
Tubulanus sexlineatus

The six-lined ribbon worm

Phylum: Nemertea
Class: Anopla
Order: Paleonemertea
Family: Tubulanidae

Taxonomy: The genera *Tubulanus* and *Carinella* were described by Renier (1804) and Johnson (1833), respectively, and were synonymized by Bürger in 1904 (Gibson 1995). Melville (1986) and the International Code of Zoological Nomenclature determined that the family name Tubulanidae takes precedence over its senior subjective synonym Carinellidae (Ritger and Norenburg 2006). Synonyms for *T. sexlineatus* include *C. sexlineata* and *C. dinema*.

Description

Size: Individuals are 20 cm in length, on average, but can extend to 1 m (Haderlie 1975; Griffin 1898). The illustrated specimen 25 cm in length and 1.5–2 cm in width (from Coos Bay).

Color: Most commonly dark brown with more than 150 regular horizontal bands and 5–6 longitudinal lines (Coe 1905). One of these lines is mid-dorsal and two are dorso-lateral. Two are ventral, dividing ventrum into three parts (Fig. 2b). If six lines are present, the sixth is a faint mid-ventral line. Horizontal bands begin at the tip of the head and only about half of them continue down through the lateral edge to the ventrum (Fig. 3). Bands are sometimes very wide in mid-section. The longitudinal lines vary in extension and are occasionally broken into spots (Griffin 1898; Haderlie 1980).

General Morphology: Soft, elongate, non-segmented (Phylum Nemertea) (Fig. 1).

Body: Cylindrical body can be slightly flattened posteriorly (Order Paleonemertea; Heteronemertea are often flat and ribbonlike, see *Cerebratulus*).

Anterior: Head blunt, not snake-like (order Paleonemertea) and not completely retractable into body. Often flattened dorsoventrally and disc-like. Head is wider than trunk,

from which it is separated by a constriction (Fig. 2b). Distinct dark cephalic furrows extend from sub-terminal proboscis pore (Figs. 2b, 2c), and lateral transverse grooves are present just above the constriction which separates head from trunk (Fig. 2b) (Order Paleonemertea). Well-developed cerebral sense organs (sensory pits and dorsal grooves) and lateral sense organs (rounded pits next to fifth horizontal ring) (Figs. 1, 3) are present. Nephridia are well developed and exit via pores near the anterior end of the lateral sense organ (Coe 1905) (Fig. 3).

Posterior: Flattened and light in color around anal pore. No caudal cirrus (Fig. 1).

Eyes/Eyespots: No ocelli (Order Paleonemertea).

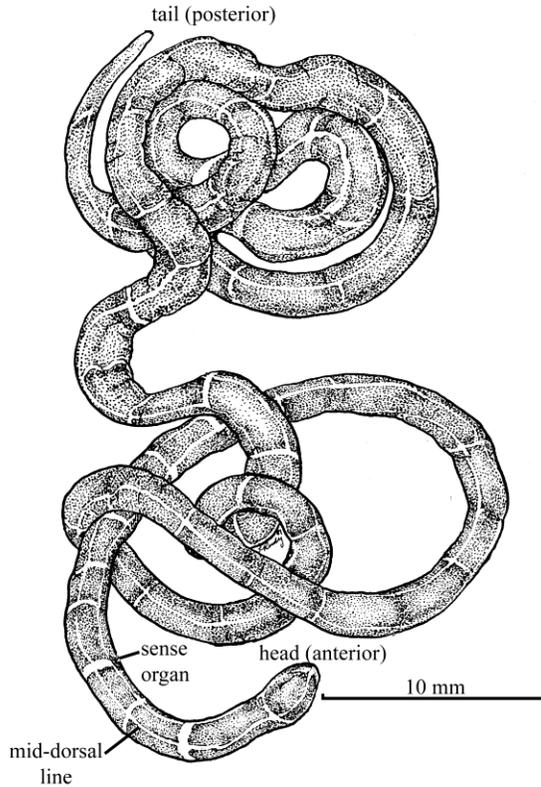
Mouth: Directly behind brain (Class Anopla) and not connected to proboscis pore. Mouth is situated ventrally just behind transverse grooves (Fig. 2b) (Haderlie 1975) and between horizontal pigment bands one and two (Griffin 1898).

Proboscis: Eversible (phylum Nemertea) and, when not everted, coiled inside rhynchocoel (cavity). Proboscis short, without stylets (class Anopla) and rhynchocoel less than half body length. Proboscis pore sub-terminal (Fig. 2b).

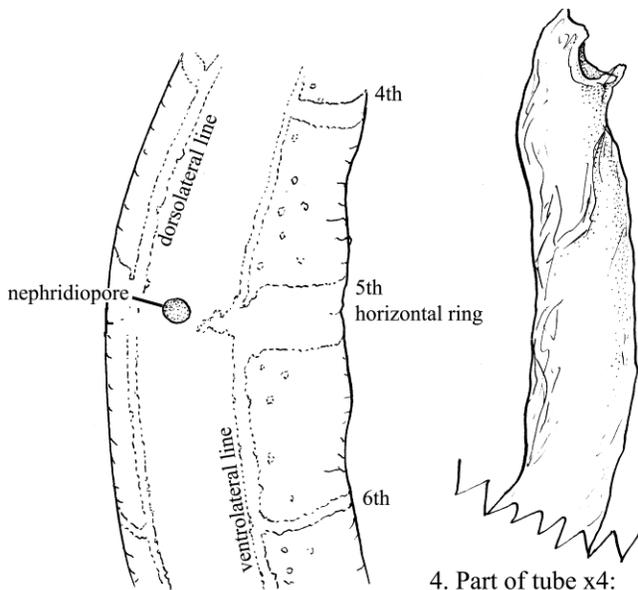
Tube/Burrow: Their long, white, rather transparent and tough tubes open at both ends (Fig. 4) and are secreted by worm's epidermis (Coe 1905).

Possible Misidentifications

The brown color of *Tubulanus sexlineatus*, with both vertical and horizontal markings, is quite distinctive, especially in nemerteans without ocelli or lateral cephalic



1. *Tubulanus sexlineatus* (L: 25cm) x4: delicate, extensible; posterior flattened; 5-6 thin white longitudinal lines, many regular horizontal rings on brown ground.

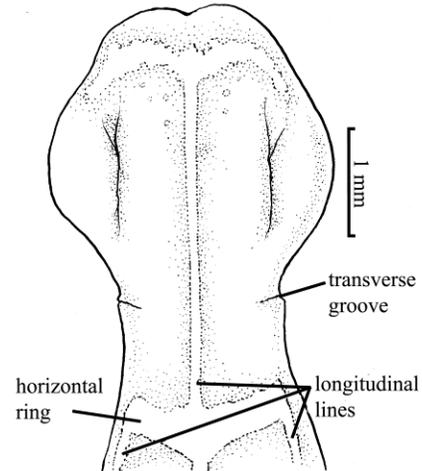


3. Lateral sensory organ.

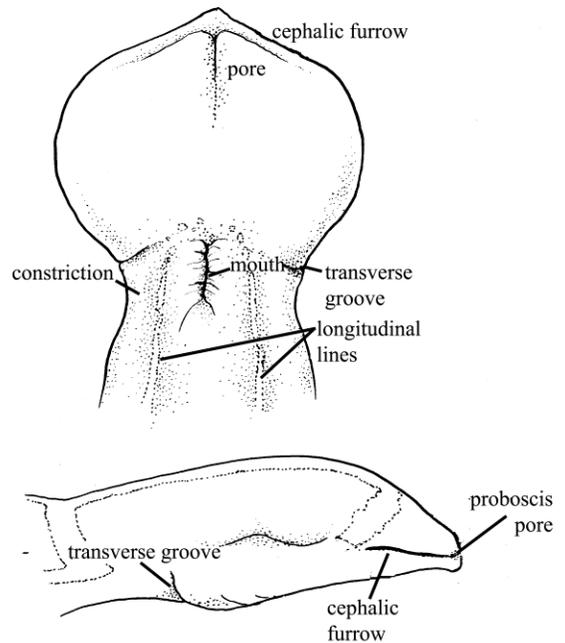
4. Part of tube x4: whitish, clear and papery.

Tubulanus sexlineatus

2a. Head (dorsal view) x20: flattened, eyeless; constriction between head and trunk; three longitudinal lines; lateral transverse grooves just anterior to constriction.



2b. Head (ventral view): proboscis pore subterminal, mouth posterior to transverse grooves.



2c. (Lateral view): cephalic furrow; no ocelli.

grooves. There are several other species of *Tubulanus* in our area of which *T. sexlineatus* and *T. polymorphus* are most common and are recognizable from one another by their dramatically differing pigment. The latter species is bright orange and lacks lines. Those with surface patterns which may provide a possible misidentification include: *T. cingulatus*, which is deep brown with white rings, but has only four longitudinal lines, not 5–6 and is subtidal; *T. capistratus*, is slender and brown with many narrow white rings but only three longitudinal lines and is up to 1 m in length; *T. albocinctus* is deep red with many narrow white rings, but without any longitudinal lines.

Because of the many identifying characteristics, which are internal and not visible, it is sometimes very difficult to distinguish among nemerteans without dissecting them. Ways in which the worms flatten, contract, and coil are useful as aids to identification of live specimens.

Ecological Information

Range: Described by Griffin from specimens collected in Puget Sound, Washington and Alaska (Griffin 1898). Known range includes Alaska to southern California (Coe 1905).

Local Distribution: Coos Bay sites in spoil islands of lower bay and the open coast of Cape Arago.

Habitat: Occurs in tubes among algae, mussels, under rocks and on pilings.

Salinity: Collected locally at salinity of 30.

Temperature:

Tidal Level: Intertidal (Coe 1905) and collected at about +0.3 m.

Associates: Found with terebellids and the polynoid polychaete, *Halosydna brevisetosa*.

Abundance: Rather common (Coe 1905).

Life-History Information

Reproduction: The reproduction and development of *T. sexlineatus* is not known.

Larva: The larval development of *T. sexlineatus* is not currently known, but is suspected to have a planktotrophic, planuliform larva (Norenburg and Stricker 2002) with lateral cirri, as is observed in other *Tubulanus* larvae (T. Hiebert, pers. obs.).

Juvenile:

Longevity:

Growth Rate: The growth rate of most nemerteans is unknown, however, most species have some regenerative ability. *Tubulanus sexlineatus* and *T. polymorphus* are known to regenerate both anterior and posterior ends (T. Hiebert, pers. obs.)

Food: Predatory on polychaetes.

Predators:

Behavior:

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