
Capitella spp. (*Capitella capitata* species complex)

A thread worm

Phylum: Annelida
Class: Polychaeta
Order: Capitellida
Family: Capitellidae

Taxonomy: Once considered a cosmopolitan species, *Capitella capitata* (Fabricius, 1780) is now regarded as a complex of several closely related, morphologically similar but genetically distinct sister species (Grassle and Grassle 1976; Blake 2000; Blake and Ruff 2007). Currently, this species complex consists of at least 6 and as many as 13 species (Blake 2000; Blake et al. 2009), some of which are recognizable by subtle differences in morphology (Grassle and Grassle 1976) or reproductive ecology. *Capitella telata* was recently described (Blake et al. 2009). Teasing apart sister species based on morphology is difficult and most researchers refer, instead, to the entire complex of species (e.g. *Capitella capitata sensu lato*, Blake and Ruff 2007).

Description

Size: Individuals range from 20–100 mm in length and 1–2 mm in width, with at least 90 segments (Blake 2000).

Color: Dark red or brownish, fixed specimens are light tan.

General Morphology: Long and earthworm-like with pointed anterior (Hartman and Reish 1950; Hartman 1969; family Capitellidae, Blake and Ruff 2007). Body cylindrical, slender and without obvious parapodia or peristomial appendages.

Body: Body divided into anterior thoracic and posterior abdominal regions. (Fig. 1: drawing done from somewhat compressed specimen). Circulatory system lacking (Morris et al. 1980).

Anterior: Broad and triangular prostomium with dorsal depression (Hartman 1969; Blake 2000) (Fig. 2). Prostomium shape variable between species (sharply pointed, conical or swollen) (Blake 2000). Peristomium short and setigerous.

Trunk: Anterior thorax with nine segments, all bearing setae.

Abdomen of 90 segments beginning at setiger 10.

Posterior: Pygidium is a simple posterior flange (Hartman 1969) without appendages (Blake 2000).

Parapodia: Biramous and inconspicuous (Hartman 1944). Parapodia reduced in thoracic region becoming swollen in abdominal segments (Blake 2000).

Notopodia become elevated posteriorly in posterior abdominal region (Blake 2000).

Setae (chaetae): Simple (not jointed).

Anterior thoracic parapodia (setigers 1–7) with long, fine capillary spines (Fig. 5a).

Abdominal segments with stout hooks and transparent hoods (Fig. 5b). Hooks

composed of a large main fang with a straight row of apical teeth where each tooth is well separated. Tooth number varies with 1–3 rows of 1–5 teeth per row (Blake 2000).

Eighth and ninth neuropodia each with two stout yellow copulatory spines (male, Fig. 4a).

Eyes/Eyespots: None in described specimen. Although some members of the species complex may possess small, paired eyespots (Blake 2000).

Anterior Appendages: None.

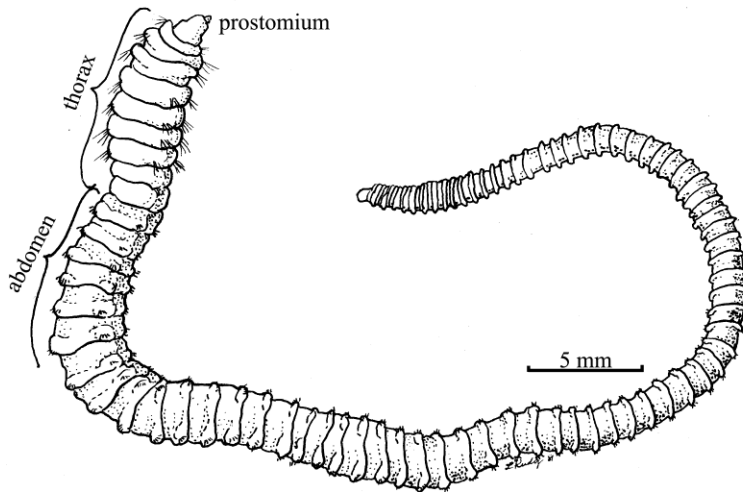
Branchiae: None.

Burrow/Tube: Individuals inhabit black membranous, mucus-lined burrows in fine mud and organic sediments (Fernald et al. 1987). Within the vertically positioned tube, individuals are situated such that their head is up (Ricketts and Calvin 1952).

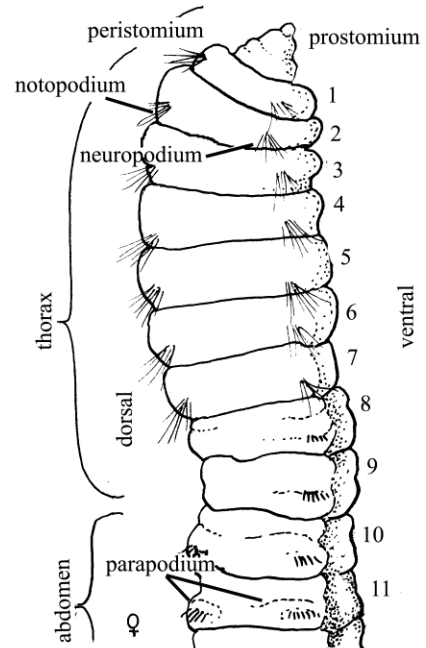
Pharynx: Bears eversible proboscis which is rarely seen everted (Hartman 1969).

Genitalia: Males with lateral generative pore between setigers 7 and 8 and 2 yellow genital spines in each notopodium of setigers eight and nine. Notopodial spines number six or

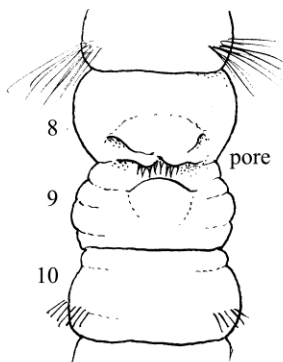
Capitella sp.
(*Capitella capitata*)



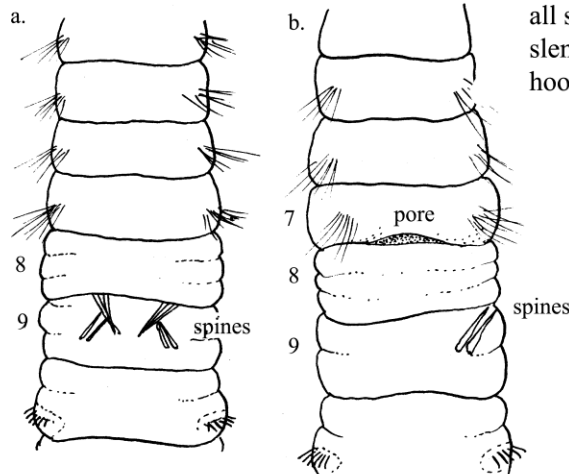
1. *Capitella sp.* (lateral view) ♀ x4:
dark red body, threadlike, with 9 thoracic and about 90 abdominal setigers; prostomium a depressed triangular lobe, without eyes or appendages.



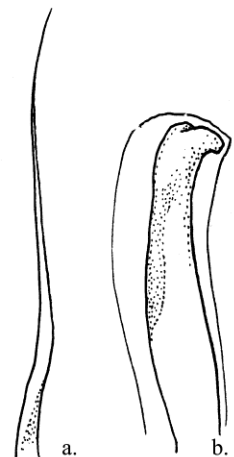
2. Prostomium and anterior setigers (lateral view) x30:
setae begin on peristomium; biramous parapodia, no branchiae; all setae simple, thoracic long, slender; abdominal stout, hooded hooks.



3. Female genital area (dorsal view): showing genital pore between setigers 8 and 9.



4. Male genital area:
a. (dorsal view) showing two copulatory spines on each notopodium, setigers 8 and 9.
b. (lateral view) generative pore between setigers 7 and 8.



5. Setae:
a. long, fine capillary seta (thorax).
b. stout, hooded hook (abdomen).

more on setiger eight and 2–4 on setiger nine (Blake 2000). Females with corresponding genital pores (Blake 2000).

Nephridia:

Possible Misidentifications

The Capitellidae lack conspicuous parapodia, branchiae, lobes and prostomial appendages. Their superficial appearance is earthworm-like. Capitellid genera are defined by characters (e.g. numbers of thoracic setigers with and without capillary setae and the first appearance of hooks) which are ontogenically dependent (Blake 2000). Identification requires adult specimens as the same species could be identified to two different genera at different developmental stages (Fredette 1982). Several genera occur locally in muddy estuarine situations:

Heteromastus spp. have 12 thoracic segments (not 11) and one is achaetous. Capillary setae are present on the first five setigers. Uncini begin on setiger six (not five) and they have notopodial branchiae on distal posterior segments.

Notomastus spp. like *Heteromastus*, have 12 thoracic segments (not 11) and one is achaetous. Some species possess branchiae. All thoracic setigers have capillary setae (as in Fig. 5).

Mediomastus spp. have an elongated, pointed prostomium and thorax with achaetous peristomium and 10 setigers (not nine). Capillary setae are present on setigers 1–4 (not 1–7) and long-handled hooks are present on setigers 5–10.

Capitella spp. are differentiable from the other genera by the presence of hooks as well as capillary setae on the last two thoracic setigers (Hartman 1969) as well as genital spines on setigers eight and nine. Members of the *Capitella capitata* species complex are the only members of this genus to possess setae on the first segment (Hartman and Reish 1950) (Fig. 2).

Ecological Information

Range: Type locality is Naples. Chiefly northern distribution including western Canada to California (Hartman 1969).

Cosmopolitan. Many species have wide and overlapping distribution (Blake 2000).

Local Distribution: In Coos Bay stations include South Slough, North Spit and Barview. Also Netarts Bay at several stations (Stout 1976).

Habitat: Mudflats, muddy sand to pure mud (Porch 1970), can be found in fish wastes, sulfurous sediments and organically enriched sediments where it may be a pollution indicator if found in great numbers and in the absence of many other invertebrate species (Filice 1959; Reish 1955). This does not hold true in Coos Bay, where it is not found in the polluted areas (Porch 1970). Found in vertical, dirt-encrusted, black, membranous tubes (Ricketts and Calvin 1971), in the mud of *Salicornia* marsh channels, Coos Bay (Porch 1970). No real preference for substrate, but likes quite intertidal conditions (Filice 1959).

Salinity: Can tolerate low saline condition (Porch 1970), collected at salinity of 14, San Francisco Bay where it is reported to prefer saline conditions (Filice 1959).

Temperature: Cold waters to tropics, more commonly in temperate waters (Morris et al. 1980).

Tidal Level: Collected at +0.9 m to -1.2 m, particular about depth, not substrate. Also found down to approximately 55 m (Filice 1959).

Associates: Coos Bay associates include other polychaetes: *Abarenicola*, *Mediomastus* (Netarts Bay), *Leptochelia*, *Pinnixa* and amphipods (Morris et al. 1980).

Abundance: Common, cosmopolitan in mudflats (Blake 1975). When present in great numbers in an area with few other invertebrates, heavy pollution of the habitat may be indicated (Reish 1955). Found in great beds of many acres on the Berkeley, California mudflats (Ricketts and Calvin 1971).

Life-History Information

Reproduction: Great variability exists within this complex of species from sexually dimorphic to hermaphroditic species (George 1984 in Blake 2000). Special copulatory setae on setigers eight and nine (Fig. 4).

Reproductively active all year (California) with mild peaks summer and winter. Males transfer spermatophores to females which can store them until eggs are ripe. Early development occurs in the female's tube. Developmental modes also vary from direct or lecithotrophic development of short duration (e.g. hours) to planktotrophic development with short pelagic duration (weeks) (Crumrine 2001). Egg diameters correspond to developmental mode and range from 50–250 µm (Grassle and Grassle 1976).

Larva: Larvae emerge from female tube after five days as trochophore larvae or hatch at 7–14 days as juveniles. Trochophore larvae have reduced or absent apical tuft, prototroch and telotroch, with gut that is not subdivided (Crumrine 2001). Metatrochophores settle to the benthos (Blake 2000) and settlement may be stimulated by an increase in hydrogen sulfide (Cuomo 1985 in Fernald et al. 1987).

Juvenile:

Longevity: Juveniles reach sexual maturity rapidly, within one month at 20° C.

Growth Rate: Members of this species complex have rapid life-cycles and rearing several generations in the laboratory is relatively straightforward (Fernald et al. 1987).

Food: A direct deposit feeder on organic matter and indicator of polluted sediments.

Predators:

Behavior:

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