Tubulanus polymorphus

An orange ribbon worm

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

"Such a worm when seen crawling in long and graceful curves over the bottom in clear water earns for itself a place among the most beautiful of all marine invertebrates" (Coe 1905)

Taxonomy: *Tubulanus polymorphous* was a name assigned in unpublished work by Renier (1804). The genera *Tubulanus* and *Carinella* were described by Renier (1804) and Johnston (1833), respectively, and were synonymized by Bürger in 1904 (Gibson 1995). Melville (1986) and the International Code of Zoological Nomenclature (ICZN) determined that the family name Tubulanidae take precedence over its senior subjective synonym Carinellidae (Ritger and Norenburg 2006) and the name *Tubulanus polymorphus* was deemed published and available (ICZN 1988). Previous names for *T. polymorphus* include *C. polymorpha*, *C. rubra* and *C. speciosa*.

Description

Size: A large nemertean, up to three meters when extended. Commonly 25–75 cm in length and 5 mm in width (Coe 1901, 1905; Corrêa 1964).
Color: Individuals boldly colored in solid red, brown, orange or vermillion. No patterns and no dorsal or ventral color differences (Coe 1901).
General Morphology: Recognizable by bright orange color and long, stretchy morphology. Individuals are sometimes found within parchment tubes.
Body: Long, thin and very soft (Coe 1901). Non-segmented (phylum Nemertea), cylindrical anterior but can flatten posteriorly (Fig. 1).

Anterior: Head rather broad, set off from body and somewhat flattened. No cephalic grooves (order Palaeonemertea) but with lateral transverse grooves (Fig. 2a, b, c). Head cannot completely withdraw into body (Kozloff 1974).

Posterior: No caudal cirrus.

Eyes/Eyespots: None.
Mouth: A long slit-like opening (Fig. 2c) posterior to the brain, separate from proboscis pore (Fig. 2c) and positioned just behind transverse furrows (Coe 1901).
Proboscis: Eversible (phylum Nemertea) and, when not everted, coiled inside rhynchocoel (cavity). The proboscis in *Tubulanus polymorphus* is short with the rhynchocoel reaching one third total worm body length. Proboscis bears no stylets and the proboscis pore almost terminal (Fig. 2c).
Tube/Burrow: As is true for most *Tubulanus* species, *T. polymorphus* individuals live in thin parchment tubes that are attached to rocks or shells and made of hardened mucous secretions (Coe 1943).

Possible Misidentifications

The genus *Tubulanus* is slender, soft, extensible without ocelli or cephalic grooves (Corrêa 1964) and with a flattened head with transverse lateral grooves. Five other species of *Tubulanus* are reported for Pacific Northwest intertidal and subtidal habitats (Roe et al. 2007). *T. polymorphus* and *T. sexlineatus* are most common intertidally. *Tubulanus polymorphus* can be distinguished from the others by its large size, strong color and lack of pattern.

Some of the other species are: *Tubulanus pellucidus,* a small (to 2.5 cm in length), white to translucent tube-dweller in estuaries, occurs on the Pacific coast from San Francisco to San Diego and on the Atlantic coast from New England to Florida (Gibson 1995; Roe et al. 2007). *Tubulanus cingulatus* is deep brown with white

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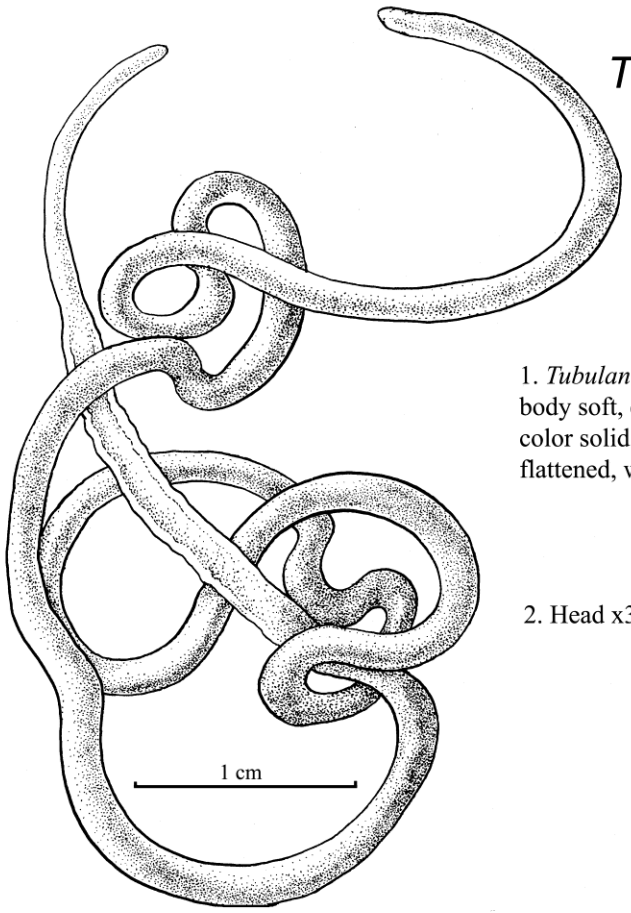
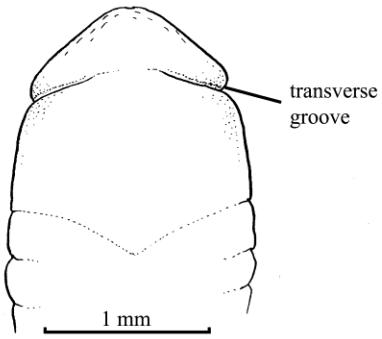
Tubulanus polymorphus

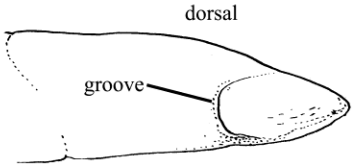


1. *Tubulanus polymorphus* (L: 25 cm) x4:
body soft, cylindrical; can be flattened posteriorly; color solid orange, red or brown; no pattern; head flattened, without ocelli or cephalic grooves.

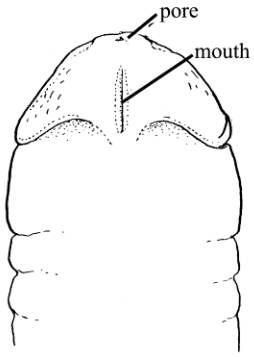
2. Head x30.



2a. (dorsal view) showing transverse grooves; no ocelli or lateral cephalic grooves.



2b. (lateral view) showing flattening, transverse grooves.



2c. (ventral view) showing proboscis pore, long, slit-like mouth, transverse grooves.

transverse rings and four long stripes. Individuals reach lengths to 15 cm and occur subtidally and lower in soft sediments. Pacific distribution from Bolinas to San Diego, California (Coe 1904; Roe et al. 2007). *Tubulanus sexlineatus* is up to 1.5 m in length, chocolate brown with white rings and 5–6 longitudinal lines. This tube-dwelling species is found from Alaska to southern California (Griffin 1898; Roe et al. 2007). *Tubulanus capistratus* is a slender and brown tube-dweller (Coe 1901), up to one meter long, with many narrow white transverse rings and three longitudinal lines. The range of *T. capistratus* is Alaska to Monterey Bay, California (Roe et al. 2007). Subtidal species found off the coast of southern California include *T. albocinctus* and *T. frenatus* (Coe 1904; Corrêa 1964).

Because of the many identifying characteristics that 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: NE Pacific range Aleutian Islands, Alaska south to Monterey, California. Worldwide distribution includes northern European and Mediterranean coasts.
Local Distribution: Collected in Coos Bay in exposed parts of estuaries, as well as rocky outer shores. Coos Bay sites include Charleston, Barview and Pony Slough.
Habitat: Under heavy boulders, among mussels, in mud and shell hash, on both open coast and in bays (Haderlie 1975). It is the common large orange nemertean of the outer coastal rocky intertidal.
Salinity: Often collected on outer rocky shores at salinities of 30.
Temperature: Found in cold and temperate waters.
Tidal Level: Intertidal (Corrêa 1964) to low intertidal and subtidal zones (Haderlie 1980).
Associates: Small polychaetes are often found within the parchment tubes of *T. polymorphus*.
Abundance: Rather common (Corrêa 1964) and quite common on the outer coast in Oregon, but rarely abundant in Alaska (Coe 1901).

Life-History Information

Reproduction: Male and female individuals often inhabit the same parchment tube where they deposit eggs (Coe 1943). Specimens are sexually mature from early summer (San Juan Island, WA, Stricker 1987) to August (Coe 1905) and can produce great numbers of large (350 µm in diameter) eggs (Stricker 1987), which are often used for experimental studies (Coe 1940; Stricker et al. 2001, 2013).
Larva: Larvae hatch after two days, are large (500 µm in length) and uniformly ciliated with inconspicuous apical tuft of cilia (Stricker 1987). These lecithotrophic larvae develop rapidly (approximately 90 hr, Coe 1940; Stricker 1987).
Juvenile:
Longevity:
Growth Rate: The growth rate of most nemerteans is unknown. Most species have some regenerative ability. *Tubulanus polymorphus* and *T. sexlineatus* are known to regenerate both anterior and posterior ends (T. Hiebert, pers. obs.)
Food: A predator on soft-bodied worms and mollusks, where only soft parts are ingested from larger prey (Coe 1943).
Predators:
Behavior: Can be found at low tide searching for food.

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