, lateral, and ventral) per side. In one specimen the tubes were actually distributed over 5 rows, with a dorsolateral and ventrolateral row also present. The total number of tubes of the trunk was more than 100 per side. From 26 to a maximum of 32 tubes on the margin of the caudal lobe; lateral tubes longer (10 μ m) than medial ones (4.8-5.3 μ m). As pointed out by Remane (1951), the number and arrangement of the tubes depends on the age and size of the animal. Pharynx length 340-375 μ m.

We completely agree with the synonymy of *Mesodasys lobocercus* (Boaden, 1963) with *Mesodasys laticaudatus* recently proposed by Hummon (in press).

Family MACRODASYIDAE Remane, 1926

Genus *Macrodasys* Remane, 1924

Macrodasys caudatus Remane, 1927

Localities - ELBA: Biodola, V.1990, SL, 1 ind; Fetovaia, V.1990, SL, >10 ind; S. Andrea, V. 1990, SL, 3 ind; Zuccale, XI.1989, SL, 1 ind; V.1990, SL, 3 ind. GIGLIO: Cannelle VI.1990, SL, 3 ind. CAPRAIA, IX.1990: Cala della Mortola, SL, 2 ind; Seno della Perruccia, SL, 1 ind.

Geographic distribution and ecology - *Macrodasys caudatus* is a cosmopolitan species recorded from numerous localities along the Italian coastline (Remane, 1927; Wilke, 1954; Boaden, 1965; Schrom, 1966a, b, 1972; Todaro & Balsamo, in press; Hummon, Todaro & Tongiorgi, unpubl. data).

It inhabits fine to coarse sand mostly with detritus or mud; also reported in *Ampibioxus* sand and among algae.

Remarks - Our specimens fully correspond with the descriptions for this species given by other authors. An individual randomly chosen from the Fetovaia samples measured 530 μ m in total length, with a 93.6 μ m caudal appendix. The postoral adhesive tubes were arranged in a transverse series of 6 tubes per side. The pharynx was 207 μ m long.

Genus *Urodasys* Remane, 1926*Urodasys viviparus* Wilke, 1954

Localities - ELBA: Zuccale, V.1990, SL, 1 ind. CAPRAIA: Torre al Bagno, IX.1990, SL, 2 ind.

Geographic distribution and ecology - The genus *Urodasys* includes about a dozen species, most of them living in sediments of various grain size rich in organic detritus. Among these species, *U. viviparus* has the widest geographic range: it has been reported from India (Ganapati & Chandrasekhara Rao, 1967; Chandrasekhara Rao & Ganapati, 1968; Chandrasekhara Rao, 1972, 1975, 1980), Maldive Islands (Gerlach, 1961), Somalia (Valbonesi & Luporini, 1984) and Florida (Hummon, 1974a; Decho *et al.*, 1985). In the Mediterranean Sea, it has been observed in the Marseilles region in biogenic sediment sand and more rarely in *Amphioxus* sand, at 0.5 m and 20 m water depth, respectively (Swedmark, 1956a); in Greece, at 20-30 m depth (Hummon & Roidou, in press) and in Croatia (Schrom, 1972). In Italy it has been found in the fine sand of the Gulf of Naples, at 12 m depth (Wilke, 1954; Hummon, Todaro & Tongiorgi, unpubl. data), at S. Maria di Leuca, in mixed gravel at 4 m depth, and in the Gulf of Trieste, in fine sand at 1.5-3 m depth (Hummon, Todaro & Tongiorgi, unpubl. data).

Remarks - The body of the animal from Elba, excluding the damaged tail, measured 380 µm in length; maximum trunk width 51 µm. On each side, 4 ventrolateral adhesive tubes on the head, 2-3 pairs of tubes in the pharyngeal region and 2 pairs at the posterior end. The pharynx was 163 µm long.

Family THAUMASTODERMATIDAE Remane, 1926

Genus *Acanthodasys* Remane, 1927*Acanthodasys aculeatus* Remane, 1927

Localities - ELBA: Lacona, V.1990, SL, 5 ind; Cavo, IX.1989, SL, >10 ind; V.1990, L, 3 ind; SL, 5 ind. GIGLIO: Arenella, VI.1990, SL, 3 ind. CAPRAIA, IX.1990: Cala della Mortola, SL, 2 ind; Porto Vecchio, SL, 2 ind.

Geographic distribution and ecology - Common species along the northern and eastern coasts of Europe (Remane, 1927; Levi, 1950; Swedmark, 1950, 1956b; Valkanov, 1957; Kaplan, 1958; Forneris, 1961; Boaden, 1963a; d'Hondt, 1965, 1966, 1968a; Rudescu, 1966; Swedmark & Teissier, 1967; Schmidt & Teuchert, 1969; Kisielewski, 1987; Hummon & Warwick, 1990); also reported in Florida (Thane-Fenchel, 1970), Massachusetts (Hummon, 1974c) and North Carolina (Hogue, 1978); from the Maldive Islands (Gerlach, 1961) and India (Ganapati & Chandrasekhara Rao, 1967; Chandrasekhara Rao & Ganapati, 1968; Chandrasekhara Rao, 1972, 1975, 1980). In the Mediterranean Sea it is known from Greece (Hummon & Roidou, in press) and along the entire Italian coastline (Wilke, 1954; Schrom, 1966a, 1972; Todaro,

1992; Todaro & Balsamo, in press; Hummon, Todaro & Tongiorgi, unpubl. data).

Sometimes found in medium and coarse sand, including *Amphioxus* sand, this species seems to prefer well-sorted fine sand, even if rich in detritus.

Remarks - The specimens examined fall within the range of variability of the species (500-800 µm). The longest individual observed measured 767.5 µm, with pharynx of 194 µm and caudal feet of 20 µm; maximum trunk width was 65 µm. The adhesive apparatus was represented by 2 postoral pairs of adhesive tubes and, on each side, by 8-9 dorsolateral tubes, 20 µm in length, 6-7 ventrolateral tubes, and by a group of 2-3 other ventrolateral tubes located near the posterior end. Each caudal appendage ended with a pair of adhesive tubes (13 µm), and a third tube arising medially near the base of each foot. The same specimen had 4 dorsal tubes, as long as the ventrolateral ones, arranged in a median longitudinal row, which have never been mentioned in previous descriptions. The uniancres were longer on the dorsal posterior region than on the anterior (8.8 *vs.* 4-6 µm, respectively), as reported by other authors.

Acanthodasys sp.

Localities - CAPRAIA, IX.1990: Cala della Mortola, SL, 2 ind; Porto Vecchio, SL, 2 ind.

Remarks - Four specimens belonging to the genus *Acanthodasys* were collected in the fine sand of the sublittoral zone. The poor condition of the specimens examined did not allow us to assign them to a specific taxon, even though they appeared morphologically different from *A. aculeatus*.

Genus *Diplodasys* Remane, 1927*Diplodasys ankei* Wilke, 1954

Localities - ELBA, V.1990: Fetovaia, L, 1 ind; Zuccale, SL, 8 ind. CAPRAIA, IX.1990: Seno della Perruccia, SL, 1 ind; Porto Vecchio, SL, 5 ind.

Geographic distribution and ecology - Recorded for the North Sea (Clausen, 1965b, 1967; Swedmark & Teissier, 1967), Irish Sea (Boaden 1966), English Channel (Swedmark & Teissier, 1967; Kisielewski, 1987), Atlantic coasts of France (Renaud-Mornant, 1971) and USA (Hummon, 1967, 1974a, 1975). Schmidt (1974) described the variety *pacifica* from the Galapagos Islands. In the Mediterranean Sea, the species has been reported from the Gulf of Marseilles (Swedmark, 1956a), from the Gulf of Naples (Wilke, 1954; Boaden, 1965), island of Ponza (Todaro, 1992) and along the Ionian coasts of Apulia (Hummon, Todaro & Tongiorgi, unpubl. data).

Diplodasys ankei has been found along the littoral zone, though it more commonly inhabits sublittoral sediments even at great depths (-170 m, cf. Renaud-Mornant, 1971), especially in coarse sand mixed with

shell fragments, and in biogenic sediment, or in *Ambioxus* sand.

Remarks - The total body length of *D. ankei* given in the literature is 315-450 μm (Wilke, 1954; Swedmark, 1956a; Kisielewski, 1987), whereas the observed specimens were much smaller (256-320 μm), like those described by Todaro from the island of Ponza (Todaro, 1992). The head width was 77 μm , the neck 63 μm , and the maximum body width 88 μm . The cuticular dorsal plates were arranged in 5 longitudinal columns, the central one composed of 22-23 plates. The first 13 plates overlapped so that their anterior margin was free; the 14th plate was rounded and its margin completely free; the other 8-9 plates overlapped showing the posterior margin free. The lateral leaf-like spines characteristic of the genus *Diplodasys* were 2 on the head, 4 on the neck and 24-25 along the trunk: the first two spines were oriented anteriorly, the other ones posteriorly. Each caudal foot bore two adhesive tubes: no tube was visible on the caudal feet. The postoral tubes were arranged in two transverse rows, as in specimens from the Atlantic coasts of France described by Kisielewski (1987); the anterior row consisted of at least 14 tubes. 32-35 adhesive tubes were located laterally to each ventral ciliary band. On the posterior end, 5 + 5 adhesive tubes were followed by another 1 + 1. The length of pharynx varied from 49 to 74 μm .

The specimens were sexually mature. The paired testicles had their distal ends at the level of the pharyngo-intestinal junction. A large oocyte was often observed dorsal to the intestine, in the posterior body region.

Diplodasys meloriae n.sp.
(Figs. 3, 4)

Diplodasys minor, Luporini *et al.* (1971).

Locality - ELBA: Nisporto, V.1990, SL, >10 ind.

Diagnosis - Our specimens matched those collected by Luporini *et al.* (1971) in the sediment of Meloria and tentatively identified as *D. minor* («Mais il est plus difficile d'établir la position de notre forme par rapport à *D. minor* et à *D. ankei* Wilke...»); thus, see Luporini *et al.* (1971) for description, drawing, and comparisons with other species.

Remarks - Total length of our specimens was 374-467 μm , maximum trunk width 112 μm . Each body side had 40-43 spines. These, like those of the individuals recently found by Hummon, Todaro & Tongiorgi (unpubl. data) in shoals off the coast of Leghorn, appeared under S.E.M. observation similar, though narrower, to those of the other *Diplodasys* species, and not conical as indicated by Luporini *et al.* (1971). The posterior end of *D. minor* has

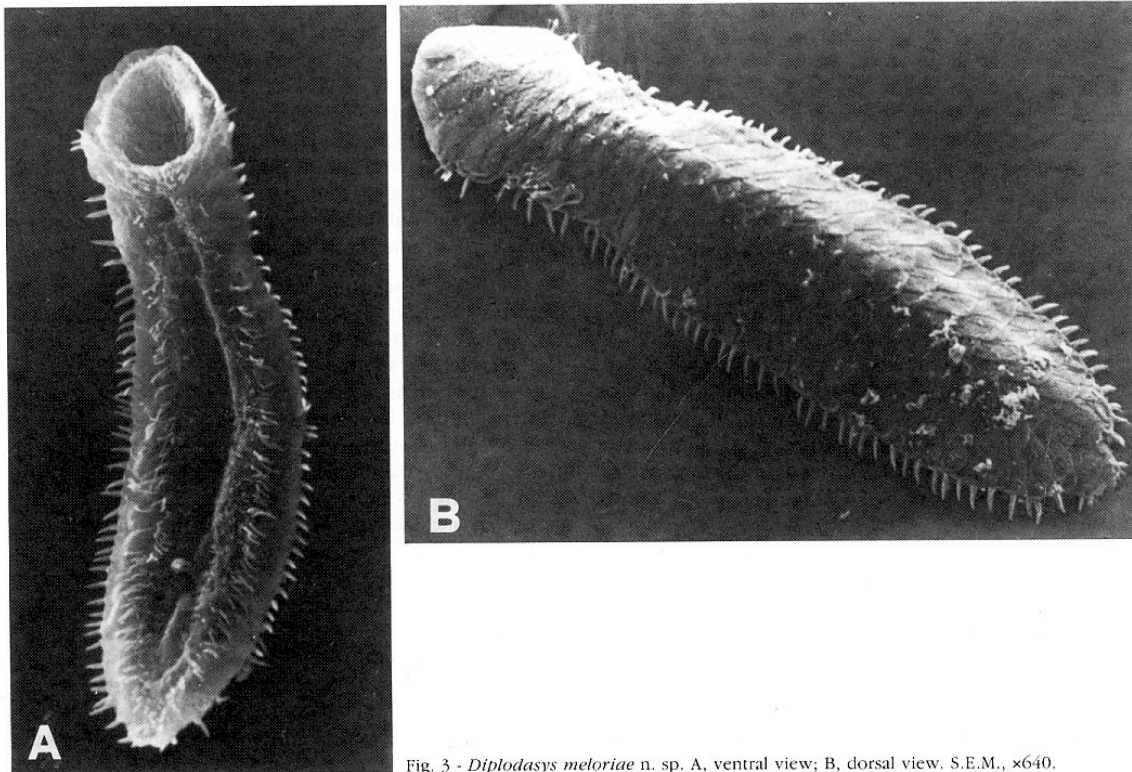


Fig. 3 - *Diplodasys meloriae* n. sp. A, ventral view; B, dorsal view. S.E.M., $\times 640$.

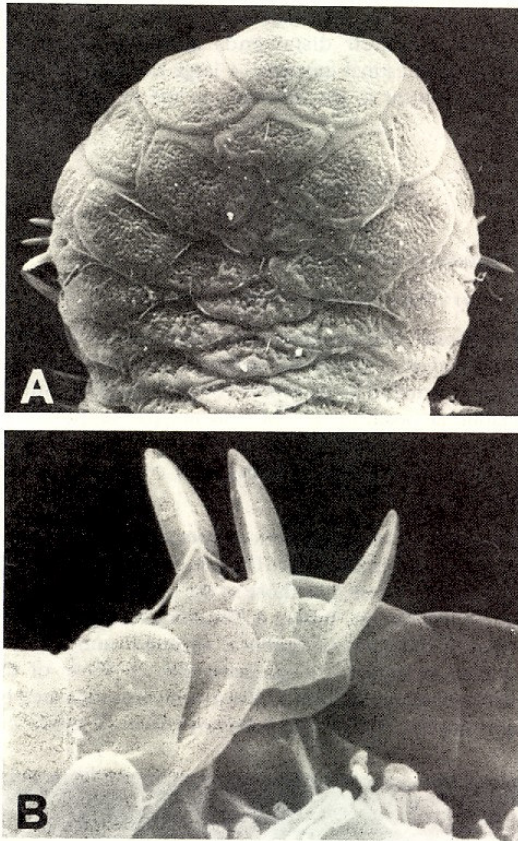


Fig. 4 - *Diplodasys meloriae* n. sp. A, dorsal view of the head; B, detail of the head spines. S.E.M., $\times 1800$.

been differently described by various authors. Kisielewski (1987), for specimens from Trezen ar Skoden and in agreement with the description of Wilke (1954) for specimens from Naples, speaks of a lobate morphology with two caudal feet, each bearing two adhesive tubes. In contrast, specimens collected by Remane (1936) and Levi (1950) had a truncated posterior end and 8-10 regularly arranged tubes not forming true caudal feet. The posterior end of *D. meloriae* consists of a small lobe (25 μm in length) with 12 tubes of 24-25 μm , uniformly arranged but never forming true caudal feet. The longest tubes are the most laterally located pair, in agreement with the observation of Luporini *et al.* (1971). Pharynx length 71-72 μm .

We believe that our specimens have to be assigned to a new taxon: *Diplodasys meloriae* (cf. also the recent studies by Kisielewski, 1987, and Todaro, 1992). The main feature distinguishing *D. minor* from *D. meloriae* is the morphology of the dorsal scales, which in the former species present an evident ribbing fanning out from the posterior margin of the scale groove, whereas in *D. meloriae* only an irregular net of microsculptures is present (Fig. 4A). Moreover, *D. meloriae* is greater in size

(374-467 *vs.* 200-350 μm), and shows two marked narrowings on the body that clearly delimit a neck² region, poorly discernible or absent in *D. minor*.

Geographic distribution and ecology - Continental and insular biogenic sediments of the Tuscan coast. Reported by Luporini *et al.* (1971) from biogenic sediments of the Meloria shoals (Leghorn) as *D. minor*.

Derivatio nominis: from the site where the species was first collected.

Genus *Pseudostomella* Swedmark, 1956

Pseudostomella etrusca Hummon, Todaro & Tongiorgi, 1993

Localities - ELBA: Fetovaia, V.1990, SL, 4 ind. GIGLIO: Cannelle, VI.1990, SL, 1 ind.

Geographic distribution and ecology - The species is known only from Italy along the coasts of Tuscany (*Pseudostomella* sp., Luporini *et al.*, 1970), Latium, Campania and Sicily (*Pseudostomella* sp., Todaro & Balsamo, in press).

It is usually found in fine sand of the sublittoral zone (Hummon *et al.*, in press).

Genus *Ptychostomella* Remane, 1926

Ptychostomella mediterranea Remane, 1927

Localities - ELBA: Zuccale, V.1990, SL, 6 ind. GIGLIO: Campese, VI.1990, SL, 4 ind. CAPRAIA, Seno della PERRUCCIA, IX.1990, SL, 4 ind.

Geographic distribution and ecology - The species is known in Italy from Naples (Remane, 1927) in *Amphioxus* sand, from Ponza island in poorly sorted pebble (Todaro, 1992) and from Leghorn (Hummon, Todaro & Tongiorgi, unpubl. data) in mixed gravel. In both cases the samples came from the sublittoral zone.

Remarks - Total body length 192-204 μm ; head width 44.5 μm ; neck width 41 μm ; trunk width 54 μm . A pair of knob-like tentacles (5.6 μm) were observed on the head. Pharynx length 48 μm .

Our specimens closely fit the original description and differ only in a few details, such as the morphology of the posterior end. According to Remane's description (1927), the animal should present two evident caudal feet each bearing 3 adhesive tubes separated by 2 + 2 intrafural tubes and flanked externally by 3 tubes. Instead, the caudal end of the specimens from Elba consisted of two small lobes each bearing 7 tubes, about 5-6 μm in length. Two lateral tubes per side (10 μm long). Our specimens also presented 8 postoral tubes (3-4 per side), 4.8-5.6 μm long, and 6 ventral tubes per side (not described by Remane). The first of these tubes was posterior to the pharyngo-intestinal junction, and was followed by the others regularly spaced; the 5th and 6th tubes formed a couple.



Fig. 5 - *Tetranchyroderma cirrophora*. Habitus. Bright field, $\times 180$.

Ptychostomella tyrrhenica Hummon, Todaro & Tongiorgi, 1993

Locality - ELBA: Biodola, V.1990, SL, 2 ind.

Geographic distribution and ecology - Known only from the Tyrrhenian coasts of Italy and from Sicily. It lives in fine, well oxygenated sand, in the sublittoral zone (*Ptychostomella* sp., Todaro & Balsamo, in press; Hummon *et al.*, in press).

Genus *Tetranchyroderma* Remane 1926

Tetranchyroderma cirrophora Levi, 1950

Localities - ELBA, V.1990: Fetovaia, SL, 1 ind; Zuccale, SL, >10 ind. CAPRAIA: Torre al Bagno, IX.1991, SL, 4 ind.

Geographic distribution and ecology - *Tetranchyroderma cirrophora* is recorded in coarse sand from Roscoff (Levi, 1950; Renaud-Mornant & Jouin, 1965), in fine shell gravel at 3 m water depth from the coast of Ireland (Boaden, 1963b, 1966) and from medium and coarse sand at 0.2-0.3 m depth off the coast of Waltair, In-

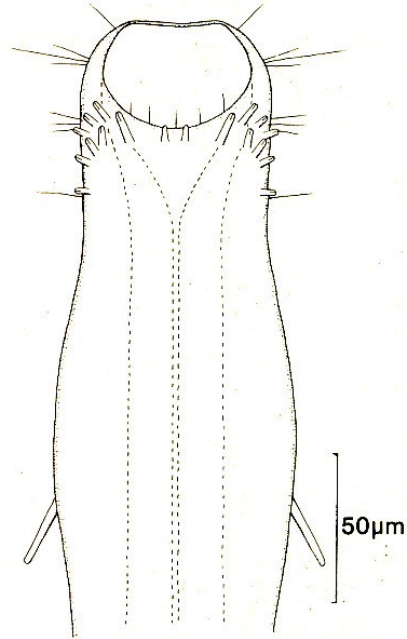


Fig. 6 - *Tetranchyroderma cirrophora*. Ventral view of the anterior region.

dia (Ganapati & Chandrasekhara Rao, 1967; Chandrasekhara Rao & Ganapati, 1968).

Remarks - Body length 500-647 μm ; maximum body width 80-100 μm . Head about 62 μm in width. Pharyngeal region delimited by two slight narrowings (58 μm). With the exception of the anterior margin of the head, the dorsum, including the base of the caudal feet, was covered by tetrancres, arranged in 25-30 alternating longitudinal columns. The spined covering also extended onto the ventral face, where the tetrancres were arranged in 8 columns per side. The tetrancres reached their maximum size on the dorsal region of the trunk, $8 \times 4 \mu\text{m}$ (Fig. 5).

The cirri set, from which the species derives its name, consisted of 4-6 pairs; their insertion on the body was variable. The largest individual examined had the first pair inserted dorsolaterally, the second pair dorsally, and the third, fourth and sixth pair ventrolaterally, whereas the fifth pair was inserted laterally. Cirri size varied from 26 μm for the anterior pair to 33-40 μm for the others; the cirri of the last pair were smaller, 10 μm . Two caudal lobes, each formed by 3 adhesive tubes, one of which was dorsal. Postoral tubes 7-9 per side, varying in length from 7 to 13 μm (Fig. 6).

The available descriptions of the species do not clearly specify the exact arrangement of the postoral tubes, and the only available illustration of the ventral surface (Chandrasekhara Rao & Ganapati, 1968) shows a different arrangement than the one we observed in the specimens

from the Tuscan Archipelago (Fig. 6). Moreover, the longitudinal columns of pentaneres appeared more numerous than that reported by previous authors (25-30 *vs.* 12), but this discrepancy may be due to different criteria used for counting the columns.

Tetranchyroderma heterotubulatum Hummon,
Todaro & Tongiorgi, 1993

Localities - ELBA: Biodola, V.1990, SL, 8 ind. GIGLIO: Cannelle, VI.1990, SL, 3 ind. CAPRAIA: Torre al Bagno, IX.1990, SL, 3 ind.

Geographic distribution and ecology - Island of Ponza (Todaro, 1992); Ionian coasts of Lucania and both the Ionian and Adriatic coast of Apulia (Hummon *et al.*, in press).

This species inhabits both fine siliceous and fine carbonaceous sand of the sublittoral zone.

Tetranchyroderma birtum Luporini, Magagnini &
Tongiorgi, 1973

Localities - ELBA, V.1990: S. Andrea, SL, 8 ind; Zuccale, SL, >10 ind. CAPRAIA, IX.1991: Porto Vecchio, SL, 3 ind; Torre al Bagno, SL, >10 ind.

Geographic distribution and ecology - Luporini *et al.* (1970) found numerous individuals of this species at Leghorn in fine and medium sand mixed with gravel. Ruppert (1978) reports *T. cf. birtum* in coarse shelly sand at 15 m water depth in Florida. In the Tuscan Archipelago, *T. birtum* was collected in medium to coarse sand with detritus mixed with gravel, in the sublittoral zone.

Remarks - The examined specimens measured 260-400 μ m in total length; caudal lobes 20.5-25.8 μ m. The head, 56-65 μ m in width, had no tentacular appendages and was covered with pentaneres, as was the rest of the dorsum. The width was 40-50 μ m at the neck, and 70-71 μ m at the trunk. 7-10 pairs of dorsolateral rod-shaped processes, 12-13 μ m. Each caudal foot bore 3 adhesive tubes; there were 8 tubes between the feet. Ventrally, the specimens presented 7-9 postoral tubes per side, 4-10 μ m (Fig. 7). Ventrolaterally on the margins of the body and on the caudal lobes 20-38 tubes were inserted. Pharynx 57.5-59.2 μ m; pharyngeal pores not visible.

The specimens from Elba differed from those described by Luporini *et al.* (1973) by their greater number of rod-shaped processes (7-10 pairs instead of 5 pairs) and by the smaller number of postoral adhesive tubes (7-9 instead of 12 per side).

Tetranchyroderma megastoma (Remane, 1927)

Locality - ELBA: Biodola, V.1990, SL, 1 ind; Zuccale, XI.1989, SL, 1 ind. CAPRAIA, IX.1990: Torre al Bagno, SL, 1 ind; Cala della Mqr-tola, SL, 2 ind; Punta del Recisello, SL, 2 ind.

Geographic distribution and ecology - Widespread species, sometimes locally very abundant. Known from the Gulf of Kiel in medium and coarse sand, sometimes

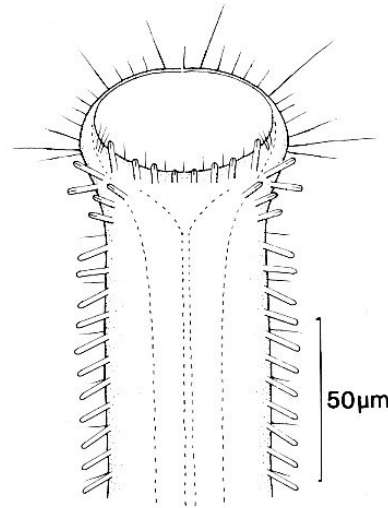


Fig. 7 - *Tetranchyroderma birtum*. Ventral view of the head.

with detritus, at 4-12 m water depth, and from Helgoland, in *Ampbioxus* sand at 15 m depth (Forneris, 1961); from Sylt in the littoral (Schmidt & Teuchert, 1969) and sublittoral zone (Potel & Reise, 1987). Reported also from the English Channel and British Isles (Swedmark, 1956b; Kaplan, 1958; Kisielewski, 1987; Hummon & Warwick, 1990) in fine, medium and coarse sand, even if rich in detritus, of littoral and sublittoral zones; from the Bassin d'Arcachon (Swedmark, 1956b; Renaud-Mornant & Joiun, 1965; d'Hondt, 1967; Kisielewski, 1987); India (Ganapati & Chandrasekhara Rao 1967; Chandrasekhara Rao & Ganapati, 1968; Chandrasekhara Rao, 1969, 1972) in medium sand, at the half tide level. In the Mediterranean Sea, *T. megastoma* has been previously found at Naples and along the Costa Flegrea (Remane, 1927; Wilke, 1954; Papi, 1957; Boaden, 1965) in fine sand rich in *Zoostera* detritus or in *Ampbioxus* sand at 5-10 m water depth. Recent studies by Todaro (1992) and by Hummon, Todaro & Tongiorgi (unpubl. data) have confirmed the previous findings and widened the Italian geographic range, now including the coasts of Tuscany, Latium, Lucania and Abruzzi.

Remarks - The specimens of the Tuscan Archipelago closely match the description of the species.

Tetranchyroderma pachysomum Hummon,
Todaro & Tongiorgi, 1993

Locality - ELBA: Zuccale, XI.1989, SL, 2 ind.

Geographic distribution and ecology - Known only from Italy at S. Maria di Leuca (Apulia) in mixed gravel at 5 m depth and among the shoals of Meloria (Leghorn) in biogenic sediment at 3-5 m depth (Hummon *et al.*, in press).

Tetranchyroderma quadritentaculatum n.sp.
(Figs 8, 9)

Locality - ELBA: Biodola, V.1990, SL, 2 ind.

Diagnosis - *Tetranchyroderma* with ribbon-like body (300-480 μm in length and 38-48 μm in width) covered by pentancreas. Head bearing 4 rod-like tentacles. Two caudal feet each bearing 3 adhesive tubes. Ten postoral adhesive tubes, 6 adhesive tubes between the caudal feet, and about 17 pairs of ventrolateral adhesive tubes along the body margins. One pair of dorsolateral adhesive tubes on the posterior trunk region.

Description - Species with long ribbon-like body, 300-480 μm in length and 38-48 μm in width. The dorsal surface, except for the anterior most region of the head, is covered by pentancreas (max 5.6 \times 5.0 μm) with equally long branches. The head presents a truncated anterior margin and bears dorsolaterally 4 rod-like tentacles and about 10 flexible bristles regularly distributed along its margins. The first two tentacles are 12.5-15.6 μm long while the second are only 4-6 μm ; the bristles are 10-20 μm long. The ventral surface is almost completely

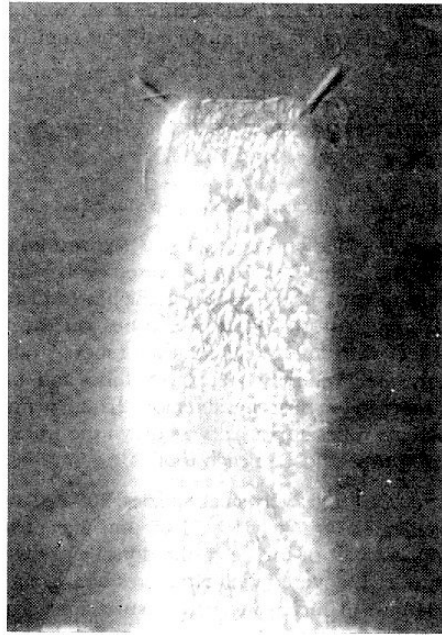


Fig. 9 - *Tetranchyroderma quadritentaculatum* n. sp. Dorsal view of the head. Nomarski optics, $\times 750$.

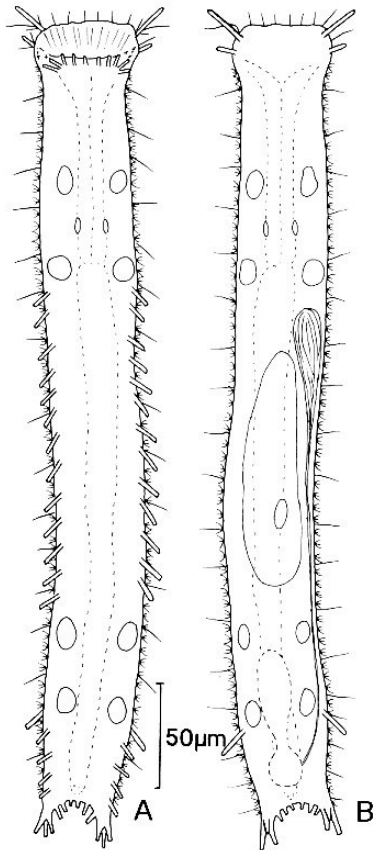


Fig. 8 - *Tetranchyroderma quadritentaculatum* n. sp. A, dorsal view; B, ventral view, of the head.

covered with locomotor cilia that, like in other *Tetranchyroderma* species, are arranged in several (here more than 15) transverse rows. The adhesive apparatus consists of 10 tubes (6-12 μm long) in the postoral region, about 17 pairs of ventrolateral tubes (7-12 μm) along the body margins, two caudal feet (each bearing 3 tubes 8-13 μm long), and 6 tubes (7-10 μm) between the caudal feet. One pair of dorsolateral adhesive tubes (13-15 μm) is inserted on the posterior region. The funnel-shaped mouth opens anteriorly, almost terminally. The pharynx, 120-139 μm in length, bears the pharyngeal pores in its distal part. The intestine is straight and opens ventrally with the anus.

One specimen showed a mature testicle on the right side of the intestine, posterior to the pharyngo-intestinal junction, and a mature oocyte dorsal to the intestine, about halfway along the trunk. A fronto-caudal organ was present, though we are unable to give a full description of it; for what we were able to observe, this structure did not differ from what is known from other congeneric species. The same specimen showed also 4 pairs of large epidermal glands dorsolateral to the digestive apparatus.

Remarks - *Tetranchyroderma quadritentaculatum* is peculiar since it is the only species bearing two pairs of rod-like cephalic tentacles. The particularly elongated silhouette and the truncated anterior margin of the body approach this species to *T. boadeni* and to *Tetranchyroderma* sp. I, sp. II, and sp. III described by Schrom (1972), which however have a cuticle covering of tetrancres.

Derivatio nominis: the specific name «*quadritentaculatum*» refers to the number of the cephalic tentacles.

Tetranchyroderma sanctaecaterinae n.sp.
(Figs. 10, 11)

Locality - ELBA: Zuccale, IX.1989, SL, 3 ind; V.1990, SL, 1 ind.

Diagnosis - Medium to small size *Tetranchyroderma* (200-270 μm in length). Body covered with tetrancres. Two pairs of knob-like tentacles on the head and a pair of dorsolateral posterior cirriform tubes on the trunk. Caudal feet with 3 terminal adhesive tubes, 6 tubes between the feet. Ventrally, 10 postoral tubes and, on each side, 1 tubes in the pharyngeal region, 2,2,2,3 ventral and ventrolateral tubes about halfway down the trunk and a series of 4 tubes close to each foot.

Description - Relatively small species, 200-270 μm total length; maximal trunk width 57-65 μm . Except for the anteriormost part of the head, the dorsal and the lateral body surface is covered with tetrancres with branches of equal length. The tetrancres measure 5.0-6.5 μm in length and 2.7-3.2 μm in width, except for the anteriormost and those closest to the furcal feet that are smaller. They are arranged dorsally in 14-16 longitudinal columns, each consisting of about 50 spines. The dorsal head

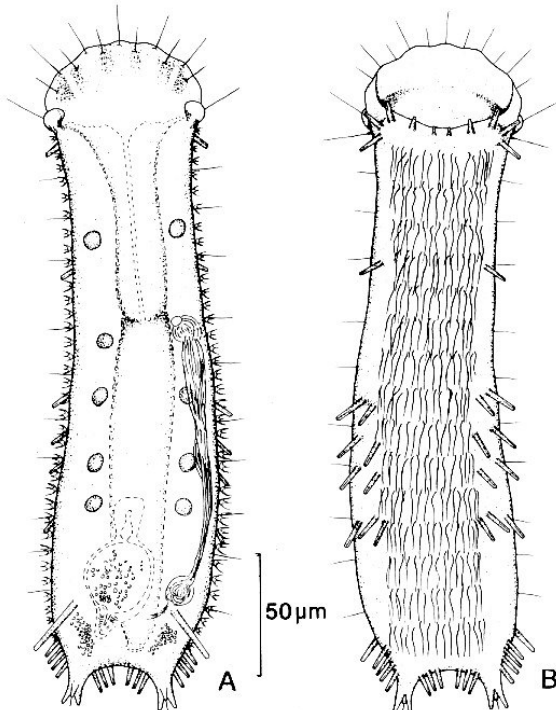


Fig. 10 - *Tetranchyroderma sanctaecaterinae* n. sp. A, dorsal view; B, ventral view.

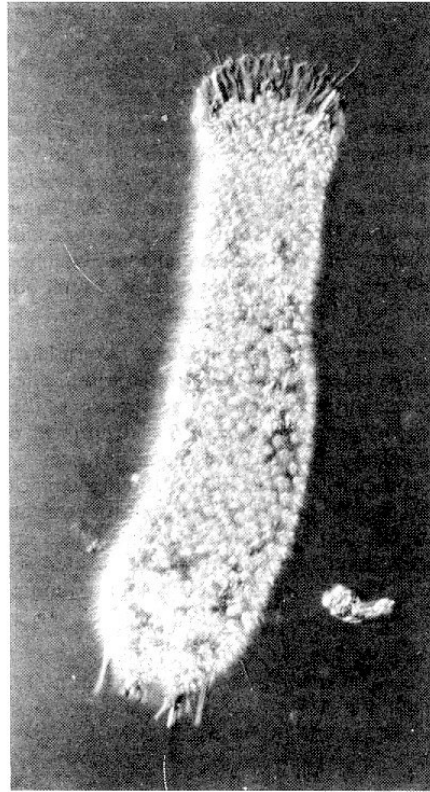


Fig. 11 - *Tetranchyroderma sanctaecaterinae* n. sp. Dorsa view. Nomarski optics, $\times 400$.

region free of tetrancres shows two longitudinal ribbings filled with refracting granules not to be mistaken for the rod-like tentacles typical of several species of the genus *Tetranchyroderma*. Two knob-like tentacles ($8.3 \times 6.8 \mu\text{m}$) are inserted dorsolaterally on each of the mouth sides. A long and stiff bristle ($17.5 \mu\text{m}$) emerges posteriorly and ventrally to each knob-like tentacle. Two dorsolateral tubes ($22 \mu\text{m}$), similar to the «cirri» of the species of the genus *Tbaumastoderma*, are near the posterior end. About 10 bristles and 7 epidermal glands can be observed on each body side. The caudal feet ($13 \mu\text{m}$) end with 3 tubes, two ventral ($6.2 \mu\text{m}$) and a smaller dorsal one, difficult to discern; 3+3 tubes between the feet ($8-10 \mu\text{m}$). On the ventral side a series of 10 adhesive tubes is inserted posterior to the mouth; the two median tubes are the smallest measuring $4.0 \mu\text{m}$, the two adjacent ones are $5.5 \mu\text{m}$ in length, whereas the six lateral tubes measure $8.4 \mu\text{m}$. The shape of the tubes varies from subconic for the medial ones to cylindrical for those displaced more laterally. On each side a ventrolateral tube is inserted just ahead of the pharyngeo-intestinal junction. These are followed at a distance by 3-4 pairs of tubes, $9.0-11.2 \mu\text{m}$, each composed by one ventral and one ventrolateral tube. A group of 3 tubes of equal length

(10 μm) follows, the most external of which is inserted ventrolaterally. Four other tubes (10 μm) are located near the caudal feet. The ventral ciliature is arranged in transverse series. No cuticular formation is present. The wide funnel-shaped mouth is surrounded by 10-12 bristles on the anterior dorsal edge and by a similar number on its posterior edge. The cylindrical pharynx extends for 54.2 μm . Pharyngeal pores were not observed. A single testis is located on the right side of the body, lateral to the gut. It begins at the pharyngo-intestinal junction and tapers out at the fronto-caudal organ. The thread-like spermatozoa, 45 μm , consist of an apical corkscrew portion and an apparently smooth tail piece of equal length. The fronto-caudal organ is rounded and located dorsally at the end of the intestine. Two refracting glandular structures are visible lateral to the anus.

Remarks - Among the species of *Tetranchyroderma* having tetrancere armature, *T. sanctaecaterinae* approaches *T. massiliense* Swedmark, 1956a for the presence of the dorsal cirri but it is distinguished from it in having: 1) one sole pair of dorsal posterior cirri, 2) very evident knob-like tentacles, 3) a different number of postoral tubes (10 *vs.* 6-8); 4) different number and arrangement of ventrolateral tubes (lateral tubes in Swedmark's description); 5) four instead of two tubes lateral to caudal feet; 6) caudal feet with three tubes instead of two, and 7) six instead of four tubes between the feet. These differences taken together justify the assignment of our specimens to a new species.

Ecology - *Tetranchyroderma sanctaecaterinae*, like *T. massiliense*, was found in samples of *Amphioxus* sand collected at water depths of 2-5 m.

Derivatio nominis - From the name of the small hermitage of S. Caterina (Rio Marina), where an Elba Island Study Center was recently founded.

Tetranchyroderma thysanogaster Boaden, 1965

Localities - CAPRAIA, IX.1990: Porto Vecchio, SL, 2 ind; Torre al Bagno, SL, 6 ind.

Geographic distribution and ecology - Species to date known only from Italy, at Porto Paone (Naples) in medium sand with detritus or in fine sand mixed with fine gravel dredged from 5 m water depth (Boaden, 1965), and from South Florida in coarse calcareous sand (Thane-Fenchel 1970) and in sea-grass sediment (Decho *et al.*, 1985).

Remarks - Two specimens only were measured, both in the hermaphroditic stage. Body length varied from 380 to 487 μm ; maximum width of the head and of the trunk 50-55 μm and 78-85 μm , respectively. The pharynx, in which the pharyngeal pores were not visible, measured about one quarter the total length. Each caudal foot, 25 μm long, was composed of three tubes, two ventral, 13 μm , and one dorsal, 8 μm . Cuticular covering

made up of tetrancres; the longest, about halfway along the trunk, measured 7.1 \times 5.2 μm . Base of the caudal feet covered by small tetrancres. The dorsum bore 4 pairs of thin rigid rods, similar to those described for other species (*viz.* *T. birtum*). Two lines of 7-8 epidermal glands per side. On the posterior region, a pair of dorsolateral tubes were visible on each side, 23 μm (in the original description by Boaden, 1965, these tubes were described as lateral). Ventrally, a transverse row of 14-16 postoral tubes, arranged in two groups. The outermost tubes of each group extended beyond the lateral margins of the body; 36-40 ventrolateral tubes on each side, 8-14 μm long, 4-5 of which in the pharyngeal region, the last one located at the level of the pharyngo-intestinal junction. Ventrally, in the hind quarter of the trunk, there were two groups each of 5-7 tubes, 18-32 μm , arranged radially. Between the feet, 8-10 tubes, 8.4 μm . The reproductive apparatus respected the original description, with a frontal organ (35 \times 32 μm) and a caudal organ (34 \times 22 μm).

Tetranchyroderma thysanophorum Hummon, Todaro & Tongiorgi, 1993

Localities - ELBA: Biodola, V.1989, SL, 3 ind; Fetovaia, V.1990, SL, >10 ind; Lacona, V.1990, SL, 2 ind; S. Andrea, V.1990, SL, 5 ind; Zuccale, XI.1989, SL, >10 ind; V.1990, SL, >10 ind. CAPRAIA, IX.1990: Cala della Mortola, SL, 2 ind; Punta del Recisello, SL, 1 ind.

Geographic distribution and ecology - Species known only along the coast of Tuscany (Hummon *et al.*, in press) in medium-fine sand at 1.5 m depth and from Sicily (Todaro & Balsamo, in press) in fine sand with detritus at 3 m water depth.

Genus *Tbaumastoderma* Remane, 1927

Tbaumastoderma mediterraneum Remane, 1927

Localities - ELBA: Cavo, XI.1989, SL, 3 ind. GIGLIO: Campese, VI.1990, SL, 4 ind. CAPRAIA: Seno della Perruccia, IX.1991, SL, 2 ind.

Geographic distribution and ecology - Species reported from Roscoff and the English Channel (Kisielewski, 1987). For the Mediterranean basin, it is known from Marseilles (Swedmark, 1956a), Greece (Hummon & Roidou, in press) and Croatia (Schrom, 1972). In Italy, it was collected along the Ligurian, Tyrrhenian and Ionian coasts (Remane, 1927; Wilke, 1954; Luporini *et al.*, 1973; Hummon, Todaro & Tongiorgi, unpubl. data).

Tbaumastoderma mediterraneum has been found in the sublittoral zone and inhabits fine, medium or coarse sand even rich in detritus, biogenic sediment, or *Amphioxus* sand.

Remarks - Total body length 188-192 μm , 207 μm including the posterior cirriform tubes; head width 30 μm ; trunk width 56.8 μm . The cephalic tentacular apparatus is typical for this species. spade-like tentacles 13.6 μm

long, cylindrical tentacles 1 μm long. Body covered dorsally by tetrancres. The spines on the trunk are about two-fold in size those covering the posterior end of the body. Four evident pairs of dorsal cirriform tubes, ranging in length from 14-15 μm for the anterior, to 9-17 μm for the two median pairs, to 30-32 μm for the posterior one. The adhesive tubes are 8 per side, in agreement with the description by Schrom (1972) for northern Adriatic specimens but in discrepancy with Remane's original description. Caudal feet 13.2 μm long, each consisting of two adhesive tubes, flanked externally by a pair of ventrolateral tubes and medially by 3 tubes. 8 adhesive postoral tubes (4 per side), the most lateral of which are about twice as long as the medial ones.

Tbaumastoderma ramuliferum Clausen, 1965

Localities - ELBA, V.1990: Biodola, SL, 4 ind; Nisporto, SL, 1 ind; S. Andrea, SL, 1 ind. CAPRAIA, IX.1991: Cala della Mortola, SL, >10 ind; Punta del Recisello, SL, 1 ind.

Geographic distribution and ecology - Species common along the coast of Tuscany, down to the Ionian coast of Apulia and in Sicily (Clausen, 1965; Todaro, 1992; Todaro & Balsamo, in press; Hummon, Todaro & Tongiorgi, unpubl. data). Outside Italy it has only been observed by d'Hondt (1970) at Roscoff.

It was found in *Amphioxus* sand at 10-12 m water depth and in fine and medium sand more or less rich in detritus at 1.5-4 m depth, and in the littoral zone, at mid-tide, in heterogeneous sediments with rather large grains.

Remarks - The observed specimens were typical (Fig. 12). The two branches of the cephalic posterior tentacles measured 11.2 and 11.7 μm . The total body length was 184-198 μm , 205 μm including the posterior cirriform tubes. Four pairs of cirriform tubes were inserted dorsolaterally, measuring 21-27 μm , 10-13 μm , 11-22 μm , and 33-34 μm in length. Caudal feet, 12 μm long, each ending with two adhesive tubes; 6 tubes between the feet. Two additional tubes were present on the external side of each caudal foot. 8-12 postoral tubes (4-6 per side). At least 9 pairs of ventral tubes, the first of which was inserted at the level of the anterior third of the pharynx and the second pair at the pharyngo-intestinal junction. Pharynx length 58.2 μm .

Family TURBANELLIDAE Remane, 1925

Genus *Paraturbanella* Remane, 1927

Paraturbanella pallida Luporini, Magagnini & Tongiorgi, 1971

Localities - ELBA: Nisporto, V.1990, SL, 2 ind; S. Andrea, V.1990, SL, 1 ind; Zuccale, XI.1989, SL, 3 ind. GIGLIO, VI.1990: Arenella, SL, 2 ind; Cannelle, SL, 2 ind. CAPRAIA, IX.1990: Porto Vecchio, SL, 2 ind; Torre al Bagno, SL, 4 ind.

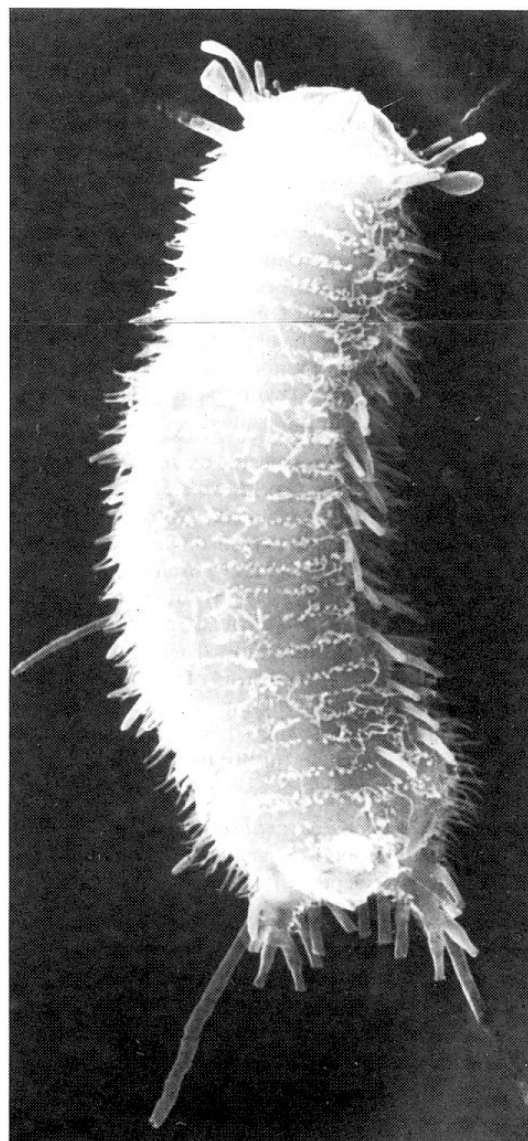


Fig. 12 - *Tbaumastoderma ramuliferum*. Ventral view. S.E.M., $\times 1000$.

Geographic distribution and ecology - *Paraturbanella pallida* was first found in Italy along the coastline of Leghorn, in medium sublittoral sand rich in organic detritus, at 3-4 m water depth. Recent investigations (Hummon, Todaro & Tongiorgi, unpubl. data) have identified this species in all Italian seas, except the northern Adriatic for which reports are still lacking. Hummon & Warwick (1990) listed *P. pallida* among the fauna of the Isles of Scilly (U.K.). Schmidt (1974) described a variety *pacifica* on specimens sorted from a heterogeneous substratum from the island of Santa Cruz (Galapagos), at 1-1.5 m water depth.

Paraturbanella teissieri Swedmark, 1954

Localities - ELBA: Biodola, XI.1989, SL, 4 ind; V.1990, SL, 8 ind; Fetovaia, V.1990, SL, >10 ind; Zuccale, XI.1989, SL, 2 ind; V.1990, SL, >10 ind. GIGLIO: Campese, VI.1990, SL, >10 ind. CAPRAIA: Cala della Mortola, IX.1900, SL, 2 ind.

Geographic distribution and ecology - Widespread species: island of Sylt (Schmidt & Teuchert, 1969; Potel & Reise, 1987); English Channel (Swedmark, 1954; d'Hondt, 1968b, 1970; Kisielewski, 1987); British Isles (Boaden, 1963a, b, c, 1966; McIntyre & Murison, 1973; Hummon, 1975; Hummon & Warwick, 1990); Atlantic coasts of France (Renaud-Debyser, 1963a, b, 1964; Renaud-Debyser & Salvat, 1963; Renaud-Mornant & Jouin, 1965; d'Hondt, 1965, 1966, 1968a; Kisielewski, 1987); Massachusetts (Hummon, 1974b). For the Mediterranean Sea, it is known from Algeria (d'Hondt, 1973), Greece (Hummon & Roidou, in press) and many localities along the Italian littoral (Wilke, 1954; Tongiorgi, 1975; Todaro, 1992; Todaro & Balsamo, in press; Hummon, Todaro & Tongiorgi, unpubl. data).

This species prefers clean, well oxygenated sand, particularly with medium grain size, of shallow sublittoral areas. However, it is not uncommon in fine sand and in *Amphioxus* sand.

Remarks - A specimen collected at Zuccale (Elba) measured 446 μm , with caudal lobes of 35 μm and pharynx of 141 μm .

Considering the numerous recent reports of *P. teissieri* from the Italian coasts and Kisielewski's observations on the characters distinguishing this species from *P. microp-tera*, the doubts originally advanced by Tongiorgi (1975) on the identity of the two species can now be considered resolved.

Genus *Turbanella* Schültze, 1853*Turbanella ambronensis* Remane, 1943

Localities - ELBA: Cavo, XI.1989, L, 1 ind; V.1990, L, 2 ind; Marina di Campo, V.1990, L, 4 ind.

Geographic distribution and ecology - North Sea (Remane, 1943; Forneris, 1961; Teuchert, 1968; Schmidt & Teuchert, 1969); British Isles (Hummon & Warwick, 1990); Atlantic coast of France (Renaud-Debyser, 1964; d'Hondt, 1965, 1966, 1968b, 1970; Ruppert, 1979) and Atlantic and Pacific coasts of the USA (Wieser, 1957; Hummon, 1974a, 1975; Hummon *et al.*, 1976; Ruppert, 1979). In the Mediterranean Sea, it has been reported along the coasts of Catalonia (Delamare-Deboutteville, 1954), Algeria (d'Hondt, 1973) and Greece (Hummon & Roidou, in press). In Italy, it has been identified along the littoral of Tuscany, Campania, Apulia and the Marches (Gerlach, 1953; Papi, 1957; De Zio & Grimaldi, 1964; Hummon, Todaro & Tongiorgi, unpubl. data).

Turbanella ambronensis is usually found in interstitial water of the supralittoral zone or in the sediment of the

shallow sublittoral zone, in medium or fine, clean and well oxygenated sand.

Remarks - The examined specimens closely fit the description of this species. All the animals from Elba presented the pair of «cirrata tubes» inserted ventrally at the level of the space between the fifth and sixth lateral tubes; this pair of tubes is not always distinct in other populations of *T. ambronensis* (Hummon, Todaro & Tongiorgi, unpubl. data). A specimen from Marina di Campo measured 433 μm in total length, with caudal lobes of 30.6 μm , and pharynx of 145 μm . The caudal adhesive tubes followed the 9,1,9 pattern.

Turbanella cornuta Remane, 1925

Locality - ELBA: Cavo, XI.1989, L, >10 ind.

Geographic distribution and ecology - Known from many localities along the coasts of European seas, the Atlantic and Pacific coasts of the USA (Wieser, 1957; Hummon, 1967, 1972, 1974a, 1975; Hummon & Hummon 1977) and the Indian Ocean (Chandrasekhara Rao, 1972). In the Mediterranean Sea, it is recorded from Marseilles (Swedmark, 1956a), Greece (Hummon & Roidou, in press) and Algeria (d'Hondt, 1973). In Italy, it has been reported from Naples (Wilke, 1954) and Venice (Schrom, 1966a, b).

Certainly one of the most ubiquitous gastrotrichs, it lives in sand from coarse and pure to quite fine, mostly in the littoral zone. Very adaptable to salinity variations, it has also been found in brackish waters even with minimum salinity of 5‰.

Remarks - Our specimens differed from those described in the literature by the presence on the head of a pair of ventrolateral adhesive papillae, 7.5 μm in length, similar to those distinguishing *Paraturbanella teissieri*. An evident pair of cirriform tubes, 16 μm , like in *Turbanella ambronensis*, were visible ventrally at the level of the fifth pair of lateral tubes. Total length 425-578 μm ; furcal lobes 20-24 μm in length; head width 48-49 μm ; maximum trunk width 40 μm . Dorsal tubes 12-14 pairs. Two groups of 5-6 postoral tubes, 4-8 μm in length. The lateral tubes were 14-15 per side, each bearing a long sensory bristle. First pair of tubes longer than the others (15.0-16.5 *vs.* 10.5-11.7 μm). Caudal tubes, 3.5-9.0 μm , arranged in a 5,1,5 or 7,1,7 pattern. Pharynx length 120-150 μm .

Turbanella thiophila Boaden, 1974

Localities - ELBA: Fetovaia, V.1990, SL, 7 ind. CAPRAIA: Seno della Perruccia, SL, 2 ind.

Geographic distribution and ecology - Island of Sylt (Potel & Reise, 1987) and western coasts of Scotland (Boaden, 1974; Hummon, 1976). Already known in Italy along the coasts of Tuscany (Tongiorgi, 1975), Apulia

(Hummon, Todaro & Tongiorgi, unpubl. data) and the island of Ponza (Todaro, 1992).

Remarks - The morphometric characteristics of the examined specimens exactly matched the descriptions by Boaden (1974) and by Tongiorgi (1975). The species was first found in black sand on Firemore Beach (Scotland), rich in hydrogen sulphide. The presence of this gastrotrich in the biocoenosis of poorly oxygenated sand of the intertidal zone was confirmed by Tongiorgi (1975). However, recent studies (Potel & Reise, 1987) show that *T. thiophila* is not limited exclusively to the thiobios.

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