

Eudistylia vancouveri

A feather-duster worm

Phylum: Annelida
Class: Polychaeta
Order: Canalipalpata, Sabellida
Family: Sabellidae, Sabellinae

Taxonomy: *Eudistylia polymorpha* was originally described as *Sabella vancouveri* and later re-described and figured by Johnson (1901) as *Bispira polymorpha*, when *Eudistylia* was differentiated by characters of thoracic notosetae which were later deemed insignificant at the genus level and the two genera were synonymized to *Eudistylia* (Fauvel 1927 and Johansson 1927 in Banse 1979). Since then, several species have been synonymized with *E. polymorpha* including *Sabella vancouveri* and *S. columbiana*, *E. abbreviata*, *E. gigantea*, *E. plumosa* and *E. tenella* (Banse 1979).

Description

Size: One of the largest sabellids. Individuals range in size from 300–480 mm in length and 15–20 mm in width, where the tube is up to 10 mm diameter (Hartman 1969; Kozloff 1974). This description is based on illustrated and dissected specimens (Fig. 1).

Color: Crown of tentacles dark red and green and radially striped (5–8 stripes) (Hartman 1969; Kozloff 1974). Hartman (1969) reports tentacles that were dark red and orange or yellow in California, but this description may refer to *E. polymorpha*, in part (see **possible misidentifications**). Some tentacles are white-tipped. The illustrated specimen (Fig. 1) had a buff colored body with light green markings and white spots. The tube is buff or grey in color.

General Morphology: A robust worm with a short tentacular crown that is brilliantly colored (Hartman 1969). Worms can be recognized in large groups called hummocks where tubes are built upon each other and resemble shrubs (e.g. Fig. 3).

Body: Body divided into thoracic and abdominal regions where abdomen gradually tapers posteriorly.

Anterior: Prostomium or head is reduced and indistinguishable (Figs. 4, 5).

Trunk: Thorax of eight segments and abdomen of many segments. Thoracic collar with four lobes (Fig. 4) that are visible on the ventral side with no long thoracic membrane. Collar is used to build the tube by incorporating sand grains with exuded mucus and attaching a “rope” to the tube anterior.

Posterior: Worm body tapers toward posterior to slender yet broad pygidium (Fig. 1).

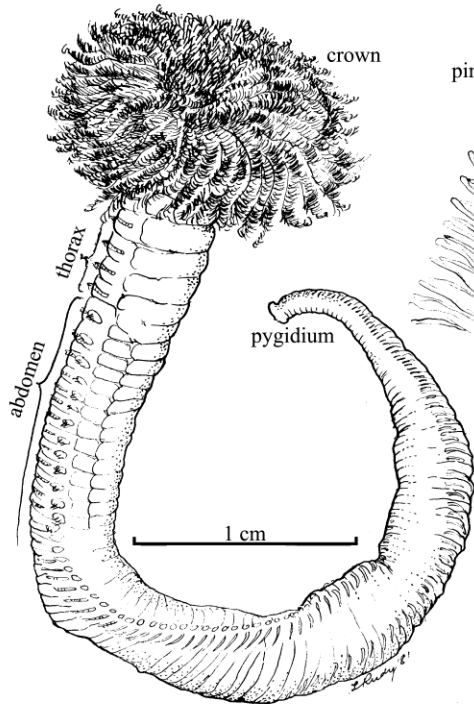
Parapodia: Biramous, (Figs. 1, 6) except for first or collar segment, which has only notopodia (Hartman 1969). In thoracic setigers (setigers 2–8), the notopodia have bundles of long and slender setae (Figs. 7b, c). The neuropodia on setigers 2–8 have pairs of short uncini (hooks) (Fig. 7a) encased in zipper-like, raised ridges called tori (Fig. 6). This arrangement is reversed in the abdomen, where the notopodia contain hooks in the abdominal segments and the neuropodia have long spines (Fig. 6).

Setae (chaetae): Thoracic notosetae of two kinds (genus *Eudistylia*): one long, slender and bilimbate (Fig. 7b) and the other spatulate and not scimitar-like (Fig. 7c). Abdominal notosetae are short avicular uncini (Fig. 7e). Thoracic neurosetae in torus, pennoned or flagged and avicular hooks or uncini arranged in a long row of about 20 pairs (Fig. 7a). Abdominal neurosetae long and pointed (Fig. 7d).

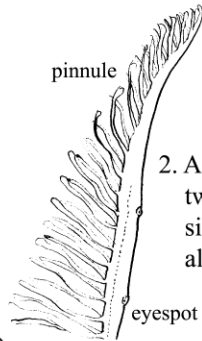
Eyes/Eyespots: Anterior eyespots lacking however, eyespots are present on radiole ribs where each radiole has 5–7 black eyes in a row (Hartman 1969) (Fig. 2) on the dorsal-most radiole pair (Blake and Ruff 2007).

Anterior Appendages: Anterior crown of tentacles made up of two equal parts

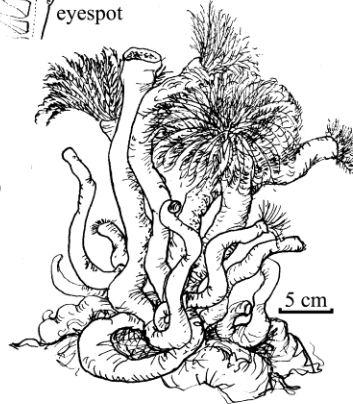
Eudistylia vancouveri



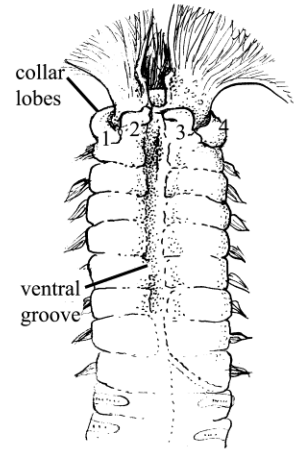
1. *Eudistylia vancouveri*, out of tube x4: a small specimen; thorax of 8 segments; tentacle crown maroon and green striped; many abdominal segments.



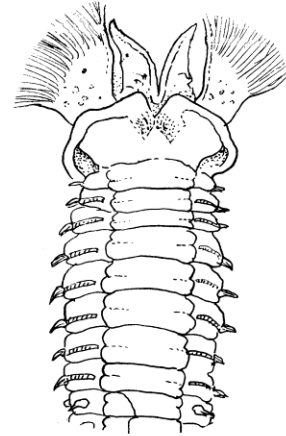
2. A single radiole (cirrus): two rows of side branches simple pinnules; eyespots along rib.



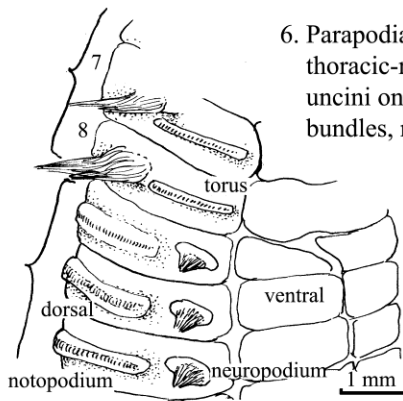
3. Worms, in situ x1/5: dense, shrub-like growth.



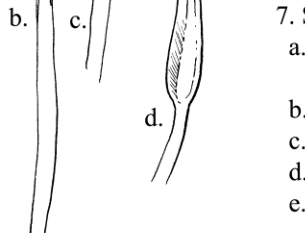
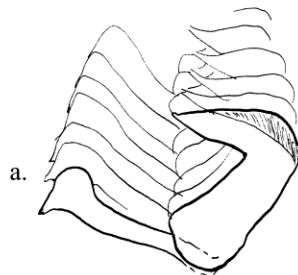
4. Anterior (ventral view): thoracic collar with four lobes.



5. Anterior (dorsal view): dorsal edge of crown without cleft.



6. Parapodia (lateral view) x12: thoracic-neuropodial setae in bundles, notopodial uncini on tori; abdominal- notopodial setae in bundles, neuropodial uncini on tori.



7. Setae:
 a. penioned setae and avicular uncini (thoracic)
 b. long, bilimbate seta (thoracic)
 c. spatulate seta (thoracic)
 d. pointed seta (abdominal)
 e. avicular uncinus (abdominal)

composed of many radioles (Fig. 1). Radioles, also called cirri or tentacles, are branches or pinnules (Fig. 2) and dark eyespots along the lower edge, especially near radiole bases (Fig. 2). Bases are spiraled twice (genus *Eudistylia*). Crown conceals mouth and head and edges are smooth and not incised (Hartman 1969) (Fig. 5).

Branchiae: Blood within branchiae is green in color due to the respiratory pigment chlorocruorin (Abbott and Reish 1980; Terwilliger et al. 1975). Branchial base without groove dorsally (Blake and Ruff 2007).

Burrow/Tube: Tube is long, cylindrical, flexible, permanent, tough, leathery and membranous. It is made of mucus and cemented sediment and is not calcareous and without operculum. Worm can completely withdraw into tube.

Pharynx:

Genitalia:

Nephridia:

Possible Misidentifications

Characteristics of the family Sabellidae are the tentacular crown of bipinnate radioles, lack of gills on the body segments and setal types reversed from thoracic to abdominal regions (see **parapodia**). These characters they share with the Serpulidae, however, sabellids are distinct from serpulids by having a leathery tube of mucus and sand which lacks an operculum or trap door. Serpulids, on the other hand, have a calcareous tube and a staked operculum resembling a golf tee (O'Donoghue 1924).

Other tube worms include the Terebellidae, which have soft cirri that cannot be completely retracted into the tube (as sabellids can). Terebellids sometimes have gills on their anterior segments (see *Thelepus crispus* and *Pista pacifica*), and their setal types are not inverted (Blake 1975).

A family with an easily confusing name is the Sabellaridae, which builds sand tubes. These have 2–3 rows of paleae (flattened setae) forming highly modified cephalic structures, but not crowns. Their bodies are

individual branches of the crown and are single and undivided with forked, simple side clearly defined into thorax, abdomen and long caudal region.

Within the family Sabellidae, there are two subfamilies represented locally, Fabriciinae and Sabellinae. The subfamily Fabriciinae differs from the Sabellinae in its small size and in its temporary fragile mucus tubes. Several northwest genera exist, including:

Chone species are tiny worms with a membrane partly uniting its radioles and a thoracic collar which is complete and not lobed. Local species have 15 or fewer pairs of radioles.

Fabricia species have few segments and sparse radioles and individuals are quite small. *Amphicorina* has 7–8 abdominal segments, not three.

The subfamily Sabellinae (to which *E. vancouveri* belongs) is noted for its avicular uncini in the thoracic neuropodia, and for its permanent, tough and leathery tubes. Other genera of the sub-family include:

Schizobranchia (=split branch) species are common from central California to Puget Sound (Blake and Ruff 2007). This small worm occurs in great masses on floats. Its radioles are branched, not single and it is often tan colored with a bright red crown (not striped) (Kozloff 1974). *Schizobranchia insignis* (Bush, 1905) often occurs with and is intermixed in clumps with *Eudistylia vancouveri* (Blake and Ruff 2007).

Megalomma species usually occurs in deep water and are rare intertidally. The composite eyes which characterize this genus are spiraled around the radiole ends (Blake 1975).

Pseudopotamilla includes three local species of small, rare tube worms which share with *Eudistylia* the simple pinnate crown of radioles, but the bases of whose two crowns of tentacles are curved into semicircles and are not spiraled.

Sabella species bear two lobes on the thoracic collar, rather than four in *Eudistylia vancouveri*. All members of this genus have spiraled fascicles on their

abdominal setae (Knight-Jones and Perkins 1998).

Brispira species are found in membranous tubes on rocky bottoms. This genus was revised in 1998 (Knight-Jones and Perkins) and now includes *Brispira* (= *Sabella*) *crassicornis* which has paired eyespots in deep red bands on its radioles (Blake 1975).

Myxicola species have a thick, transparent mucus sheath or gelatinous tube covering its body and its radioles are joined by a web for most of their length (Fitzhugh 1989).

Eudistylia vancouveri and *E. polymorpha*, may in fact be the same species (Ricketts and Calvin 1971) and some believe that hybridization occurs (Blake and Ruff 2007). There are two obvious differences between them: *E. polymorpha* does not have striped radioles, they are a solid dark red with orange tips and the dorsal edge of the crown of radioles is not entire (Fig. 5), but is instead notched. *Eudistylia vancouveri* is slightly larger than *E. polymorpha* and the latter is much less likely to be found in large clumps and is the more common species in California (Kozloff 1993). *Eudistylia polymorpha* is also recognizable by a deep cleft or groove, which serves in excretory and gametic transport out of the tube, on each side and at the base of the two spiraled cirri (Blake and Ruff 2007). This groove is ventral and becomes dorsal anteriorly (Kozloff 1993).

Ecological Information

Range: Type locality is Vancouver Island, B.C. (Hartman 1969). NE Pacific range from Alaska to central California.

Local Distribution: In Coos Bay on floating docks or in hummocks. Several hummocks occur just northwest of the OIMB beach.

Habitat: Wharfs, floats, sandy and silty mudflats, as well as vertical rock faces in heavy surf (Kozloff 1974).

Salinity: Found at salinities of >30, in areas of heavy flushing of water. This species doesn't tolerate reduced salinity (Ricketts and Calvin 1971).

Temperature: Cold to temperate.

Tidal Level: Collected on floats just below water surface, intertidal (Hartman 1969).

Associates: Associates include the copepod, *Gastrodelphys dalesi* (at Tomales Point, California), but worm tubes form a complex microhabitat in which many animals and plants survive. Tube hummocks of *Eudistylia vancouveri* are often interspersed with another sabellid, *Schizobranchia insignis* (Blake and Ruff 2007).

Abundance: Gregarious and can be the principal sabellid in rocky habitats (e.g. Puget Sound, Kozloff 1974). Individuals grow in large clumps, in shrub-like masses called hummocks (Ricketts and Calvin 1971) (Fig. 3).

Life-History Information

Reproduction: Developmental modes among sabellids are highly variable from brooded lecithotrophy, to direct development, and planktonic larvae that are either planktotrophic or lecithotrophic (Crumrine 2001). *Eudistylia vancouveri* are sexual and dioecious although asexual reproduction with some regeneration is also possible. Males, with white sperm, and females, with green eggs, are free spawners and gametes are released through abdominal nephridial pores and into a ventral shallow groove (Fig. 4) and out of tube. Spawning has been observed from late February to July (Washington, Fernald et al. 1987). The development of *Eudistylia vancouveri* is not known.

Larva: There are only two local sabellid species with described larvae and those are *Demonax media* and *Chone infundibuliformis* (Crumrine 2001).

Juvenile:

Longevity:

Growth Rate:

Food: A filter feeder. Plankton particles are trapped by funnel of pinnules and driven by beating cilia, carried down to radiole base where they are sorted and ingested.

Predators: This species is frequently used by humans for fish bait.

Behavior: Individuals can retract fully extended tentacular crown rapidly and does so in response to even slight disturbance, such as a passing shadow. The ability to retract is due to large nerve fibers that allow

the worm to withdraw completely into its tube at rates up to 7 m/s (*Eudistylia polymorpha*, Abbot and Reish 1980).

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