Guide to common California intertidal invertebrates & algae: distinguishing characteristics
Information adapted from various sources and personal observations of the SWAT Team
http://cbsurveys.ucsc.edu

**Anthopleura elegantissima**  
*(Brandt, 1835)*

- 6 cm diameter for aggregating individuals, occasionally larger
- up to 10 cm diameter (large solitaries almost certainly *A. sola*, but if tentacles are touching adjacent animals that have the same disk pattern, then *A. elegantissima*)
- to 25 cm diameter, 51 cm high

**Anthopleura sola**  
*(Pearse and Francis, 2000)*

- 6 cm diameter for aggregating individuals, occasionally larger
- up to 10 cm diameter (large solitaries almost certainly *A. sola*, but if tentacles are touching adjacent animals that have the same disk pattern, then *A. elegantissima*)
- to 25 cm diameter, 51 cm high

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Anthopleura elegantissima</th>
<th>Anthopleura sola</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size range</strong></td>
<td>6 cm diameter for aggregating individuals, occasionally larger</td>
<td>up to 25 cm diameter, 51 cm high</td>
</tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Appearance</strong></td>
<td>column light green to white</td>
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</tr>
<tr>
<td></td>
<td>longitudinal rows of adhesive tubercles (verrucae) that are often bearing debris</td>
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<tr>
<td></td>
<td>tentacles of various colors, often several distinctive white, while most greenish; often pink, lavender, or blue tipped</td>
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<tr>
<td><strong>Oral disk</strong></td>
<td>insertions of mesentaries evident as lines radiating from around mouth</td>
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</tr>
<tr>
<td></td>
<td>color brownish or greenish</td>
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</tr>
<tr>
<td><strong>Habitat</strong></td>
<td>rock faces or boulders, tidepools or crevices, wharf pilings</td>
<td>mid to low intertidal, extending well subtidally</td>
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<tr>
<td></td>
<td>usually in dense aggregations.</td>
<td>often attached to rocks covered with layer of sand</td>
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<tr>
<td></td>
<td></td>
<td>base nearly always inserted into crevice or holes.</td>
</tr>
<tr>
<td><strong>Distinguishing</strong></td>
<td>tubercles round, arranged in longitudinal rows and often bearing attached debris</td>
<td>identical to <em>A. elegantissima</em> except grows to larger size and does not clone</td>
</tr>
<tr>
<td><strong>characteristics</strong></td>
<td>small to medium sized anemones, commonly densely massed on rocks in sand</td>
<td>can not distinguish two species when solitary and below about 5 cm diameter-- probably best to call such individuals <em>A. elegantissima</em>, especially if there are lots present, certainly if they have identical color pattern</td>
</tr>
<tr>
<td></td>
<td>identical color pattern as seen in <em>A. sola</em></td>
<td>larger animals that are solitary with clear space between them and others almost certainly <em>A. sola.</em></td>
</tr>
<tr>
<td></td>
<td>can only be sure of identity if tentacles interdigitate with adjacent clonemates.</td>
<td><em>A. sola</em> when in or near mussel beds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>distinguished from <em>A. xanthogrammica</em> by radial lines on disk, variable color of tentacles, distinct rows of tubercles on column, narrow base, and looseness of the gullet if you put your finger into it.</td>
</tr>
</tbody>
</table>
**Anthopleura xanthogrammica**  
*(Brandt, 1835)*

- **Size range**
  - to 30 cm high, 25 cm wide

- **Appearance**
  - column: greenish-brown
  - tentacles: green or bluish, rarely bleached along with whole animal
  - tubercles irregular and not arranged in rows but appear velvety; often bearing debris.

- **Oral disk**
  - disc without distinct radial lines
  - uniform color, green, grayish, or blue-green

- **Habitat**
  - middle intertidal to shallow subtidal
  - almost always below or adjacent to mussel beds
  - base almost always flaring out on the rock.

- **Distinguishing characteristics**
  - disk uniform bluish-green color without radial lines; distinguishes A. xanthogrammica from A. sola- which has radiating lines
  - tubercles irregular, compound, not in longitudinal rows
  - tentacles uniform in color
  - opening to gullet muscular and tight when you put your finger in it as opposed to A. sola which feels loose
  - almost always found below or near to mussel beds.

**Anthopleura artemisla**  
*(Pickering in Dana, 1848)*

- **Size range**
  - column to 5cm diameter
  - crown 7cm
  - capable of elongation to over 5 times its diameter

- **Appearance**
  - column black, gray, or brown grading to white or pink near base
  - tentacles numerous, tapering, semi-transparent colored variously red, white, orange, black, or blue.
  - tubercles rounded and restricted to upper portion of column

- **Oral disk**
  - variously colored with variable patterns

- **Habitat**
  - on rocks buried in sand, or in abandoned holes
  - occ. on pilings or floats, low intertidal and subtidal

- **Distinguishing characteristics**
  - distinctive habitat
  - bright color patterns of tentacles and disk
  - usu. only tentacular crown is exposed, at low tide
  - often withdraws some distance below sand surface when disturbed.
|                  | **Urticina felina**  
(Linneaus, 1761) = Actinia crassicornis Muller, 1776 | **Tealia loftensis**  
(Danielssen, 1890) | **Tealia coriacea**  
(Cuvier, 1798) |
|-----------------|--------------------------------------------------|-----------------|-----------------|
| **Size range**  | • column usu. 8 cm in diameter, may reach up to 30 cm in diameter  
• 8-10 cm in height, | • column to 10 cm in diameter  
• 15 cm in height | • column to 10 cm in diameter  
• 14 cm in height |
| **Appearance**  | • column red, frequently with irregular patches of green or brownish green, sometimes to point of appearing mostly green or brownish  
• tubercles absent or very few, weak, scattered  
• tentacles short, stout, blunt | • column smooth, free of adherent material, bright scarlet  
• tubercles white, few, in regular longitudinal rows  
• tentacles slender, elongate, scarlet, lacking bands or marks | • column dull brownish red to bright red, with thick tubercles to which sand grains and other debris adhere  
• tentacles short, stout, blunt in four cycles, colored green, pink or blue |
| **Oral disk**   | • same color as tentacles (which are varying patterns or pale shades of cream, pink, blue, or green, the tips usu. white | • disk reddish, less bright than tentacles | • disk gray, blue, red, or pink |
| **Habitat**     | • sides and undersurfaces of rocks  
• low intertidal zone and subtidal waters  
• along exposed rocky shores | • common on rocks and walls of surge channels  
• low intertidal and subtidal (to 15 m)  
• exposed outer coast; concrete piles and marina floats | • rocky outer coast or in bays  
• low intertidal  
• typically lying buried in patches of sand, gravel or shell between large rocks with only tentacular crown exposed. |
| **Distinguishing characteristics** | • mottled column of red and greenish brown  
• stubby tentacles | • bright scarlet/red column color  
• white tubercles arranged in longitudinal rows. | • column never variegated with green (as *U. felina* is). |
### Pisaster ochraceus
*Brandt, 1835*
- **Size**: arm radius to 25 cm
- **Appearance**: orange, reddish, purple, brown or yellow; star shaped; 5 stout arms (rarely 6 arms); upper surface with many short, white spines
- **Habitat**: middle intertidal to shallow subtidal, on rocks in exposed areas; juveniles in crevices, under rocks, or within mussel beds but seldom seen in central and so. CA
- **Distinguishing characteristics**: aboral surface with many small white spines arranged in detached groups or in a star-shaped design on the central part of disk

### Henricia spp.
*Gray, 1840*
- **Size**: arm radius to 9 cm, usu. less
- **Appearance**: orange, red, tan, yellow or purplish; usu. with spots or mottled; 5 slender arms
- **Habitat**: low intertidal zone and subtidal to over 40m; common on protected sides of rocks, under rocks, and in caves and pool; most frequently where rock is encrusted with sponges and bryozoans
- **Distinguishing characteristics**: arboreal surface is smooth and leathery compared to *Pisaster*; bright orange or mottled orange; very small *Henricia* may be mottled and size of *Leptasterias*, but with only 5 slender or tapering arms; smooth underside compared to *Leptasterias*; arboral surface usu. mottled with white and gray; never larger than silver dollar; will brood embryos in humped posture (*Henricia* does not brood); underside appears furry, (*Henricia* has smooth underside)

### Leptasterias spp.
*Verrill, 1866*
- **Size**: arm Radius to 5 cm
- **Appearance**: black, brown, red, or green; frequently mottled; star shaped; 6 arms
- **Habitat**: middle intertidal to shallow subtidal on rocks
- **Distinguishing characteristics**: 6 arms; arboral surface usu. mottled with white and gray; never larger than silver dollar; will brood embryos in humped posture (*Henricia* does not brood); underside appears furry, (*Henricia* has smooth underside)
**Mytilus californianus**  
*(Conrad, 1837)*

- Size range: to 10-13 cm long (longer in Baja California and subtidal)
- Shell:
  - thick
  - pointed at anterior end
  - broadening posteriorly
  - sculptured with strong radial ribs and irregular growth lines
  - often with surface eroded or worn
- Habitat:
  - abundant
  - attached in massive beds on surf-exposed rocks and wharf piles
  - mainly in uppermiddle intertidal zone on outer coast
- Distinguishing characteristics:
  - radial ribs
  - elongated shape
  - usu. much larger

**Mytilus galloprovencialis/trossulus**  
*(Lamark, 1819) (Gould, 1850)*

- Size range: up to 13 cm long, but usu. half that
- Shell:
  - thin
  - nearly smooth
  - lacking radiating ridges
  - shell shape varies greatly with age, density of the bed, rate of growth and height in the intertidal zone, but usually hatchet-shaped.
- Habitat:
  - common
  - often in clusters on rocks and esp. to wharf pilings
  - low intertidal zone and subtidal to 40m in sheltered areas.
- Distinguishing characteristics:
  - distinct 'elbow' on one side, making its overall shape much wider
  - smooth shell
### Key Characteristics of some Common Intertidal Barnacles

#### Chthamalus dalli/fissus (Darwin, 1854)
- **Grayish brown shell**
- **Rounder operculum than Balanus**, flattened top*
- **Smoother plates than Balanus***
- **Terga and scuta come together with less of a lock and key structure than B. glandula***
- Up to 6mm high, 10mm wide at base
- Recruits have no hairs
- Rostrum is overlapped by adjacent plates
- Common in high to mid intertidal, can be found in low zone, on rocks
- Alaska to southern CA (*dalli*), central CA to Baja (*fissus*)

#### Balanus glandula (Darwin, 1854)
- **White to gray shell**
- **Diamond shaped operculum, sharper than Chthamalus***
- **Terga and scuta come together like a lock and key***
- **Test is stronger and more sculptured and ridged than B. crenatus***
- Up to 22mm diameter,
- New recruits (1-2 weeks) have hairs around operculum only
- Can sometimes see black mark on scutal plate
- Rostrum overlaps adjacent lateral plates
- Common in high to mid intertidal, can be found in low zone, on rocks, pier pilings, and shells of other animals
- Aleutian Islands to Baja California

#### Balanus crenatus (Bruguière, 1789)
- **White shell**
- **Terga and scuta come together like a beak (pointed)***
- **Scutal plates are sculpted with parallel ridges***
- **Junctions of plates are denoted by smooth, upside-down triangular regions***
- **Test fragile, smoother than B. glandula***
- Up to 20 mm diameter
- New recruits (1-2 weeks) have hairs all over the test (outer plates)
- Rostrum is overlapped by adjacent plates
- Low intertidal to subtidal
- Alaska to Santa Barbara

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**Test of Barnacle** is made up of the outer wall plates

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**Picture from Light's Manual**
Key Characteristics of some Common Intertidal Barnacles

**Semibalanus cariosus** (Pallas, 1788)
- Gray to white shell
- Wider shape (not volcano shaped like *Tetraclita*)
- Test is heavily ridged with grooves, top is often more eroded and smoother
- Up to 51 mm high, 60 mm wide at base
- New recruits (1-2 weeks) have hairs all over the test (outer plates)
- No calcified base (no basal plate)
- High to low intertidal, on rocks in exposed zones
- Bering Sea to Morro Bay, CA

**Tetraclita rubescens** (Darwin, 1854)
- Pink or red shell (juveniles are white)
- Volcano shaped with highly ribbed plates, more uniformly ribbed than *Semibalanus*
- Up to 51 mm high, 51 mm wide at base
- New recruits (1-2 weeks) have hairs all over the test (outer plates)
- High to low intertidal, on rocks in wave swept areas
- San Francisco Bay, CA to Baja California, Mexico

**Megabalanus californicus** (Pilsbry, 1916)
- Red shell with smooth triangular white regions at the plate junctions
- Up to 51 mm high, 51 mm wide at base
- Low intertidal to subtidal, on rocks, kelp, mussels, and other hard shelled animals
- Humboldt Bay, CA to Guaymas, Mexico

- Wide operculum
- Grooved ridges
- Top eroded (L), smooth
- Volcano shaped
- Uniformly ribbed plates
- Triangular white regions

"Test" of Barnacle is made up of the outer wall plates

Picture from Light's Manual
A look at barnacle recruits!

1. *Balanus glandula* with hairs around operculum. *Chthamalus* has no hairs.

2. *Balanus crenatus* (L) and *Semibalanus* (R) recruits with hairs all over test.

3. *B. glandula* recruit after hairs are gone. Only 4 plates, but rostral plate overlaps neighbors.

4. Rostral plate overlaps in *B. glandula* and underlaps in *Chthamalus*.

5. *B. glandula* (R) with 6 plates, younger (L) with 4 plates.

### Key Characteristics of some often confusing algae

<table>
<thead>
<tr>
<th><strong>Fucus spp</strong></th>
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</table>
| ![Photo](image1) | - Distinct midrib, with no white hairs on either side as seen in *Hesperophycus*
| | - Wider fronds and larger receptacles than *Hesperophycus*
| | - High to mid intertidal, wave sheltered to exposed areas, Bering Sea to Santa Barbara County, CA (*F. gardneri)* |

<table>
<thead>
<tr>
<th><strong>Silvetia compressa</strong></th>
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</tr>
</thead>
</table>
| ![Photo](image2) | - No midrib
| | - Branches generally narrower and longer than *Pelvetiopsis*
| | - Upper mid rocky intertidal, occurs lower than *Pelvetiopsis*, Shelter Cove, CA to Baja California |

<table>
<thead>
<tr>
<th><strong>Neorhodomela larix</strong></th>
<th><strong>Neorhodomela larix</strong></th>
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</table>
| ![Photo](image3) | - Branches short, blunt (not sharp like *Odonthalia*), cylindrical; in tight tufts along axis
| | - Axes unbranched or sparingly branched, with wiry texture (unlike *N. oregona*)
| | - Often in dense aggregations in upper intertidal with sand influence, Alaska to Baja California |

<table>
<thead>
<tr>
<th><strong>Hesperophycus californicus</strong></th>
<th><strong>Hesperophycus californicus Silva</strong></th>
</tr>
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</table>
| ![Photo](image4) | - Distinct midrib with 2 conspicuous rows of tiny white hairs on either side, (unlike *Fucus*)
| | - Narrower fronds and smaller receptacles than *Fucus*
| | - High zone, found higher than *Silvetia*, Santa Cruz, CA to N. Pacific Mexico |

<table>
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<tr>
<th><strong>Pelvetiopsis spp</strong></th>
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</table>
| ![Photo](image5) | - No midrib
| | - Branches more cylindrical, and shorter than *Silvetia*
| | - Upper intertidal in wave exposed areas on rocks, generally highest growing fucoid, British Columbia to San Luis Obispo County, CA |

<table>
<thead>
<tr>
<th><strong>Neorhodomela oregona</strong></th>
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</table>
| ![Photo](image6) | - Branches fine, tapered, cylindrical; borne alternately in rows in one plane
| | - Axes branching frequently, not wiry like *N. larix*.
| | - High intertidal pools, low intertidal zones, Northern California to Washington |

<table>
<thead>
<tr>
<th><strong>Odonthalia floccosa</strong></th>
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</table>
| ![Photo](image7) | - Highly variable depending on environment and reproductive state of plant
| | - Branches cylindrical to compressed (especially near base), with loose bushy tufts of branches with sharp tips (not blunt like *N. larix*)
| | - On rocks throughout the intertidal, Alaska to Santa Barbara County, CA |
# Key Characteristics of some often confusing snails

<table>
<thead>
<tr>
<th><strong>Nucella emarginata/ostrina</strong> (Deshayes, 1839)</th>
<th><strong>Nucella emarginata</strong></th>
<th><strong>Ocnebra interfossa</strong> (Carpenter, 1864)</th>
</tr>
</thead>
</table>
| ![Nucella emarginata/ostrina](image) | - "Low spire, smooth to weak spiral cords which alternate from thick to thin, unlike *N. canaliculata*"  
- "Aperture height over \( \frac{1}{2} \) shell length, but less than \( \frac{1}{2} \) shell diameter, anterior canal short and wide"  
- "Interior of aperture brownish or purple"  
- To 40 mm long, color variable, with or without stripes | ![Ocnebra interfossa](image) | - "8-11 well developed axial ribs crossed by equally strong spiral cords (unlike *O. lurida* and *interfossa*), which alternate from thick to thin"  
- "5 whorls with flattened shoulders, spire turreted with sharp apex"  
- To 20 mm long, color dull grayish brown or yellow  
- Low intertidal and subtidal, under rocks, Alaska to Baja California |

<table>
<thead>
<tr>
<th><strong>Nucella canaliculata</strong> (Duclos, 1832)</th>
<th><strong>Nucella canaliculata</strong></th>
<th><strong>Ocnebra lurida</strong> (Middendorff, 1848)</th>
</tr>
</thead>
</table>
| ![Nucella canaliculata](image) | - "Slender shell, low spire, uniformly sized spiral cords unlike *N. emarginata*, grooves between spiral cords have tiny axial scales"  
- To 40 mm long, mottled white to dark orange, darker motling on spiral ridges  
- Mid intertidal, on rocks and in mussel beds, Alaska to San Luis Obispo County, CA | ![Ocnebra lurida](image) | - "Spiral structure stronger than axial ribs, unlike *O. interfossa*; up to 6 whorls; no peripheral band as in *O. circumtexta*"  
- "Oval aperture with 6-7 or more teeth"  
- To 40 mm, color variable, sometimes with dark spiral bands  
- Low intertidal to subtidal, on or under rocks, Alaska to Baja California |

<table>
<thead>
<tr>
<th><strong>Nucella lamellosa</strong> (Gmelin, 1791)</th>
<th><strong>Nucella lamellosa</strong></th>
<th><strong>Ocnebra circumtexta</strong> (Steams, 1871)</th>
</tr>
</thead>
</table>
| ![Nucella lamellosa](image) | - "1-2 prominent spiral ridges on each whorl, smaller ridges may be present; axial frills; smoother shell than *N. canaliculata*"  
- "Moderately long anterior canal unlike *N. emarginata*, outer lip flared with 3 rounded teeth"  
- To 50 mm long, color variable, may have color bands | ![Ocnebra circumtexta](image) | - "Rounded axial ribs cut by stronger deep spiral grooves (unlike *O. interfossa*); a prominent spiral ridge, smaller ridges may be present; axial frills; smoother shell than *N. canaliculata*"  
- "Large aperture, thick outer lip with teeth, short open anterior canal"  
- To 25 mm long, white or grayish with "brown peripheral bands"  
- Mid to low intertidal, on rocks in heavy surf, Humboldt County, CA to Baja California |
Sources of information for the Guide to common California intertidal invertebrates and algae:

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12. MARINe (Multi-Agency Rocky Intertidal Network), http://www.marine.gov
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24. Walla Walla College Marine Station at Rosario Beach, Dave Cowles’ Web Page, http://www.people.wwu.edu/staff/cowlda/