Thelepus crispus

A terebellid worm

Phylum: Annelida
Class: Polychaeta
Order: Terebellida
Family: Terebellidae

Description

Size: Individuals range in size from 70–280 mm in length (Hartman 1969). The greatest body width at segments 10–16 is 13 mm (88–147 segments). The dissected individual on which this description is based was 120 mm in length (from Coos Bay, Fig. 1).
Color: Pinkish orange and cream with bright red branchiae, dark pink prostomium and gray tentacles and peristomium.
General Morphology: Worm rather stout and cigar-shaped.
Body: Two distinct body regions consisting of a broad thorax with neuro- and notopodia and a tapering abdomen with only neuropodia.

Anterior: Prostomium reduced, with ample dorsal flap transversely corrugated dorsally (Fig. 5). Peristomium with circlet of strongly grooved, unbranched tentacles (Fig. 5), which cannot be retracted fully (as in Ampharctidae).

Trunk: Thorax with well over 25 segments (Hartman and Reish 1950). Anterior thorax not greatly enlarged. Thoracic ventral plates not clearly distinguishable (as in *Pista*) and do not extend into lappets.

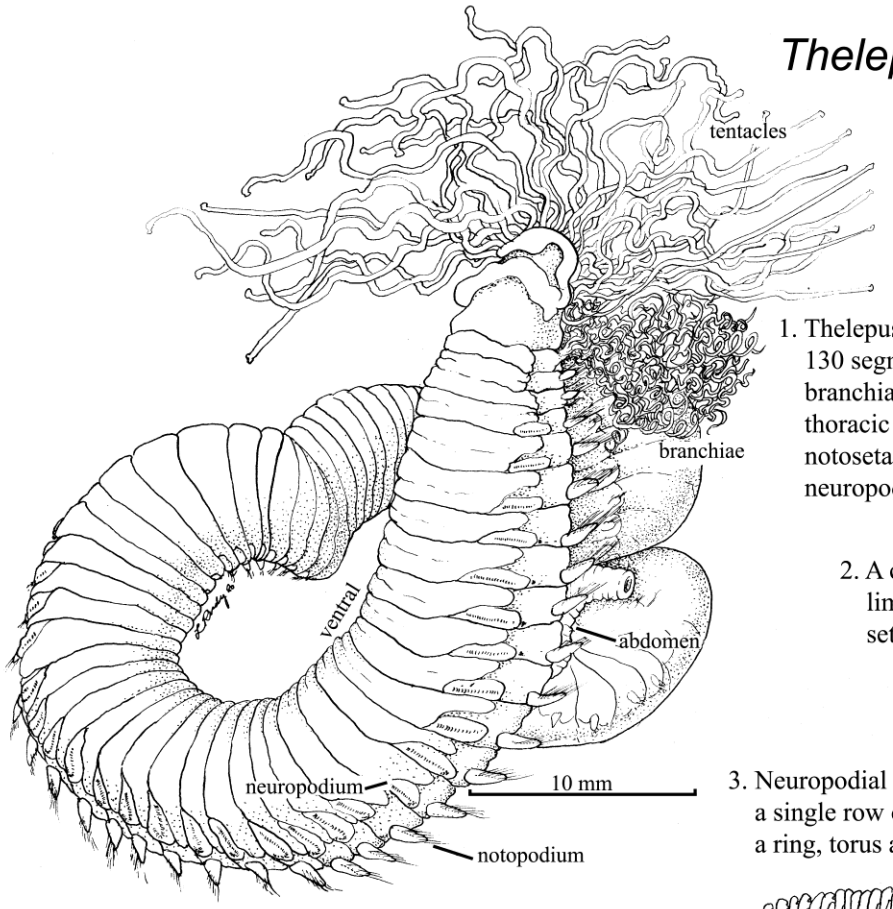
Posterior:
Parapodia: Thoracic segments biramous and abdominal segments bear only neuropodia. Parapodial tori (a ridge-like parapodial branch) are longest on setigers 9–21 and become papillar posteriorly (Hartman 1969).
Setae (chaetae): Notosetae appear as groups of long capillary setae in raised parapodia (Figs. 1, 5). Each seta is limbate (wing-shaped) with smooth margins (Fig. 2) (Hartman 1969). Notosetae present from second branchial segment (third body segment) and continue almost to the worm posterior (to 14th segment from end in mature specimens) (Hutchings and Glasby 1986). All neurosetae short handled, avicular (bird-like) uncini, imbedded in a single row on oval-shaped tori (Figs. 3, 5) where the single row curves into a hook, then a ring in latter segments (Fig. 3). Each uncinus bears a thick, short fang surmounted by 4–5 small teeth (Hartman 1969) (two in this specimen) (Fig. 4). Uncini begin on the fifth body segment (third setiger), however, Johnson (1901) and Hartman (1969) have uncini beginning on setiger two.
Eyes/Eyespots: None.
Anterior Appendages: Feeding tentacles are long (Fig. 1), filamentous, white and mucus covered.
Branchiae: Branchiae present (subfamily Thelepinae) and with many slender single filaments (Fig. 1). Three filiform pairs are present on segments two, three, and four (Hartman 1969; Hutchings and Glasby 1986). Branchiae contain vascular hemoglobin (as in *Pista pacifica*), which transfers oxygen to coelomic hemoglobin (Garlick and Terwilliger 1974).
Burrow/Tube: Stiff tube of coarse sand, gravel and shells over a chitinous base is attached to shell and/or rock or within empty burrows.
Pharynx:
Genitalia:
Nephridia:

Possible Misidentifications

The Terebellidae are one of a number of tube-building polychaete families with soft tentacles for deposit feeding and with gills on their anterior segments (Blake 1975). Many terebellids occur in our Northwest bays. All of them have bodies with numerous segments and two distinct regions, a tapering abdomen with neurosetae only and both capillary setae and uncinigerous tori on the thorax

Hiebert, T.C. 2015. *Thelepus crispus. In:* Oregon Estuarine Invertebrates: Rudys' Illustrated Guide to Common Species, 3rd ed. T.C. Hiebert, B.A. Butler and A.L. Shanks (eds.). University of Oregon Libraries and Oregon Institute of Marine Biology, Charleston, OR.

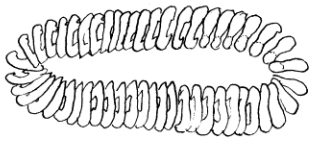
Thelepus crispus

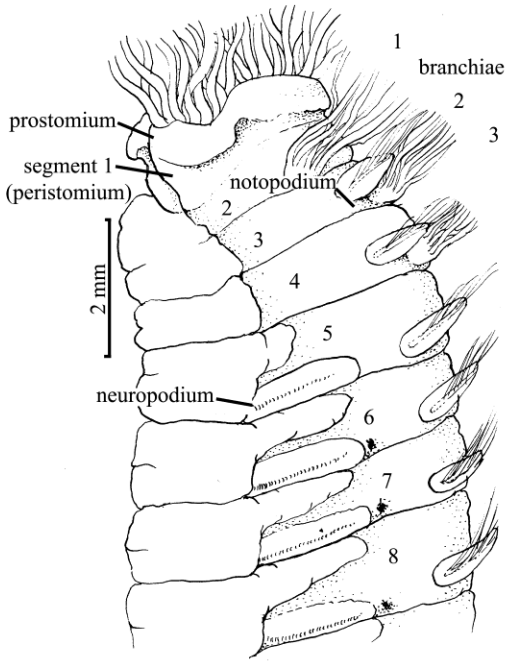


1. Thelepus crispus x4:
130 segments; pinkish-orange, red branchiae, whitish tentacles; many thoracic segments with neura- and notosetae; abdomen short and with neuropodia only .

2. A capillary notoseta:
limbate; on thoracic setigers.

3. Neuropodial torus, medial x90:
a single row of uncini curved into a ring, torus a low, flat oval.





4. Single uncinus:
large avicular fang with small teeth above it; short handled.

5. Anterior segments x12:
branchiae - 3 pairs beginning segment 2; capillary notosetae begin segment 3; uncinigerous tori begin segment 5.

(Berkeley and Berkeley 1952). They all have a modified and reduced head with the prostomium and peristomium at least partly fused, and many non-retractible filiform tentacles emerging from the folded prostomium. Terebellids are relatively large, usually over 5 cm in length, and havefeeding tentacles ("spaghetti worms") which are not completely retractile into the worm's mouth. Their branchiae are not simple, but consist of masses of aborescent or filamentous structures. There are 14 local terrebellid genera (Blake and Ruff 2007): *Amaeana*, *Eupolymnia*, *Lanice*, *Loimia*, *Nicolea*, *Neoamphitrite*, *Neoleprea*, *Polycirrus*, *Proclea*, *Ramex*, *Spinosphaera*, *Streblosoma*, *Thelepus* and *Pista*.

The subfamily Thelepinae, which includes the genus *Thelepus*, always have branchiae and uncini, which occur in single rows which may curve around into a circle (e.g. Fig. 3). Other genera in this subfamily include *Streblosoma* and *Naneva* (Hartman 1969). The latter does not occur in our area. The main difference between *Streblosoma* and *Thelepus* is the position of the first notopodium and neuropodium which is the second and third segments and the third and fifth segments, for the two genera respectively (Hilbig 2000).

Streblosoma spp. have uncini arranged in single straight rows throughout the body, not changing into a depressed ring as in *Thelepus crispus*. They, too, have three pairs of branchiae and notosetae beginning on the first branchial segment, not on the second (Blake 1975). *Streblosoma* spp. can be further differentiated from *T. crispus* in that members of the former genus have many eyespots, a tightly coiled tube, a small number of tentacles and conspicuous ventral plates. *Streblosoma crassibranchia* is reported in southern and central California (Blake and Ruff 2007). *Streblosoma bairdi*, reported from Puget Sound, is small (to 80 mm), with only 30-40 setigers, a fragile posterior, notosetae beginning on the first branchial segment, and uncinal tori, which become projecting rectangular pinnules (Berkeley and Berkeley 1952; Kozloff 1974).

There are three other species of *Thelepus,* which might occur in our area. The reported range of *Thelepus hamatus* is from Alaska to California (Hilbig 2000) with a distribution that is probably subtidal and below. This species is a small, delicate terebellid, which is about 26 mm in length, with only a few thick, deeply grooved tentacles. It has only two pairs of branchiae, with few filaments and is orange. *Thelepus setosus* (= *Phenacia setosa*), a cosmopolitan terebellid, is distinguished from *T. crispus* chiefly because all of its uncini are in single rows which do not curve into rings as in *T. crispus* and the uncini are on projecting rectangular pinnules as in *T. hamatus* (Berkeley and Berkeley 1952). *Thelepus setosus* has three pairs of branchiae and capillaries beginning on the third segment as in *T. crispus*. *Thelepus setosus* also has conspicuous black eyespots behind the tentacle bases, noticeable ventral plates (about 20) and a long narrow posterior. It is yellow to brown, with red branchiae and orange-brown tentacles (Berkeley and Berkeley 1952).

Ecological Information

Range: Type locality is San Francisco, California (Hartman 1969). Distribution along the NE Pacific from Alaska south to California.

Local Distribution: Oregon sites include Yaquina Bay (Hartman and Reish 1950). Coos Bay sites include Pigeon Point and many stations inside and outside the bay.

Habitat: *Thelepus crispus* attaches its tube to the undersides of rocks and shells. Individuals are found in Coos Bay in empty pholad (= family Pholadidae, boring clams) burrows.

Salinity: Found at salinities of 30 in Coos Bay. Individuals encountered in lower parts of bays where salinity is not likely to be reduced.

Temperature:

Tidal Level: Intertidal.

Associates: Nearly all specimens, from Coos Bay, had the polynoid polychaete, *Halosydna brevisetosa* in their burrows. In under-rock and mudflat habitats of bays, associates include *Cancer oregonensis* and

burrowing clams from the genera *Adula* and *Penitella*.

Abundance: This species can be fairly abundant within its narrow habitat and is one of the most common local intertidal terebellids.

Life-History Information

Reproduction: Terebellid reproductive and developmental modes are highly variable. *Thelepus crispus* is an iteroparous brooder where individuals are continually reproductive over six months (July–December, 14˚C, San Juan Island, WA, McHugh 1993). Females spawn large (400 µm) yellow-orange oocytes (Fernald et al. 1987), which are attached in egg masses to the sides of maternal tubes in extremely large numbers (as many as 51,500 larvae per brood, McHugh 1993).

Larva: Larval developmental stages of *Thelepus crispus* are described in McHugh (1993). Larvae hatch from their brood at the one-setiger stage and have a prototroch, neurotroch, telotroch and two red eyes one day later. They have five setigers and long first tentacle at 12 days and are juveniles with eight setigers by day 26 (McHugh 1993).

Juvenile:

Longevity:

Growth Rate:

Food: A suspension and deposit feeder, *Thelepus crispus* traps detritus particles with is tentacles and passes food in a mucus film along tentacle grooves and into the mouth. Research suggests that *Thelepus crispus* orients its feeding tentacles in response to the predominating direction and strength of currents (Musgrove 1982).

Predators:

Behavior: *Thelepus crispus* contains and releases brominated aromatic metabolites into sediment surrounding their burrows. Concentrations of dibromobenzyl alcohol in surface sediments (to 6 cm depths) increased with proximity to burrows of *T. crispus* (Lincoln et al. 2005). These contaminated sediments can negatively impact the nearby community and reduce settlement and recruitment of other polychaetes (e.g. *Nereis vexillosa*, Woodin et al. 1993).

Bibliography

1. BERKELEY, E., and C. BERKELEY. 1952. Annelida: polychaeta sedentaria. Canadian Pacific Fauna. 9b:1-139.
2. BLAKE, J. A. 1975. Phylum Annelida: Class Polychaeta, p. 151-243. *In:* Light's manual: intertidal invertebrates of the central California coast. S. F. Light, R. I. Smith, and J. T. Carlton (eds.). University of California Press, Berkeley.
3. BLAKE, J. A., and E. R. RUFF. 2007. Polychaeta, p. 309-410. *In:* Light and Smith manual: intertidal invertebrates from central California to Oregon. J.T. Carlton (ed.). University of California Press, Berkeley, CA.
4. FERNALD, R. L., C. O. HERMANS, T. C. LACALLI, W. H. WILSON, JR, and S. A. WOODIN. 1987. Phylum Annelida, Class Polychaeta, p. 138-195. *In:* Reproduction and development of marine invertebrates of the northern Pacific coast. M. F. Strathmann (ed.). University of Washington Press, Seattle, WA.
5. GARLICK, R. L., and R. C. TERWILLIGER. 1974. Coelomic cell hemoglobin of the terebellid polychaete, *Thelepus crispus* Johnson: structure and oxygen equilibrium. Comparative Biochemistry and Physiology. 47:543-553.
6. HARTMAN, O. 1969. Atlas of the sedentariate polychaetous annelids from California. Allan Hancock Foundation, University of Southern California, Los Angeles.
7. HARTMAN, O., and D. J. REISH. 1950. The Marine annelids of Oregon. Oregon State College, Corvallis, Oregon.
8. HILBIG, B. 2000. Family Terrebellidae, p. 231-290. *In:* Taxonomic atlas of the benthic fauna of the Santa Maria Basin and western Santa Barbara Channel. J. A. Blake, B. Hilbig, and P. H. Scott (eds.). Santa Barbara

Museum of Natural History, Santa Barbara, CA.
9. HUTCHINGS, P., and C. GLASBY. 1986. A Revision of the genus *Euthelepus* (Terebellidae: Thelepinae). Records of the Australian Museum. 38:105-117.
10. JOHNSON, H. P. 1901. The Polychaeta of the Puget Sound region. Proceedings of the Boston Society of Natural History. 29:381-437.
11. KOZLOFF, E. N. 1974. Keys to the marine invertebrates of Puget Sound, the San Juan Archipelago, and adjacent regions. University of Washington Press, Seattle.
12. LINCOLN, D. E., K. T. FIELMAN, R. L. MARINELLI, and S. A. WOODIN. 2005. Bromophenol accumulation and sediment contamination by the marine annelids *Notomastus lobatus* and *Thelepus crispus*. Biochemical Systematics and Ecology. 33:559-570.
13. MCHUGH, D. 1993. A comparative study of reproduction and development in the polychaete family Terebellidae. The Biological Bulletin. 185:153-167.MUSGROVE, N. 1982. The feeding behavior of the terebellid polychaete *Thelepus crispus* Johnson in response to currents. Journal of Shellfish Research. 3:113.
14. WOODIN, S. A., R. L. MARINELLI, and D. E. LINCOLN. 1993. Allelochemical inhibition of recruitment in a sedimentary assemblage. Journal of Chemical Ecology. 19:517-530.