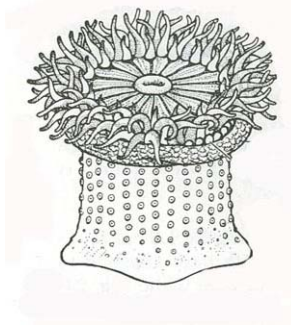


**Guide to common California intertidal invertebrates & algae: distinguishing characteristics**

Information adapted from various sources and personal observations of the SWAT Team

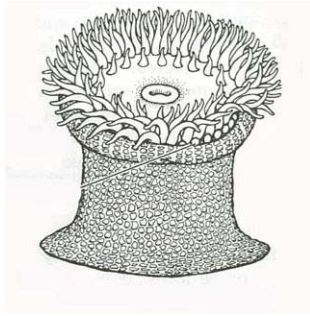
<http://cbsurveys.ucsc.edu>



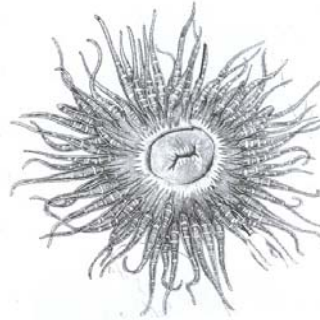
***Anthopleura elegantissima*  
(Brandt, 1835)**

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

<p><b>Size range</b></p>	<ul style="list-style-type: none"> <li>• 6 cm diameter for aggregating individuals, occasionally larger</li> <li>• up to 10 cm diameter (large solitaries almost certainly <i>A. sola</i>, but if tentacles are touching adjacent animals that have the same disk pattern, then <i>A. elegantissima</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• to 25 cm diameter, 51 cm high</li> </ul>
<p><b>Appearance</b></p>	<ul style="list-style-type: none"> <li>• column light green to white</li> <li>• longitudinal rows of adhesive tubercles (verrucae) that are often bearing debris</li> <li>• tentacles of various colors, often several distinctive white, while most greenish; often pink, lavender, or blue tipped</li> </ul>	
<p><b>Oral disk</b></p>	<ul style="list-style-type: none"> <li>• insertions of mesenteries evident as lines radiating from around mouth</li> <li>• color brownish or greenish</li> </ul>	
<p><b>Habitat</b></p>	<ul style="list-style-type: none"> <li>• rock faces or boulders, tidepools or crevices, wharf pilings</li> <li>• usually in dense aggregations.</li> </ul>	<ul style="list-style-type: none"> <li>• mid to low intertidal, extending well subtidally</li> <li>• often attached to rocks covered with layer of sand</li> <li>• base nearly always inserted into crevice or holes.</li> </ul>
<p><b>Distinguishing characteristics</b></p>	<ul style="list-style-type: none"> <li>• tubercles round, arranged in longitudinal rows and often bearing attached debris</li> <li>• small to medium sized anemones, commonly densely massed on rocks in sand</li> <li>• identical color pattern as seen in <i>A. sola</i></li> <li>• can only be sure of identity if tentacles interdigitate with adjacent clonemates.</li> </ul>	<ul style="list-style-type: none"> <li>• identical to <i>A. elegantissima</i> except grows to larger size and does not clone</li> <li>• can not distinguish two species when solitary and below about 5 cm diameter-- probably best to call such individuals <i>A. elegantissima</i>, especially if there are lots present, certainly if they have identical color patterns</li> <li>• larger animals that are solitary with clear space between them and others almost certainly <i>A. sola</i>.</li> <li>• <i>A. sola</i> when in or near mussel beds</li> <li>• distinguished from <i>A. xanthogrammica</i> 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.</li> </ul>

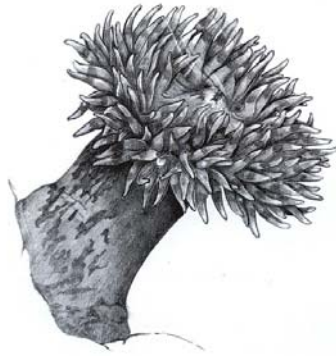


***Anthopleura xanthogrammica***  
**(Brandt, 1835)**



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

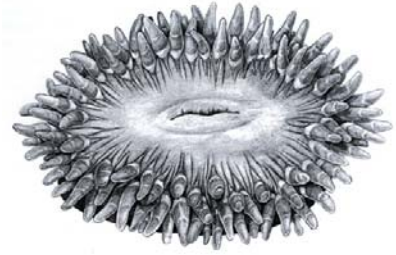
<b>Size range</b>	<ul style="list-style-type: none"> <li>to 30 cm high, 25 cm wide</li> </ul>	<ul style="list-style-type: none"> <li>column to 5cm diameter</li> <li>crown 7cm</li> <li>capable of elongation to over 5 times its diameter</li> </ul>
<b>Appearance</b>	<ul style="list-style-type: none"> <li>column: greenish-brown</li> <li>tentacles: green or bluish, rarely bleached along with whole animal</li> <li>tubercles irregular and not arranged in rows but appear velvety; often bearing debris.</li> </ul>	<ul style="list-style-type: none"> <li>column black, gray, or brown grading to white or pink near base</li> <li>tentacles numerous, tapering, semi-transparent colored variously red, white, orange, black, or blue.</li> <li>tubercles rounded and restricted to upper portion of column</li> </ul>
<b>Oral disk</b>	<ul style="list-style-type: none"> <li>disc without distinct radial lines</li> <li>uniform color, green, grayish, or blue-green</li> </ul>	<ul style="list-style-type: none"> <li>variously colored with variable patterns</li> </ul>
<b>Habitat</b>	<ul style="list-style-type: none"> <li>middle intertidal to shallow subtidal</li> <li>almost always below or adjacent to mussel beds</li> <li>base almost always flaring out on the rock.</li> </ul>	<ul style="list-style-type: none"> <li>on rocks buried in sand, or in abandoned holes</li> <li>occ. on pilings or floats, low intertidal and subtidal</li> </ul>
<b>Distinguishing characteristics</b>	<ul style="list-style-type: none"> <li>disk uniform bluish-green color without radial lines; distinguishes <i>A. xanthogrammica</i> from <i>A. sola</i>- which has radiating lines</li> <li>tubercles irregular, compound, not in longitudinal rows</li> <li>tentacles uniform in color</li> <li>opening to gullet muscular and tight when you put your finger in it as opposed to <i>A. sola</i> which feels loose</li> <li>almost always found below or near to mussel beds.</li> </ul>	<ul style="list-style-type: none"> <li>distinctive habitat</li> <li>bright color patterns of tentacles and disk</li> <li>usu. only tentacular crown is exposed, at low tide</li> <li>often withdraws some distance below sand surface when disturbed.</li> </ul>



***Urticina felina***  
(Linnaeus, 1761) = *Actinia crassicornis* Muller, 1776)



***Tealia lofotensis***  
(Danielssen, 1890)

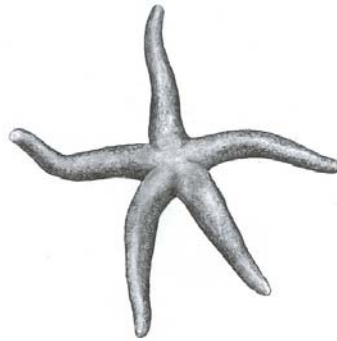


***Tealia coriacea***  
(Cuvier, 1798)

<b>Size range</b>	<ul style="list-style-type: none"> <li>• column usu. 8 cm in diameter, may reach up to 30 cm in diameter</li> <li>• 8-10 cm in height,</li> </ul>	<ul style="list-style-type: none"> <li>• column to 10 cm in diameter</li> <li>• 15 cm in height</li> </ul>	<ul style="list-style-type: none"> <li>• column to 10 cm in diameter</li> <li>• 14 cm in height</li> </ul>
<b>Appearance</b>	<ul style="list-style-type: none"> <li>• column red, frequently with irregular patches of green or brownish green, sometimes to point of appearing mostly green or brownish</li> <li>• tubercles absent or very few, weak, scattered</li> <li>• tentacles short, stout, blunt</li> </ul>	<ul style="list-style-type: none"> <li>• column smooth, free of adherent material, bright scarlet</li> <li>• tubercles white, few, in regular longitudinal rows</li> <li>• tentacles slender, elongate, scarlet, lacking bands or marks</li> </ul>	<ul style="list-style-type: none"> <li>• column dull brownish red to bright red, with thick tubercles to which sand grains and other debris adhere</li> <li>• tentacles short, stout, blunt in four cycles, colored green, pink or blue</li> </ul>
<b>Oral disk</b>	<ul style="list-style-type: none"> <li>• same color as tentacles (which are varying patterns or pale shades of cream, pink, blue, or green, the tips usu. white</li> </ul>	<ul style="list-style-type: none"> <li>• disk reddish, less bright than tentacles</li> </ul>	<ul style="list-style-type: none"> <li>• disk gray, blue, red, or pink</li> </ul>
<b>Habitat</b>	<ul style="list-style-type: none"> <li>• sides and undersurfaces of rocks</li> <li>• low intertidal zone and subtidal waters</li> <li>• along exposed rocky shores</li> </ul>	<ul style="list-style-type: none"> <li>• common on rocks and walls of surge channels</li> <li>• low intertidal and subtidal (to 15 m)</li> <li>• exposed outer coast;</li> <li>• concrete piles and marina floats</li> </ul>	<ul style="list-style-type: none"> <li>• rocky outer coast or in bays</li> <li>• low intertidal</li> <li>• typically lying buried in patches of sand, gravel or shell between large rocks with only tentacular crown exposed.</li> </ul>
<b>Distinguishing characteristics</b>	<ul style="list-style-type: none"> <li>• mottled column of red and greenish brown</li> <li>• stubby tentacles</li> </ul>	<ul style="list-style-type: none"> <li>• bright scarlet/red column color</li> <li>• white tubercles arranged in longitudinal rows.</li> </ul>	<ul style="list-style-type: none"> <li>• column never variegated with green (as <i>U. felina</i> is).</li> </ul>



***Pisaster ochraceus***  
**(Brandt, 1835)**



***Henricia spp.***  
**(Gray, 1840)**



***Leptasterias spp.***  
**(Verrill, 1866)**

<b>Size</b>	<ul style="list-style-type: none"> <li>arm radius to 25 cm</li> </ul>	<ul style="list-style-type: none"> <li>arm radius to 9 cm, usu. less</li> </ul>	<ul style="list-style-type: none"> <li>arm Radius to 5 cm</li> </ul>
<b>Appearance</b>	<ul style="list-style-type: none"> <li>orange, reddish, purple, brown or yellow</li> <li>star shaped;</li> <li>5 stout arms (rarely 6 arms)</li> <li>upper surface with many short, white spines</li> </ul>	<ul style="list-style-type: none"> <li>orange, red, tan, yellow or purplish</li> <li>usu. with spots or mottled</li> <li>5 slender arms</li> </ul>	<ul style="list-style-type: none"> <li>black, brown, red, or green</li> <li>frequently mottled</li> <li>star shaped</li> <li>6 arms</li> </ul>
<b>Habitat</b>	<ul style="list-style-type: none"> <li>middle intertidal to shallow subtidal, on rocks in exposed areas</li> <li>juveniles in crevices, under rocks, or within mussel beds but seldom seen in central and so. CA</li> </ul>	<ul style="list-style-type: none"> <li>low intertidal zone and subtidal to over 40m</li> <li>common on protected sides of rocks, under rocks, and in caves and pool</li> <li>most frequently where rock is encrusted with sponges and bryozoans</li> </ul>	<ul style="list-style-type: none"> <li>middle intertidal to shallow subtidal on rocks</li> </ul>
<b>Distinguishing characteristics</b>	<ul style="list-style-type: none"> <li>aboral surface with many small white spines arranged in detached groups or in a star-shaped design on the central part of disk</li> </ul>	<ul style="list-style-type: none"> <li>aboral surface is smooth and leathery compared to <i>Pisaster</i></li> <li>bright orange or mottled orange</li> <li>very small <i>Henricia</i> may be mottled and size of <i>Leptasterias</i>, but with only 5 slender or tapering arms</li> <li>smooth underside compared to <i>Leptasterias</i></li> </ul>	<ul style="list-style-type: none"> <li>6 arms</li> <li>aboral surface usu. mottled with white and gray</li> <li>never larger than silver dollar</li> <li>will brood embryos in humped posture (<i>Henricia</i> does not brood)</li> <li>underside appears furry, (<i>Henricia</i> has smooth underside)</li> </ul>



***Mytilus californianus***  
(Conrad, 1837)



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

<b>Size range</b>	<ul style="list-style-type: none"> <li>to 10-13 cm long (longer in Baja California and subtidal)</li> </ul>	<ul style="list-style-type: none"> <li>up to 13 cm long, but usu. half that</li> </ul>
<b>Shell</b>	<ul style="list-style-type: none"> <li>thick</li> <li>pointed at anterior end</li> <li>broadening posteriorly</li> <li>sculptured with strong radial ribs and irregular growth lines</li> <li>often with surface eroded or worn</li> </ul>	<ul style="list-style-type: none"> <li>thin</li> <li>nearly smooth</li> <li>lacking radiating ridges</li> <li>shell shape varies greatly with age, density of the bed, rate of growth and height in the intertidal zone, but usually hatchet-shaped.</li> </ul>
<b>Habitat</b>	<ul style="list-style-type: none"> <li>abundant</li> <li>attached in massive beds on surf-exposed rocks and wharf piles</li> <li>mainly in uppermiddle intertidal zone on outer coast</li> </ul>	<ul style="list-style-type: none"> <li>common</li> <li>often in clusters on rocks and esp. to wharf pilings</li> <li>low intertidal zone and subtidal to 40m in sheltered areas.</li> </ul>
<b>Distinguishing characteristics</b>	<ul style="list-style-type: none"> <li>radial ribs</li> <li>elongated shape</li> <li>usu. much larger</li> </ul>	<ul style="list-style-type: none"> <li>distinct 'elbow' on one side, making its overall shape much wider</li> <li>smooth shell</li> </ul>

Key Characteristics of some Common Intertidal Barnacles

*Chthamalus dalli/fissus*

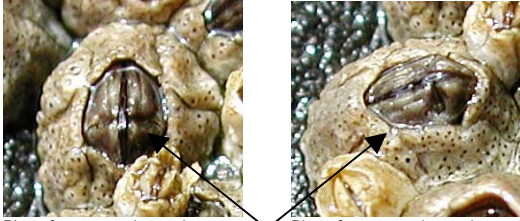


Photo from www.piscoweb.org Photo from www.piscoweb.org

- Round operculum
- No "lock & key"
- Smooth plates

*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*

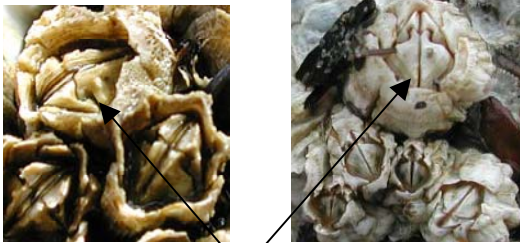


Photo from www.piscoweb.org Photo from www.beachwatchers.wsu.edu

- Diamond operculum
- Lock & key

*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*

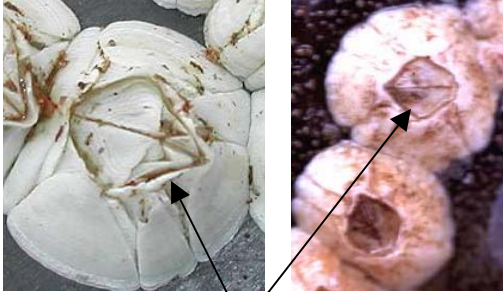
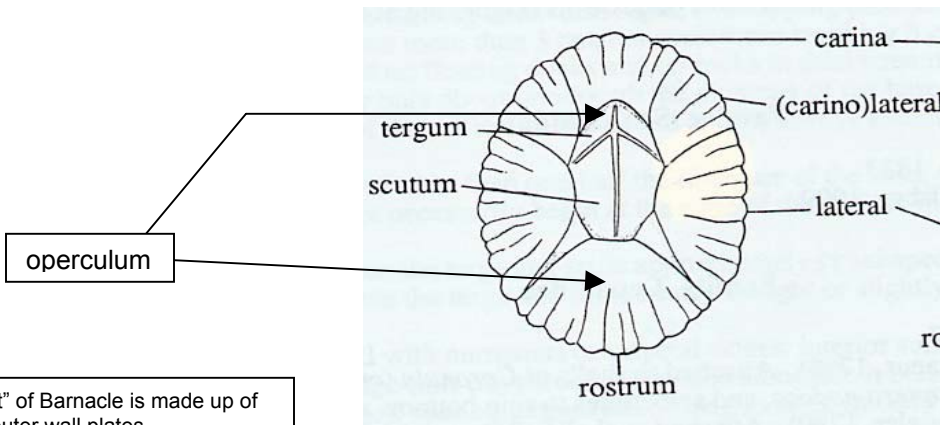


Photo from beachwatchers.wsu.edu Photo from www.piscoweb.org

- Pointed beak
- Triangle plate junctions

*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



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

Picture from Light's Manual

Key Characteristics of some Common Intertidal Barnacles

*Semibalanus cariosus*

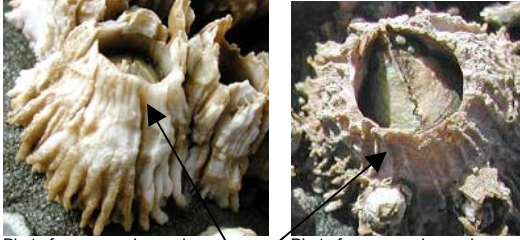


Photo from www.piscoweb.org      Photo from www.piscoweb.org

- Wide operculum
- Grooved ridges
- Top eroded (L), smooth

*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 51mm 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*

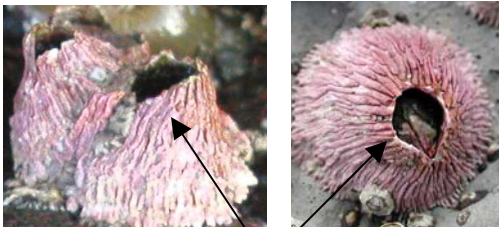


Photo from www.piscoweb.org      Photo from www.piscoweb.org

- Volcano shaped
- Uniformly ribbed plates

*Tetraclita rubescens* (Darwin, 1854)

- **\*Pink or red shell (juveniles are white)\***
- **\*Volcano shaped with highly ribbed plates, more uniformly ribbed than *Semibalanus*\***
- Up to 51mm 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*

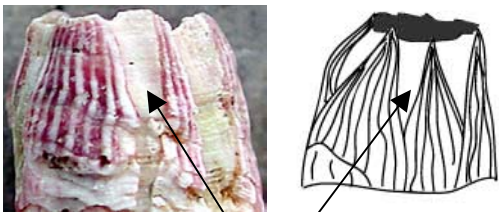
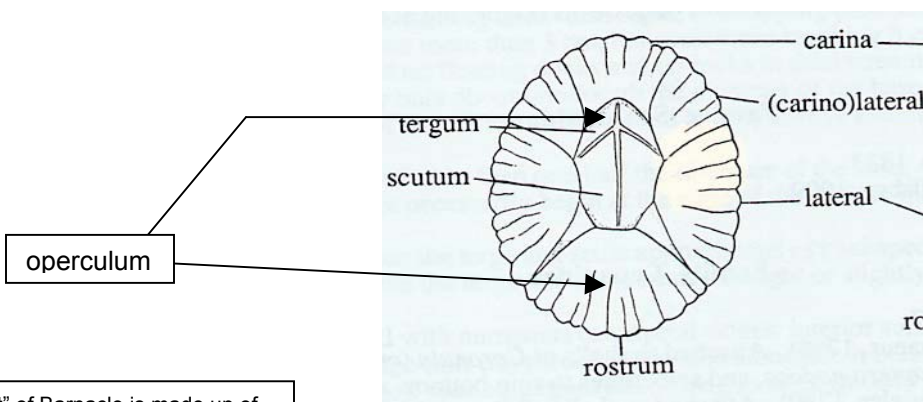


Photo from www.piscoweb.org      Picture from www.marine.gov

- Triangular white regions

*Megabalanus californicus* (Pilsbry, 1916)

- **\*Red shell with smooth triangular white regions at the plate junctions\***
- Up to 51mm 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



Picture from Light's Manual

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

A look at barnacle recruits!

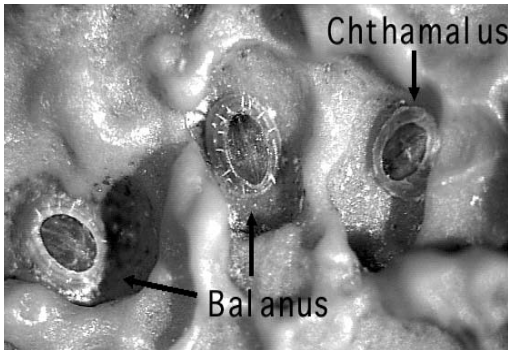


Photo by PISCO Intertidal

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

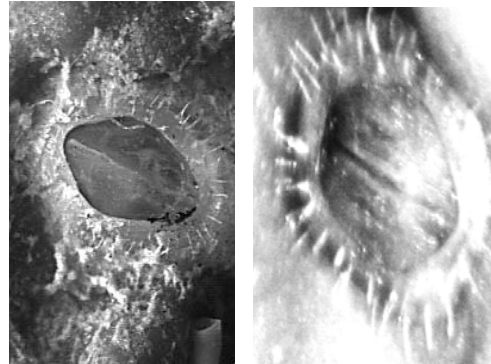


Photo by PISCO Intertidal

Photo by PISCO Intertidal

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

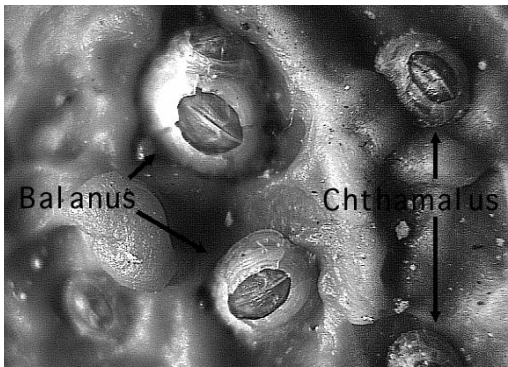


Photo by PISCO Intertidal

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

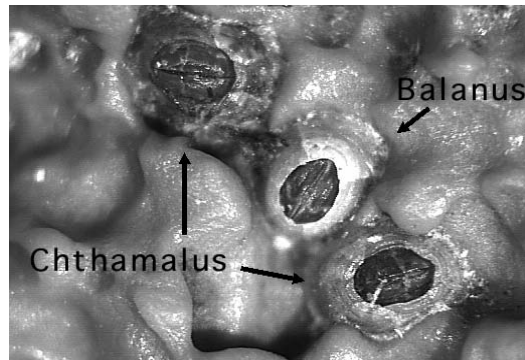


Photo by PISCO Intertidal

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

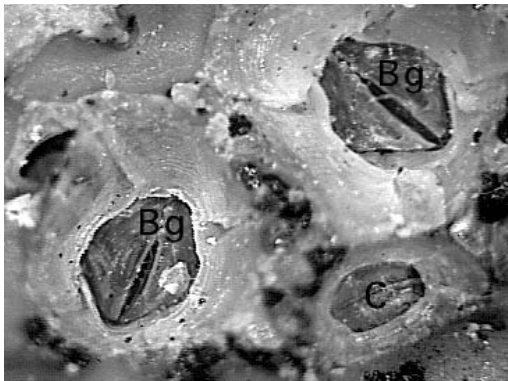


Photo by PISCO Intertidal

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

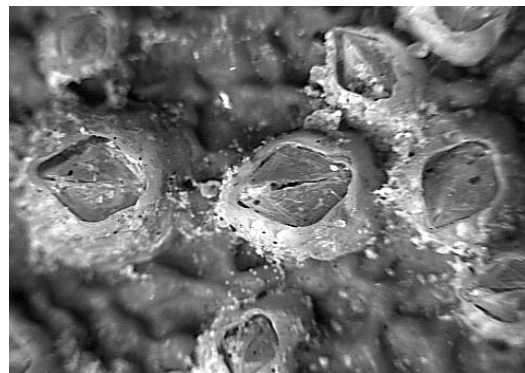


Photo by PISCO Intertidal

6. Older *B. crenatus* recruits. Compare with 6 plate *B. glandula* in 5.



Key Characteristics of some often confusing algae

*Fucus* spp



Photo by University Herbarium, UC Berkeley

*Fucus* spp

- 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*)

*Hesperophycus californicus*



Photo by University Herbarium, UC Berkeley

*Hesperophycus californicus* Silva

- 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

*Silvetia compressa*



Photo by University Herbarium, UC Berkeley

*Silvetia compressa*

- No midrib
- Branches generally narrower and longer than *Pelvetiopsis*
- Upper mid rocky intertidal, occurs lower than *Pelvetiopsis*, Shelter Cove, CA to Baja California

*Pelvetiopsis* spp



Photo by University Herbarium, UC Berkeley

*Pelvetiopsis* spp

- 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

*Neorhodomela larix*



Photo by SWAT Team

*Neorhodomela larix*

- 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

*Neorhodomela oregona*



Photo by SWAT Team

*Neorhodomela oregona*

- 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

*Odonthalia floccosa*



Photo by SWAT Team

*Odonthalia floccosa*

- 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

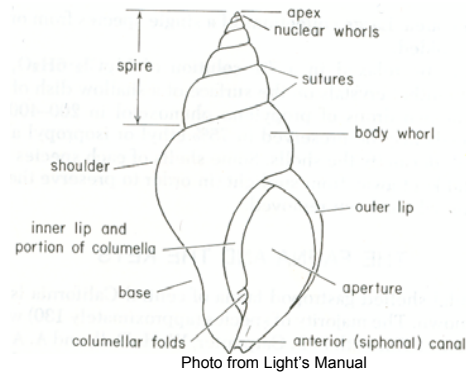


Photo from Light's Manual

### *Nucella emarginata/ostrina*



Photo from members.shaw.ca

### *Nucella emarginata* (Deshayes, 1839)

- **\*Low spire, smooth to weak spiral cords which alternate from thick to thin, unlike *N. canaliculata*\***
- **\*Aperture height over 1/2 shell length, but less than 1/2 shell diameter, anterior canal short and wide\***
- **\*Interior of aperture brownish or purple\***
- To 40 mm long, color variable, with or without striae

### *Nucella canaliculata*



Photo from www.gastropods.com

### *Nucella canaliculata* (Duclos, 1832)

- **\*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 mottling on spiral ridges
- Mid intertidal, on rocks and in mussel beds, Alaska to San Luis Obispo County, CA

### *Nucella lamellosa*



Photo from www.gastropods.com

### *Nucella lamellosa* (Gmelin, 1791)

- **\*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

### *Ocenebra interfossa*



Photo from members.shaw.ca

### *Ocenebra interfossa* (Carpenter, 1864)

- **\*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

### *Ocenebra lurida*



Photo from members.shaw.ca

### *Ocenebra lurida* (Middendorff, 1848)

- **\*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

### *Ocenebra circumtexta*



Photo from www.gastropods.com

### *Ocenebra circumtexta* (Stearns, 1871)

- **\*Rounded axial ribs cut by stronger deep spiral grooves (unlike *O. interfossa*)\***
- **\*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

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