
Diadumene lineata

Orange-striped anemone

Phylum: Cnidaria

Class: Anthozoa, Hexacorallia

Order: Actiniaria, Enthemonae

Family: Metridioidea, Diadumenidae

Taxonomy: *Diadumene lineata* was first described by Verrill in 1869 as *Sagartia lineata*. The subclass Zoantharia has been synonymized with Hexacorallia (Hoeksema 2015). Synonyms include *Haliplanella luciae* (Fautin and Hand 2007).

Description

Medusa: No medusa stage in Anthozoans

Polyp:

Size: A large specimen can be 30 mm high (Kozloff 1983). It is usually not more than 20 mm high and 10 mm diameter (Fautin and Hand 2007)

Color: The color is variable; specimens are usually green with single or double vertical orange, white or yellow stripes (Fautin and Hand 2007), but they can have a brownish or olive column. Gonads are pink or orange and may be visible on the lower column. Mesenteries appear as dark vertical lines. Tentacles are usually colorless, though they can be gray to light green with white flecks (nematocysts) (Hand 1955). The oral disc is transparent and can appear dark because of the dark interior. Lips are dark gray.

Body: This anemone is cylindrical with many fine long tentacles (Fig. 1). Mesenteries divide the internal structure. Defensive tentacles called acontia can extend through pores called cinclides in the column. The parapet rings the end of the column, from which the capitulum extends distally (Fig. 2). On the oral disc, specimens occasionally have ciliated grooves to direct water (siphonoglyphs) and spaces between the mesenteries (endocoels).

Column: The column is a

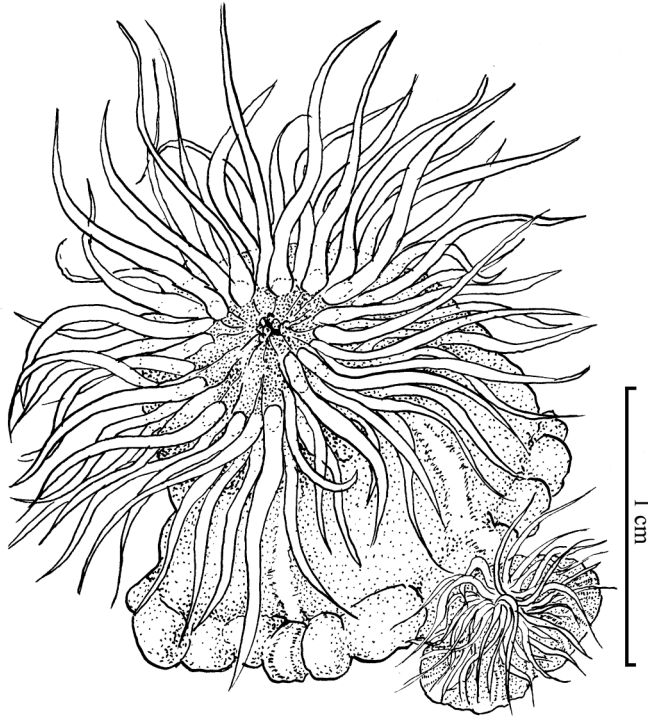
smooth, low cylinder that tapers towards the top and has vertical stripes (often 7-19) (Fautin et al. 1987). Dark mesenteries show through the column. It is dotted with cinclides (portholes through which acontia can protrude) that can be seen by the naked eye. The column is often scarred by longitudinal fission (asexual reproduction) (Hand 1955).

Collar: The collar includes the parapet and capitulum. The capitulum is the top part of the anemone, separated from the column by the parapet (Fig. 2). The capitulum is transparent, usually light green, and without cinclides. There are tentacles around the upper margin of the capitulum. The parapet is noticeable only when anemone is fully extended, and rings the top of the column.

Oral Disc: The mouth is dark and ribbed. The ribs correspond to number of mesenteries. There are 0-3 siphonoglyphs (ciliated grooves on the ends of the mouth that direct water into the pharynx) (none figured). The margin is plain, rather than frilled or lobed (Fautin and Hand 2007). A large area of the disc around the mouth is tentacle-free, with radiating rows of white flecks on the endocoels (spaces between the pairs of mesenteries) (Hand 1955) (Fig. 4).

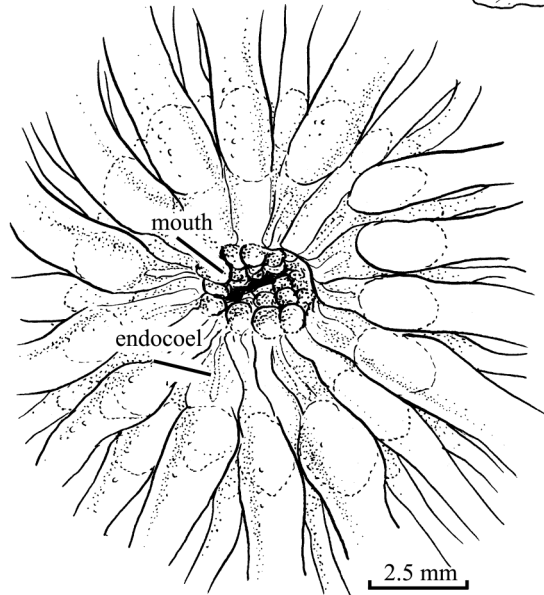
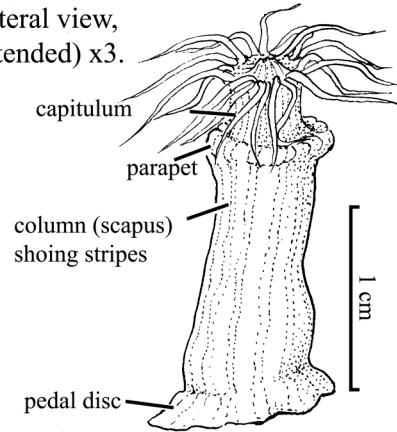
Tentacles: The number of tentacles is greater than 24 but fewer than 100 (Fautin and Hand 2007). They are retractile and smooth, short and blunt when contracted, and they are not capitate (knobbed). There are only one kind, and there's no oral ring of tentacles. 2 pairs of "directives" (a kind of tentacle close to the ends of mouth) (not figured) are typically present, but this can vary (Hand 1955); when present, these tentacles are

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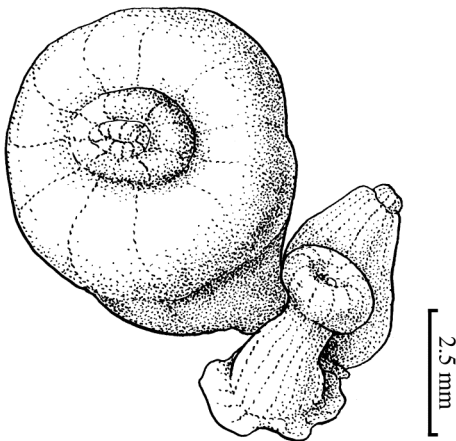


1. *Diadumene lineata* (H:1cm) x4.5:
up to 100 clear, tapered tentacles; low, cylindrical column attached to substrate; oral disc with tentacle-free area; column smooth, green, striped white, yellow or orange; margin not frilled or lobed.

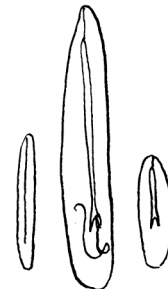
2. Small anemone (lateral view, extended) x3.



4. Oral disc x9:
radiating white endocoels; large tentacle-free area dark, ribbed mouth.



3. Contracted anemones x8:
tentacles completely retracted.



—=0.01 mm

5. Nematocysts from acontia x1000 (Hand 1955).

marked no differently than the others (Fautin and Hand 2007). They can have up to 18 "catch" tentacles near the mouth, which are short, blunt and opaque (Williams 1975). This species has acontia, which are thread-like defensive structures discharged through the column wall when the anemone is disturbed (Fautin and Hand 2007).

Mesenteries: Mesenteries are vertical internal partitions (usually 6 in this species) visible as dark vertical lines. There are usually more mesenteries distally than near the base (Hand 1955). Gonads appear as thickened bands on mesentery filaments.

Pedal Disc: At the base, there is a distinct pedal disc, which is circular and attaches to the substrate.

Cnidae: The cnidae are stinging organelles. There are several types present in this species; on the acontia there are 3 kinds (Fig. 5) (Haliplanellidae) (Hand 1955).

Possible Misidentifications

Metridium senile is another anemone found on docks and pilings. However, while *D. lineata* usually has a darker brown or olive-colored column and stripes, *M. senile* has a lighter white or gray column and lacks stripes. *Metridium senile* is also often larger (if only by a centimeter or two) than *D. lineata*.

The anemone most likely to be confused with *Diadumene lineata* is *D. franciscana*, which can be cream to light green with white stripes. It has one pair of directive tentacles (long, retractable tentacles that point toward the mouth), which are yellow at their bases, while *D. lineata*'s are identical to their other tentacles (Fautin and Hand 2007). *Diadumene franciscana* usually has 2 siphonoglyphs, pink lips, a rough column, and often an irregular base. Its parapet is poorly developed compared to *D. lineata*'s.

The Puget Sound *Diadumene* is not green but orange, yellowish, grayish, red-

dish, cream or brown. Other *Diadumene* species are not usually green (Fautin and Hand 2007).

If the specimen is orange striped "it can only be [*D. lineata*]" (Hand 1955).

Ecological Information

Range: The type locality is Hong Kong harbor (Verrill 1869). This anemone is more widespread than any other anemone species (Fautin and Hand 2007), and has been found in Europe, North America, and Asia. It was likely introduced to Europe through the Suez Canal in Egypt (Streftaris et al. 2005). In the US Atlantic, it is found on the New England coast, and on the Pacific it is found from the Puget Sound to California. It was likely introduced to the US from Asia with oyster spat (Ricketts et al. 1985).

Local Distribution: It is found in Oregon estuaries. Locally (in Coos Bay), it is found on the Charleston docks and in South Slough.

Habitat: *Diadumene lineata* lives high in the intertidal on rocks and pilings, often in barnacle tests and cracks in wood, in estuarine situations, but they have not been found on the outer coast (Hand 1955; Fautin and Hand 2007). Specimens can tolerate a variety of habitats, from rocks high in the intertidal to eelgrass in mudflats (MacGinitie and MacGinitie 1968; Ricketts et al. 1985). They are often found in fouling communities (Fautin and Hand 2007).

Salinity: This species is euryhaline (Ricketts et al. 1985), and adapts to variations in salinity.

Temperature: *Diadumene lineata* is eurythermal, living in cold and temperate waters (Ricketts et al. 1985; Fautin and Sebens 1987). Contraction and encystment can occur with extreme high temperatures (East Coast) (Williams 1975).

Tidal Level: Shallow waters, high in the intertidal.

Associates: *Metridium* sp. are often found in

conjunction with *Diadumene lineata*. They are also found on the mussel *Mytilus edulis* with its accompanying fauna, and they have been reported growing on the stems and roots of the cordgrass *Spartina alterniflora* (Molina et al. 2009).

Abundance: This species is usually found in clonal aggregations (Fautin and Hand 2007). These aggregations can completely cover the surface of logs or pilings. Though stable populations are present year-round, they can have a higher abundance in the summer (Molina et al. 2009).

Life-History Information

Reproduction: This specimen can reproduce both sexually and asexually, the latter by longitudinal fission of the column or pedal laceration (Haderlie et al. 1980). Pedal laceration occurs when the anemone spreads out its base and then tears itself away at the center, leaving parts of the outer base attached to the substrate that can then mature into clonal anemones (MacGinitie and MacGinitie 1968). This process can only occur when the anemone is well-fed and relatively large, and it usually takes many hours (MacGinitie and MacGinitie 1968). Its success is largely due to its ability to colonize quickly (Hausmann 1919; Ricketts et al. 1985). In female specimens, the eggs are spherical and magenta, while in male specimens the sperm is white (Fukui 1991). During the spawning season in summer, *Diadumene lineata* can be sexed by checking the color of the gametes through the body wall (Fukui 1991). They reproduce through spontaneous broadcast spawning.

Larva: After fertilization, it takes eighteen hours for the embryo to develop into a swimming planula larva (Fukui 1991). These larvae are ciliated and have an apical tuft on their aboral end (Fukui 1991; Sadro 2001).

Juvenile:

Longevity: Unknown

Growth Rate: Unknown

Food: *Diadumene lineata* eats small crustaceans and annelids (Hausmann 1919).

Predators: In San Francisco Bay, the nudibranch *Cuthona perca* eats *Diadumene lineata* (McDonald 2007). Other nudibranchs, like *Hermisenda crassicornis*, also eat this species (McDonald 2007).

Behavior: The catch tentacles are used only for stinging, not feeding, and serve to keep anemones separate (Williams 1975). *Diadumene* is considered one of the faster anemones and, in some studies, has been reported moving three to four inches in an hour (MacGinitie and MacGinitie 1968). It also shows a sensitivity to light in laboratories, and will contract when exposed to bright lights (MacGinitie and MacGinitie 1968).

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