
Anthopleura artemisia

Buried anemone, moonglow anemone

Phylum: Cnidaria

Class: Anthozoa, Hexacorallia

Order: Actiniaria, Enthemonae

Family: Actinioidea, Actiniidae

Taxonomy: *Anthopleura artemisia* was originally described by Pickering in Dana (1846) as *Actinia artemisia*. The subclass Zoantharia has been synonymized with Hexacorallia (Hoeksema 2015).

Description

Medusa: No medusa stage in Anthozoans.

Polyp:

Size: Most solitary polyps are around 2.5 cm in diameter, and can extend 6-7 cm long. The specimen used for this description was 2 cm long, with a 2.5 cm crown diameter and 1.5 cm column diameter. The column may have to extend 15-20 cm from its attachment to the sediment surface, and a fully expanded crown and tentacles can be 5 cm in diameter (Kozloff 1983).

Color: The oral disc can be red, brown, gray, or black, and can have solid or concentric patterns. The specimen used for this description had a brown disc with tan spots and a light tan mouth. Tentacles can be brightly colored and/or patterned with nearly every color (red, white, black, blue, or orange, Hand 1975; pink and green, Ricketts et al. 1985; white bands on gray, brown, black, or green background, Kozloff 1974). The specimen used for this description had "day glow" and pink tentacles and pink spots on oval disc. The discs can also be semi-transparent (Ricketts et al. 1985). The top third of the column is black, brown, or gray shading to white or pink at the bottom third (the specimen used for this description was gray). Verrucae on the collar tend to be white-tipped (Hand 1955). Mesentery insertions can be visible on the bottom 3rd of column, showing as vertical white lines (not on

the specimen used in this description).

Acrorhagi are white (fig. 2) (Fautin and Hand 2007).

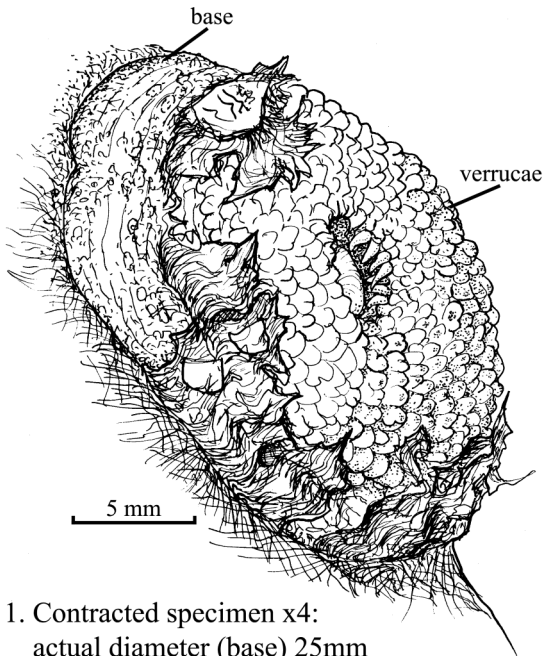
Body: The polyp can have a very extended column (not figured), with tubercles (verrucae) near the top. Its tentacles are slender and tapering. They are extensions of the gut cavity, and so are hollow. The anemone has a broad flat oral disc, a prominent collar, and acrorhagi (spherules). *Anthopleura artemisia* can also contract into a crevice with only its crown showing. When contracted, it forms a low round-topped pillar (fig. 1) (Hand 1955). The column has a groove below the tentacles (fosse) covered by a distinct fold (parapet or collar). Adherent shell and debris are typical of this solitary species.

Column: The column can extend to 5 times the diameter. It has a well-developed collar and longitudinal rows of verrucae on uppermost (distal) third of column (fig. 1). There are rarely any verrucae on proximal 3rd of column (Fautin and Hand 2007).

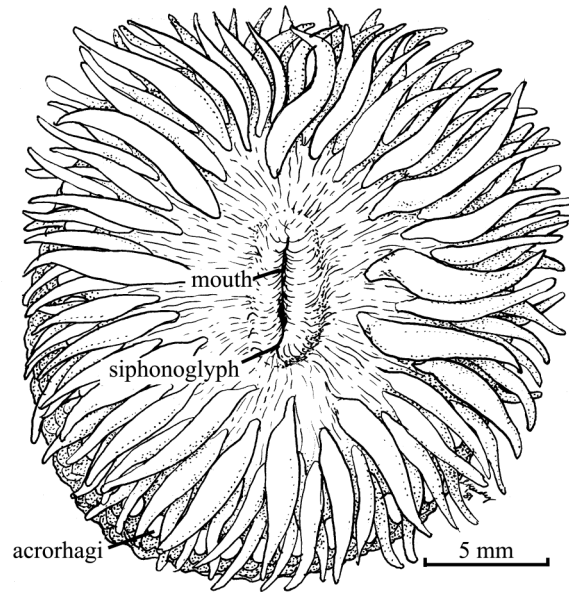
Collar: The parapet is well-developed and separated from tentacles by a deep fosse (groove) in which there are acrorhagi (spherules). The collar is covered with compound verrucae (fig. 3).

Oral Disc: The oral disc is a large central area without tentacles on the top of the column, and sometimes has a radial pattern. It is broad, usually flat, and about 1.5 times the column diameter when expanded. It has radial lines (mesenterial insertions) (fig. 2). Its lips are not ribbed and do not protrude above the disc surface. They usually have siphonglyphs (ciliate grooves). The mouth is

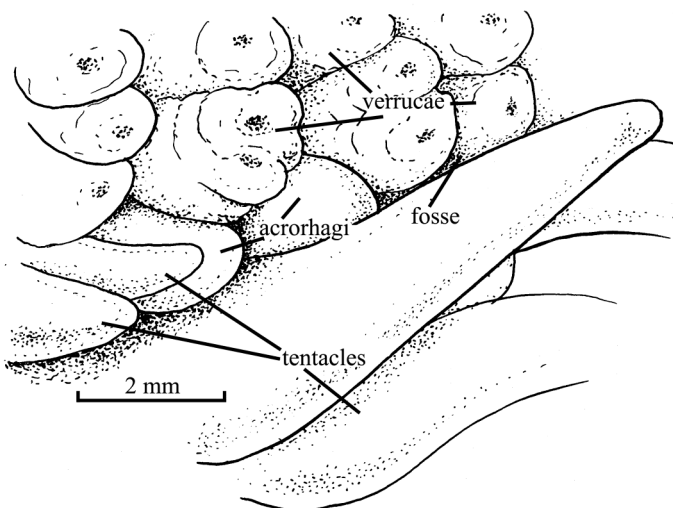
Anthopleura artemisia



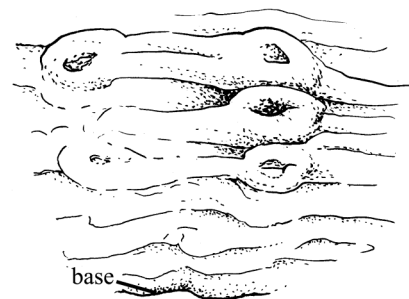
1. Contracted specimen x4:
 actual diameter (base) 25mm
 algae, shell adhere to verrucae on upper third,
 sand particles near base; column gray;
 many verrucae on upper third, sparse on middle
 third, none near base.



2. *Anthopleura artemisia* crown x4:
 width 25 mm; brightly colored tentacles, slender,
 tapering, about 5 rows; broad oral disc; lips not
 grooved, mouth a long slit; 1-3 siphonoglyphs.
 acrorhagi: round, white, under tentacles.



3. Verrucae, acrorhagi (collar) x12:
 verrucae compound; acrorhagi round, white,
 in single row in fosse under tentacles.



4. Verrucae, mid-column x12:
 simple, sparsely spaced; none near base.

commonly an elongate slit (Fig. 2).

Tentacles: There are numerous slender, tapering tentacles. They are about half as long as the oral disc diameter. There are rarely more than 5 orders (rows) (Hand 1955). Arrangement is sometimes irregular due to longitudinal fission. There are no acontia (thread-like defensive structures expelled through column wall).

Mesenteries: Mesenteries are interior vertical partitions. There are up to 24 pairs in some adults. They are often irregular due to asexual longitudinal fission. Mesenterial insertions are often visible as white lines on the proximal third of the column in elongated specimens (not shown).

Pedal Disc: The pedal disc attaches the column firmly to the substrate. It is circular to irregular, and is often wider than the column. There is no physa (bulb) at the base.

Cnidae: Cnidae are tiny stinging cells. *Anthopleura artemisia* has many different kinds, varying in size, distribution from other species (not shown).

Acrorhagi: Also known as spherules, these fighting tentacles are round, hollow bodies covered with nematocysts. They are inconspicuous structures in the fosse, just under the tentacles (fig. 2, 3) (Hyman 1940).

Verrucae: These are rounded, wart-like tubercle structures that pebble the column. They are well-developed and arranged in longitudinal rows on upper third of column, and sparsely spaced and solitary on the middle third of column; there are usually none on lowest third of column (Hand 1955). They are also on the collar, where they are compound, with 3-6 vesicles each (fig. 3). Verrucae are adherent, and collect a layer of shells and debris for protection (MacGinitie and MacGinitie 1968). They also contain cinclides (pores) (see fig. 4, *A. elegantissima*). Those near the acrorhagi are sometimes white-tipped.

Possible Misidentifications

There are other more common estuarine anemones (*Metridium*, *Diadumene*, etc.), but none of them have acrorhagi inside the fosse at the collar edge, or adherent tubercles on the column. *Anthopleura* species have both of these, as well as a well-developed pedal disc (base), and a flat broad oral disc with a clear central area.

Anthopleura xanthogrammica is usually an open coast species, large, green solitary and unicolored; its column is completely covered with verrucae (they are not in rows). It is found occasionally in the lower reaches of the most marine estuaries.

Anthopleura elegantissima, the aggregating anemone, can be solitary, like *A. artemisia*, and is often found in like habitats, i.e., rock substrate with sand and mud over the rock. *Anthopleura elegantissima* has verrucae in longitudinal rows on the entire column, not just on the upper part; the column is green or whitish, not black or gray fading to pinkish. The tentacles in *A. elegantissima* are pink, white, purple, blueish or green, not brightly colored red, orange or patterned, as in *A. artemisia*. *Anthopleura elegantissima*, when solitary, is usually larger than *A. artemisia*, which never has symbiotic algae in its endoderm. *Anthopleura artemisia* is the only species of the genus whose verrucae do not extend down to the base.

A third species of *Anthopleura*, *A. sola*, is very similar in appearance to *A. elegantissima*. The primary difference between the two is that *A. elegantissima* is clonal while *A. sola* is solitary. Though *A. sola* is not found locally, there are many examples in the literature of *A. sola* being misclassified as *A. elegantissima*, and some examples of it being misclassified as *A. artemisia* (Pearse and Francis 2000).

Retracted *A. artemisia* can be confused with *Metridium*, for their bright tentacles are hidden and they are plain white or green-gray

(Ricketts et al. 1985).

Ecological Information

Range: The type localities are Discovery Harbor, Puget Sound, and the northwest coast of North America (Pickering in Dana 1846). The range is Alaska to southern California (Ricketts et al. 1985), and possibly Japan (Hand 1955).

Local Distribution: In Coos Bay, they can be found in high abundance at Pigeon Point.

Habitat: In estuaries, *Anthopleura artemisia*'s column is often buried in mud or sand in a crevice or pholad burrow, with only the crown exposed, while the base is attached to solid substrate beneath the softer sediment. It withdraws into its burrow when disturbed or at low tide. It can also be found on pilings, floats, and the open coast. It is solitary on open coasts, lives in groups in estuaries, and is individually attached to stones buried in the muddy sand (Fautin and Hand 2007).

Salinity: Collected at 30.

Temperature: 8° C to 13° C (Anderson 2000).

Tidal Level: Distribution centers around mean lower low water, but specimens are also found occasionally quite a bit higher (Hand 1955).

Associates: Though there is some debate on the topic (Kozloff 1983), it is unlikely that *A. artemisia* contains the symbiotic green algae (zoochlorellae) and dinoflagellates (zooxanthellae) that are found in other *Anthopleura* species (Geller and Walton 2007; Weis et al. 2005). Copepods sometimes live on the anemone's column (Lønning and Vader 1984).

Abundance: This species is less abundant than *A. elegantissima* in most places (Smith and Potts 1987).

Life-History Information

Reproduction: There are both sexual and asexual reproductive cycles. Individual

anemones are sexually dioecious. Gonads are borne on directive mesenteries attached to siphonoglyphs. This species has been witnessed in mass spawning events during low tide, in which nearly every individual in the area releases their gametes in broadcast spawning (Weis et al. 2005). Asexually, specimens can divide by longitudinal fission.

Larva: This species produces feeding planula larvae with similar development to *A. elegantissima* (Weis et al. 2005). They are ovoid to cylindrical, covered in cilia, and have an apical tuft. They actively swim using the cilia on their apical tuft (Sadro 2001).

Juvenile:

Longevity: Unknown.

Growth Rate: Unknown.

Food: *Anthopleura artemisia* is a carnivorous stationary hunter in the tidepools (Niesen 2007) that uses tentacles to capture prey (Ricketts et al. 1985). It primarily eats small crustaceans.

Predators: This anemone is not one of the preferred foods of coelenterate predator *Aeolidia papillosa* (Waters 1975). It is eaten by occasionally by *A. papillosa*, and is likely prey to other nudibranchs and small fish (Ottaway 1977).

Behavior: They will retract completely into their "burrow" when disturbed. They will display aggressive behavior when brought into contact with members of the same species as well as other anemone species. This behavior is similar to the aggressive response in *A. elegantissima*, in which the acrohagi inflate and attack neighboring anemones (Francis 1973).

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