Cyfoeth Naturiol Cymru
Natural Resources Wales

Identification guide for selected marine non-native species

The 47 species in this guide are non-native seaweeds and marine animals that may be found:

- **in ports and marinas**
- **on boat hulls**
- **on fishing gear or aquaculture equipment**
- **on natural shores**

Key features

The guide is aimed at marina and aquaculture operators, inshore fishers, recreational boat owners, watersports enthusiasts and all those who have an interest in maintaining healthy and productive seas.

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For further information visit the non-native species information portal www.nonnativespecies.org

Wireweed (*Sargassum muticum*)

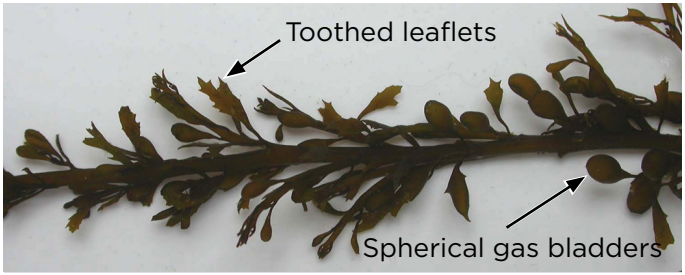
A brown alga

Description: A large olive-brown seaweed with fronds often over 1 m long. A main axis or stipe bears alternating secondary branches, giving characteristic 'washing line' appearance out of water. Branches with small flattened leaflets and spherical gas bladders.

Habitat: Grows on hard surfaces in rock pools and in shallow water rarely deeper than 5 m.

Seasonal changes: Perennial but branches die in autumn and only the small basal holdfast remains over winter.

Key features



Similar to: Some *Cystoseira* species, although these are smaller (up to 60 cm in length), bushy and branch irregularly.

Images: John Bishop.

Wakame (*Undaria pinnatifida*)

A brown alga

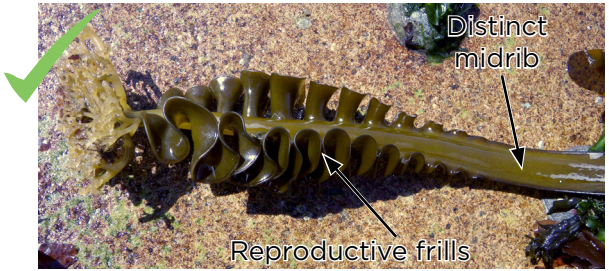
Description: A large, golden-brown kelp 1 to 2 m in length, consisting of a frond with fingered edges and a midrib, and reproductive frills just above the root-like holdfast.

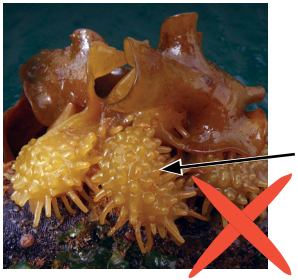
Habitat: Grows on any natural or artificial hard surface including rocky reefs, cobble, mudstone, shells, moorings, pontoons and boat hulls, from low intertidal down to 18 m. Cultivated for use in oriental cuisine.

Seasonal changes: Individuals are mostly annual: young plants found in spring are old and covered with growths by autumn. Recruitment again next spring from a microscopic phase.

Also known as: Japanese Kelp.

Key features





Similar to: The native kelps *Saccorhiza polyschides*, *Saccharina latissima* (neither of which has a midrib) and *Alaria esculenta*; *S. polyschides* can be identified by its knobbly, bulbous holdfast, *A. esculenta* has a distinct midrib but lacks divided frond or reproductive frills above the holdfast.

Images: John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Oyster Thief (*Colpomenia peregrina*)

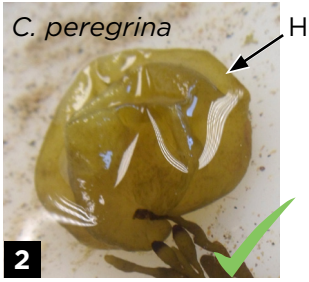
A brown alga

Description: Inflated, thin-walled hollow sphere usually 3-9 cm, but can be up to 25 cm in diameter, olive or yellow-brown. Tears like paper. Attached by root-like filaments from a single point at the base.

Habitat: Grows in rockpools, attached to other seaweeds, on natural or artificial hard surfaces including rocks, shells and pontoons; from intertidal to shallow subtidal. Prefers sheltered areas.

Seasonal changes: The reproductive phase described here is found early summer to late autumn. Young specimens are smooth, while older ones are more crumpled.

Key features



Leathesia marina

Distinguished by: Smooth, hollow ball with dry papery texture which tears easily, does not disintegrate between finger and thumb when rubbed. It may be confused with the native *Leathesia marina* which is smaller, spongy to the touch, has a gelatinous surface and breaks up in the fingers.

Images: 1,3 www.aphotomarine.com; 2 Esther Hughes.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Harpoon Weed (*Asparagopsis armata*)

A red alga

Description: Densely tufted branches form an elongated, cone-like or feather-shaped growth up to 30 cm long. Bears distinctive harpoon-like branches with barbs that attach this seaweed to other algae and seagrasses. Rosy-pink, yellowish-pink or whitish-pink.

Habitat: The large tufted phase of this alga (as pictured and described here) is found in deep pools or shallow, sheltered coast habitats, often attached to other seaweeds by barbs. Cultivated in Ireland for use in the cosmetics industry.

Seasonal changes: Live fragments occur all year round and regeneration to the mature stage occurs between July and October. Sea temperatures in Britain and Ireland currently preclude significant sexual reproduction. Spread and survival is mainly by vegetative propagation.

Key features

Harpoon-like branches with barbs

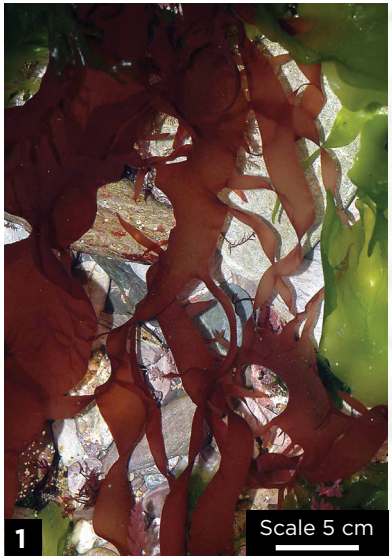
Similar to: *Bonnemaisonia hamifera* and *Vertebrata byssoides*. The harpoons distinguish *Asparagopsis* from other species.

Images: 1 Fiona Crouch; 2 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Devil's Tongue Weed (*Grateloupia turuturu*)

A red alga



Description: Red blades up to 1 m long, often with narrow extensions from the margins. Very small area of attachment and very short 'stem' before blade widens. Slippery to the touch, but slimy sensation does not transfer to the fingers.

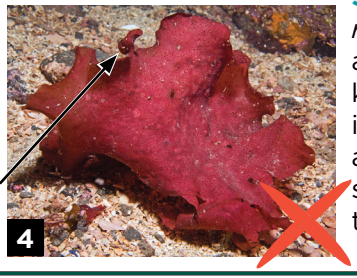
Habitat: Most frequently on marina pontoons, navigation buoys etc.; also on pebbles in the shallow subtidal and in lower intertidal pools at sheltered sites.

Seasonal changes: Can be found throughout the year, especially on marina pontoons. Young blades are quite thin and slippery but become thicker and more rigid with age.

Key features

Elongated blades with extensions in *G. turuturu*

Less elongate blade and kidney-shaped outgrowths in *K. reniformis*



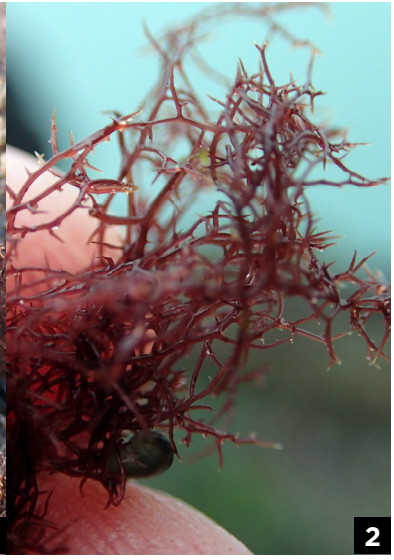
Similar to: The native species *Kallymenia reniformis,* which has a similar texture and colour, but *K. reniformis*: usually has kidney-shaped blade extensions not seen in *G. turuturu*; has a less elongate blade; and is unlikely on pontoons. Other large, slippery, flat, red algae are restricted to the subtidal.

Images: 1 Anon. (Plymouth 2009); 2,3 Ignacio Bárbara; 4 Lin Baldock.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Pom-pom Weed (*Caulacanthus okamurae*)

A red alga

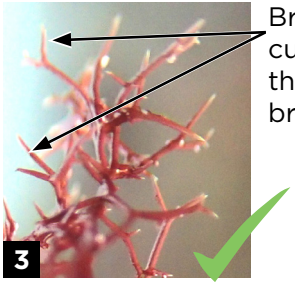


Description: A small bright-red to red-brown seaweed up to 3 cm high, typically forming springy clumps of tangled pom-poms attached by many scattered holdfast pads. Each pom-pom has several roughly cylindrical main branches and short, curved, thorn-like, forked side branches.

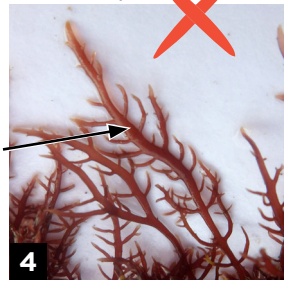
Habitat: Middle and lower intertidal zone of moderately or very exposed rocky shores. Often forms loose irregular mats mixed with other similar algae. Can also be found growing on other seaweeds and on mussels.

Seasonal changes: Perennial, probably found throughout the year. Young, healthy specimens are bright red in colour but may become darker and more rigid with age.

Key features



Gelidium sp.



Similar to: Straggle weeds (*Gelidium* species), but these do not form pom-poms and the main axes are distinctly more flattened, often narrower at the base, with short side branches, often in opposite pairs, spine-like or spoon-shaped. *G. pulchellum* most easily confused in spring before spoon shape of side branches develops.

Images: 1 Francis Bunker; 2,3 Matt Slater, Cornwall Wildlife Trust; 4 Esther Hughes.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Hook Weed (*Bonnemaisonia hamifera*)

A red alga

Gametophyte phase

Trailliella phase

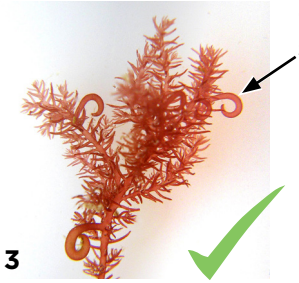
Description: Gametophyte (haploid, gamete-producing lifecycle phase) has brownish-red or purplish-pink, delicate, feathery fronds with a slightly flattened erect main axis up to 1 mm wide and 25 cm long. Branches spirally in pairs of unequal length. Usually attached to other algae by crozier-shaped hooks. 'Trailliella' (diploid, tetraspore-producing phase) is brownish-red, much branched, filamentous, cotton wool-like tuft up to 25 mm in diameter.

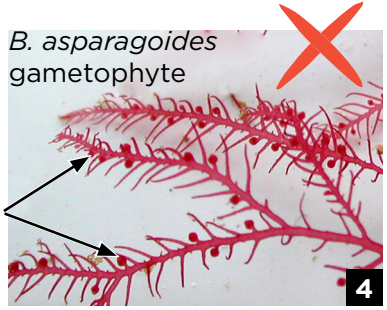
Habitat: Gametophytes usually attached to other algae, rocks or shells in the shallow subtidal. Trailliella phase in shaded rock pools on the lower shore, or subtidal.

Seasonal changes: Gametophytes occur March – June, Tralliella phase all year round, but most obvious October – March.

Also known as: Trailliella phase as Pink Cotton Wool, *Trailliella intricata*.

Key features





Similar to: *B. asparagoides*, which lacks the crozier-shaped hooks. The Trailliella phase requires microscopic examination to distinguish it from the same life phase of *Asparagopsis armata*.

Images: 1 Sue Daly; 2 Bernard Picton; 3 John Bishop; 4 Francis Bunker.

For further information visit the non-native species information portal
www.nonnativespecies.org

Golden Membrane Weed (*Botryocladia wrightii*)

A red alga

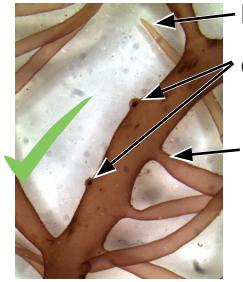
Description: A large (10-40 cm long) glistening light-pink, brown to dark red seaweed. The frond is soft, smooth and slippery, the axes and main branches are generally cylindrical, translucent and hollow with variously arranged branches narrower at the base and pointed at the tips. Some are profusely branched, others less so. The seaweed is attached by a discoid holdfast. Female plants have small (up to 1.2 mm diameter) fruiting structures called cystocarps (small raised nodules) scattered on mature branches.

Habitat: On natural and artificial hard substrate in the lower intertidal and in pools; subtidal to 15 m. Prefers sheltered inlets and bays.

Seasonal changes: The growing season uncertain, but has been found in the UK between June and September.

Formerly known as: *Chrysymenia wrightii.*

Key features



Dudresnaya verticillata

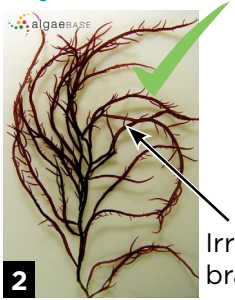
Similar to: Dudresnay's Whorled Weed (*Dudresnaya verticillata*) is very similar in form but is fluffier or 'fuzzier' in appearance, has banded branches when young, and branches are generally smaller with smaller branchlets. Possible confusion with *Agardhiella subulata* which bears branches that taper to a point but in this species are neither hollow nor slippery.

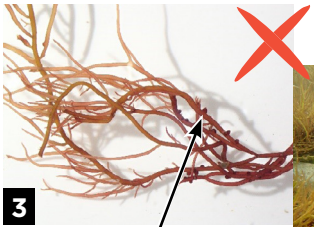
Images: Francis Bunker.

Worm Wart Weed (*Agarophyton vermiculophyllum*) A red alga

Description: A cartilaginous red seaweed which can be dark red/ brown to almost black (lighter if sun-bleached). Branched fronds are elongated and slender growing to around 2 m in length. Branches are circular to slightly compressed in cross-section, often wrinkled with longitudinal grooves, and feel elastic due to the lower parts being hollow. Branching irregular, holdfast is a small disc. Male plants tend to be bushier than females, which can appear stragglier.
Habitat: Found in sheltered, shallow habitats. Favours soft-bottomed, muddy, sheltered bays, inlets, harbours, lagoons and estuaries rich with nutrients. Tolerant of many stresses. Can be found loose lying or attached to small stones or shells.
Seasonal changes: Maximum biomass during early to mid-summer, minimal levels in winter.
Formerly known as: *Gracilaria vermiculophylla.*

Key features





Similar to: Wart weed, *Gracilaria gracilis* (3) and long wart weed, *Gracilariopsis longissima* (4), although these usually have cystocarps (warts) along their length and grow attached to rocks. In Europe *A. vermiculophyllum* plants are non-sexual; no cystocarps. Difficult to distinguish from other species when attached to rock, but when living freely in estuaries on sand and muddy sand, most likely to be *A. vermiculophyllum.*

Images:1 Paul Brazier; 2 Ignacio Barbara, AlgaeBase; 3,4 www.aphotomarine.com

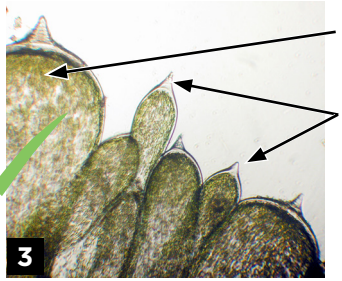
For further information visit the non-native species information portal *www.nonnativespecies.org*

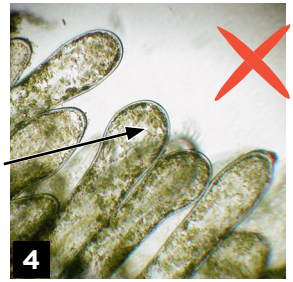
Green Sea Fingers (*Codium fragile subsp. fragile*)

A green alga

Description: A dark green seaweed with velvety, spongy, finger-like branches. The plump, round branches are 3-10 mm wide and are typically 15-40 cm long. Branches repeatedly divide equally into two. Attached by a small, spongy base.
Habitat: Intertidal and shallow subtidal, in rockpools and attached to rocks or artificial structures. Grows well in sheltered areas including harbours and marinas. Can tolerate wide range of water temperature, salinity and nutrient levels. Grows well in shady areas such as beneath pontoons.
Seasonal changes: Present year-round, but may be reduced by cold conditions to a perennial holdfast.
Also known as: Velvet Horn, Dead Man's Fingers. Formerly *C. fragile tomentosoides*.

Key features



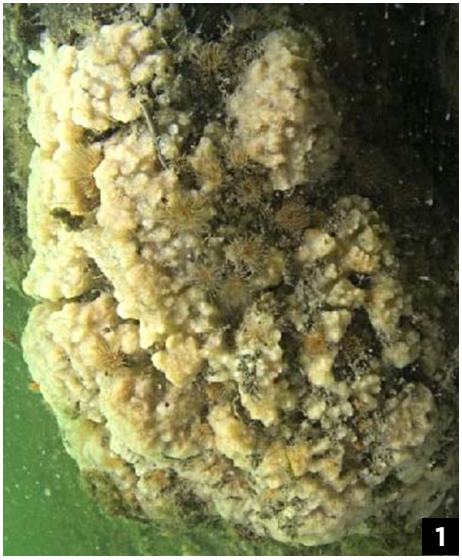


Similar to: Native species of *Codium*. Microscopic examination of the utricles (tiny club-shaped structures which form the outer layer of branches) reveals that in *C. fragile subsp. fragile* the utricles have prominent colourless points, whereas in the native *C. tomentosum* and *C. vermilara* they have rounded or flattened ends. *C. fragile subsp. atlanticum* has short points. With experience it is possible to distinguish with a hand lens.

Images: 1 www.aphotomarine.com;
2 Urtica www.flickr.com CC BY-NC-SA 2.0; 3,4 Lin Baldock.

Cauliflower Sponge (*Celtodoryx ciocalyptoides*)

A sponge


1

2

Description: A soft, yellow or pale brown sponge with surface lobes or papillae but no obvious openings in surface. Initially a thinly encrusting sheet, but may grow to very substantial globular or broadly attached forms up to 50 cm thick and 1 m^2 or more in area. Produces copious mucus when handled. Variable in appearance and can be confused with other sponges; microscopic examination of skeletal spicules needed for definitive identification.

Habitat: Semi-enclosed inlets with turbid water and moderately strong currents, on both rocky and sedimentary bottoms at shallow subtidal depths down to 40 m.

Seasonal changes: Present year-round, but population may be reduced by cold winter conditions.

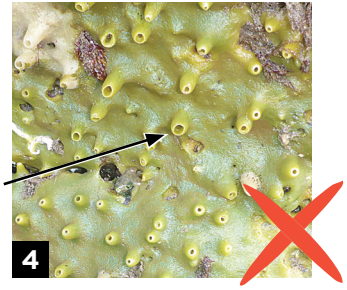
Formerly known as: *Celtodoryx girardae.*

Key features


3

Section through thick growth (here 6 cm)

Species with obvious exhalant openings (oscules) e.g. Breadcrumb Sponge


4

Distinguished by: Yellowish colour, irregular papillae on upper surface, soft thick growth producing abundant mucus when damaged, absence of obvious exhalant openings. Can grow very large. Reliable identification requires microscopical examination of skeletal spicules.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Orange-striped Anemone (*Diadumene lineata*)

An anemone

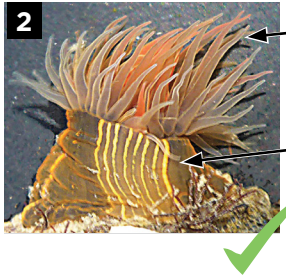
Description: Small, delicate anemone, smooth column up to 20 mm in diameter and generally olive green or brown with contrasting vertical stripes (orange, less commonly yellow or white). Up to 100 slender tentacles, grey or yellow; inner tentacles red in some populations.

Habitat: In sheltered settings on hard surfaces including stones and shells intertidally or on floating artificial structures. Frequently where fresh and salt water meet, but will not withstand salinities below 12 for prolonged periods. Often occurs in association with mussels or oysters.

Seasonal changes: Present year-round. Generally reproduces by dividing, with regrowth of the resulting pieces.

Formerly known as: *Haliplanella lineata, Diadumene luciae.*

Key features



Variant with red inner tentacles

Stripes - still visible when tentacles retracted - may be grouped

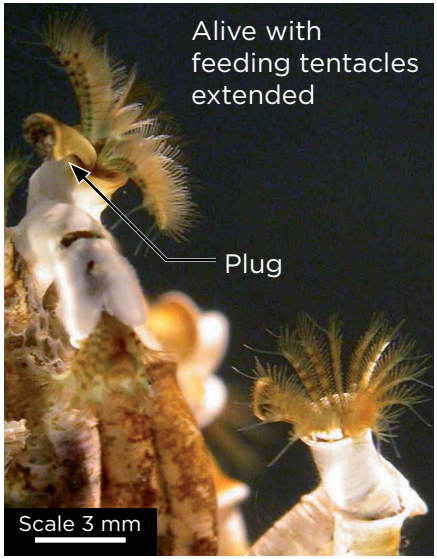
Distinguished by: The vertical stripes on the column. Young specimens of plumose anemone (*Metridium senile*) may be similar in general form, but are not striped.

Images: 1 Patrick Van Moer; 2, 3 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Trumpet Tube-worm (*Ficopomatus enigmaticus*)

An annelid tube-worm



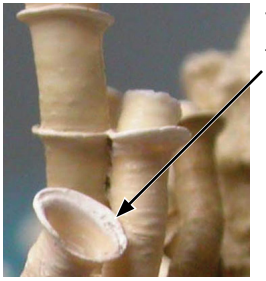
Description: Clumps or reefs of upright, white, intertwined chalky tubes (1-3 mm diameter) with flared collars at intervals, attached at base to solid surface. Collars largely absent if growth recumbent over substrate. Recently formed tubes are pale horn-brown. Each tube houses worm with crown of banded, feathery feeding tentacles; spiny plug (operculum) closes tube when animal withdrawn.

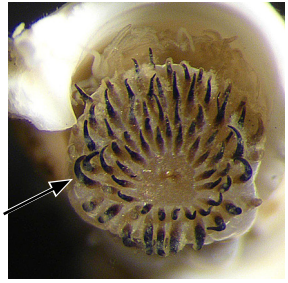
Habitat: Sheltered, shallow coastal sites with reduced or fluctuating salinity. Ports, harbours, marinas, channels, lagoons.

Seasonal changes: Tubes, at least, present year-round; reproduces in warmest months.

Also known as: Coral Worm.

Key features





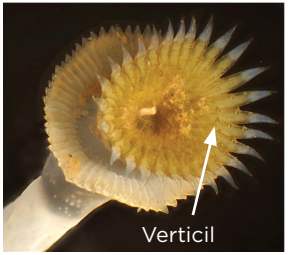
Similar to: Other tube-worms with chalky tubes. Periodic flared collars along roughly 2 mm-wide, smooth, erect tube, and plug bearing numerous dark brown incurved spines, distinguish *F. enigmaticus*.

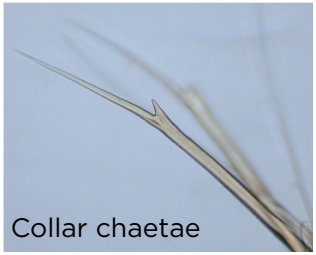
Images: John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Twin-keel Worm (*Hydroides ezoensis*)

An annelid tube-worm





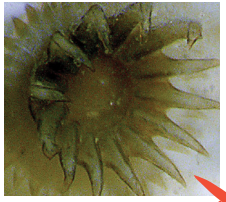
Description: White chalky tube (specimen in main image is discoloured) up to c. 4 mm wide and at least 45 mm long, with two parallel ridges, one either side of midline (except where growing up unsupported). Full identification involves characteristics of outer crown of operculum (i.e. the verticil), and collar chaetae of first body segment of worm.

Habitat: A fouling species in ports and harbours, but also on seabed and on stones and boulders on the shore. Can form substantial aggregations several cm thick.

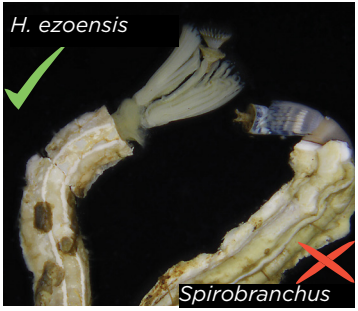
Seasonal changes: A summer breeder in its native range.

Key features

H. dianthus



H. norvegica



Similar to: Other *Hydroides sp.* lack pair of ridges, although *H. norvegica* tube can look flattened across top. Details of verticil and chaetae distinguish species, e.g. main spines of verticil are bent inwards around part of circumference in *H. dianthus* and have side-spines in *H. norvegica*. *Spirobranchus* tube has central keel.

Images: John Bishop.

Pacific Oyster (*Magallana gigas*)

A bivalve mollusc

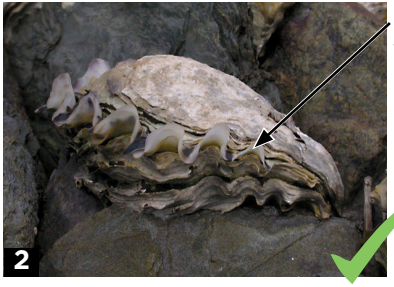
Description: Thick, rough, hinged shells up to 18 cm long with lower half often cemented to a solid surface; strong raised ribs lead into markedly wavy or saw-toothed shell margin. Often with dark-purple brown markings. May grow upright when crowded, presenting sharp edges of shells.

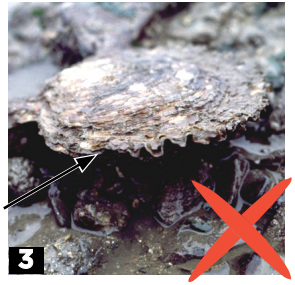
Habitat: Lower shore and coastal waters; on fixed artificial structures in harbours and marinas, and on natural shores.

Seasonal changes: Present year-round, spawning in the warmer months.

Also known as: (Pacific) Cupped Oyster. Formerly as *Crassostrea gigas.*

Key features





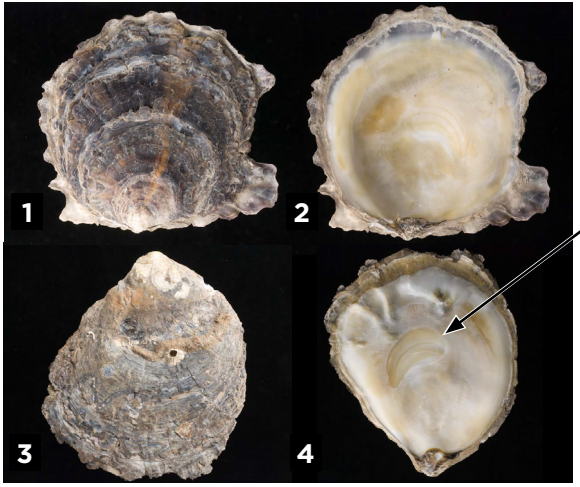
Similar to: Native oyster (*Ostrea edulis*), which has more numerous but much weaker ridges and much less wavy shell margin. Shell shape of both species varies extensively to fit growing space, but *M. gigas* tends to be more elongate whereas *O. edulis* can be almost circular.

Images: 1 Guy Baker; 2 John Bishop; 3 Keith Hiscock.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Chilean Oyster (*Ostrea chilensis*)

A bivalve mollusc



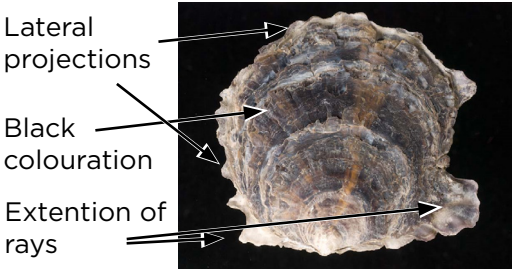
Description: Morphologically variable depending on habitat. Lower valve/ half (photos 1,2) slightly cupped and top valve (3,4) is flat. Surface is very irregular with irregular radiating ribs which can extend to outer margin as projections. Its length is up to 105 mm, width to 70 mm, and inflation to 33 mm. Shell is solid but not heavy. Upper valve coloured tan becoming black with paler radiating rays; lower valve paler overall. Internally creamy to yellowish with a darker marginal band. Adductor scar kidney-shaped, same colour as underlying shell.

Habitat: In its native range, near-shore waters to depths of 550 m. Inhabits low intertidal and shallow subtidal in Menai Strait. Lives on soft sandy and muddy bottoms and on hard substrates, in enclosed bays or areas protected from strong waves.

Seasonal changes: Present year-round, breeding season June-September.

Also known as: New Zealand flat oyster, Bluff oyster.

Key features

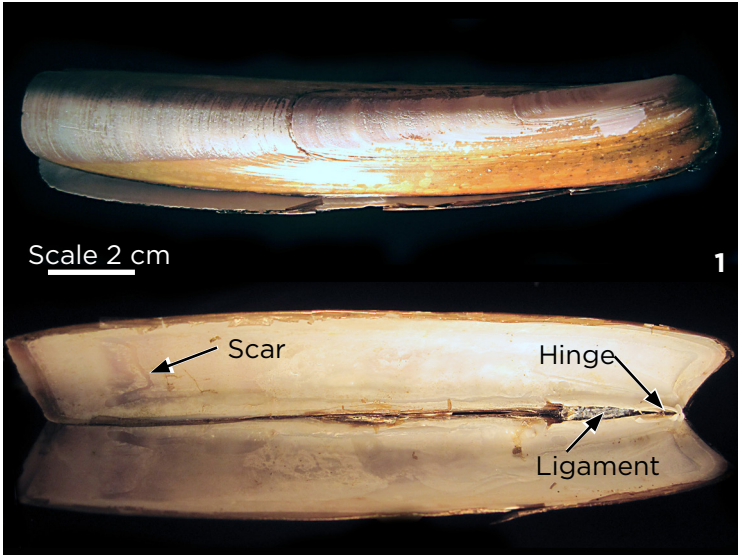


Similar to: The shape is most similar to *Ostrea edulis* (5), but the black colour/ rays are distinctive. *O. chilensis* has lateral projections with extensions of rays either side of the umbo. *Magallana gigas*, another invasive oyster, has a markedly wavy shell margin and tends to be more elongate.

For further information visit the non-native species information portal *www.nonnativespecies.org*

American Jackknife Clam (*Ensis leei*)

A bivalve mollusc



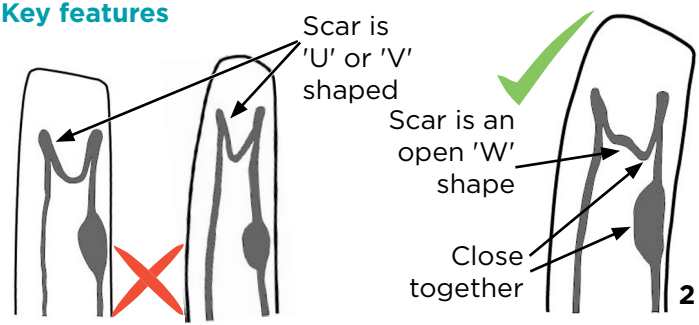
Description: A thin, elongated bivalve. The two valves of the shell are attached by a hinge towards one end. Shell yellow to red-brown with many pink to purple-brown growth bands. Shell up to 20 cm long, slightly curved to distinctly curved along both margins, length to width ratio 6:1.

Habitat: Burrows in sand or muddy sand from low intertidal to shallow subtidal in coastal waters and estuaries.

Seasonal changes: Present year-round, spawning in March - April.

Also known as: American Razor Clam, Atlantic Jackknife Clam. Formerly as *Ensis americanus*, *Ensis directus*.

Key features



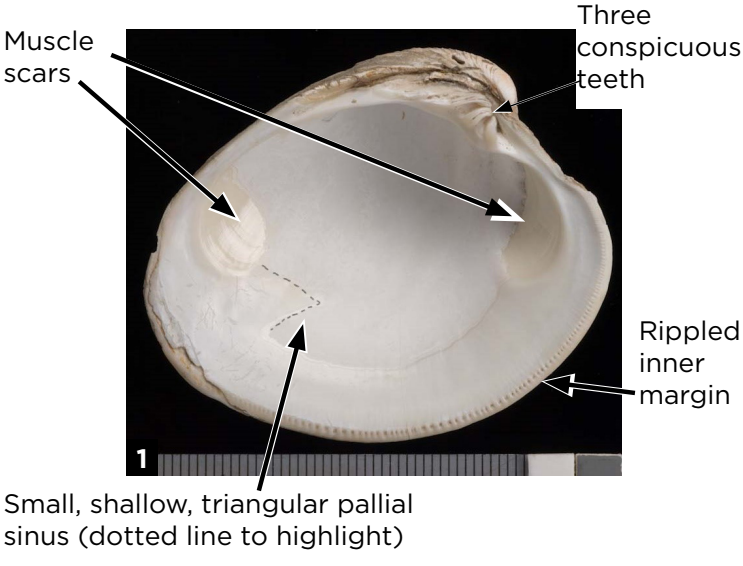
Similar to: Several native razor clams (*Ensis spp*. and *Solen capensis*). *E. leei* can be distinguished by the marks ('scar') of the pallial sinus inside the shell at the end opposite the hinge, resembling an open 'W' (U- or V-shaped in other *Ensis*). The shells of *E. siliqua*, *E. minor* and *S. capensis* are straight and parallel-sided, not curved, and that of *E. magnus* is straight along the hinged margin. The shell of *E. leei* is relatively wider than that of other *Ensis* spp. (similar to that of *S. capensis*).

Images: 1 Jack Sewell; 2 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Hard-shell Clam (*Mercenaria mercenaria*)

A bivalve mollusc



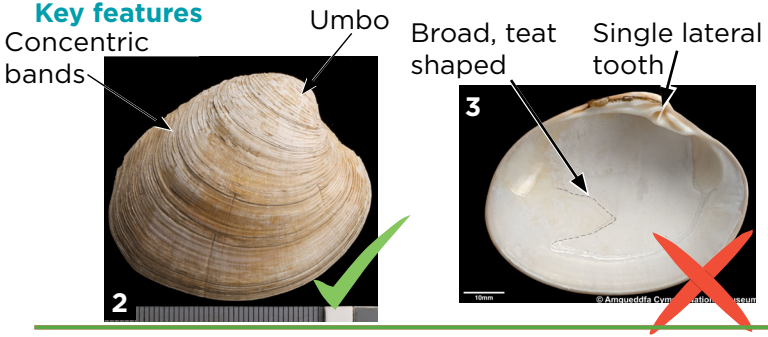
Description: A large, thick-shelled clam up to 13 cm in length. Light brown to grey in colour. Thin concentric bands are conspicuous and are closely spaced around the margins but more widely spaced around the umbo (beak). Inner shell surface is shiny with a purplish-blue tinge around the muscle scars. Beak extends well beyond the main shell. Pallial sinus is short/small and triangular. Shell inner margin is finely rippled/ crenulated. Each valve has three conspicuous teeth. Muscle scars roughly equal: Posterior slightly fatter than anterior. Swollen umbos.

Habitat: A shallow burier in muddy sediment on the lower shore and shallow sublittoral and in bays and estuaries. Prefers sandy environments to depths of 15 m.

Seasonal changes: Present year-round, spawning in autumn.

Also known as: Quahog.

Key features

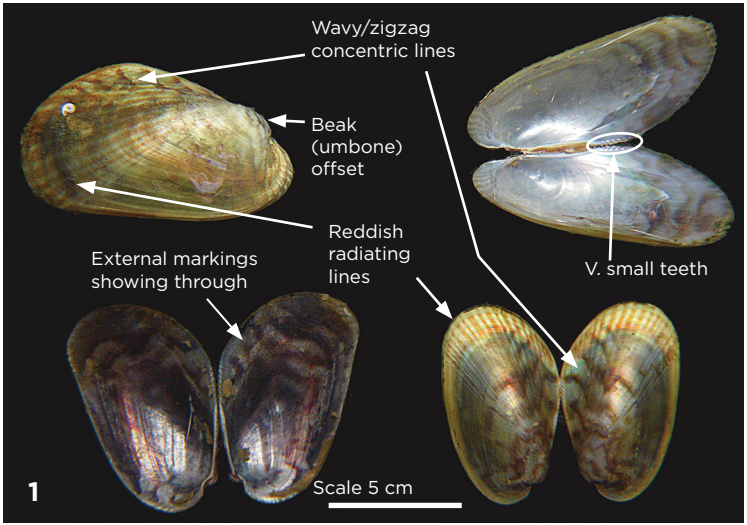


Similar to: The brown venus, *Callista chione* (3) which grows to 9 cm, has a single, large anterior lateral tooth, broad and teat shaped pallial sinus, often darker streaks radiating from umbones. Striped venus, *Chamelea gallina* grows to 4 cm, is broadly triangular with prominent umbones, and three broad radiating chestnut bands. The rayed artemis, *Dosinia exoleta* and the smooth artemis, *Dosinia lupinus* are almost circular and smaller, to 6 cm and 4 cm diameter respectively.

 For further information visit the non-native species information portal *www.nonnativespecies.org*

Asian Date Mussel (*Arcuatula senhousia*)

A bivalve mollusc



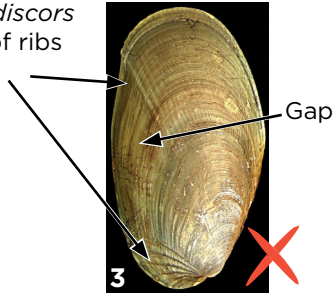
Description: A small (10-30 mm), plump, greenish mussel. Shell with radiating reddish lines at broader end; often with thicker purple-brown, wavy/zigzag, concentric lines. Shell thin and smooth, anterior end narrowly rounded with the beak separate. Shell interior lustrous purplish-grey with external concentric markings often showing through.

Habitat: Prefers enclosed intertidal and shallow subtidal flats (to 20 m), on soft or hard substrates and attached to seaweeds and artificial structures. Can aggregate into dense, extensive mats in shallow coastal water. Solitary mussels may be almost enclosed in a byssal cocoon.

Seasonal changes: *A. senhousia* mats can experience significant mortalities in the autumn/winter.

Also known as: Bag Mussel (refers to cocoon).

Key features



Similar to: *A. senhousia* could be confused with young blue mussels (*Mytilus spp.*), which differ in shape, with the beak at the extreme anterior end, and more uniform colouration. *Musculus discors* (3) has similar shape, but has two groups of radiating ribs separated by smooth region, unpatterned colouration and a slightly convex ventral margin.

For further information visit the non-native species information portal *www.nonnativespecies.org*

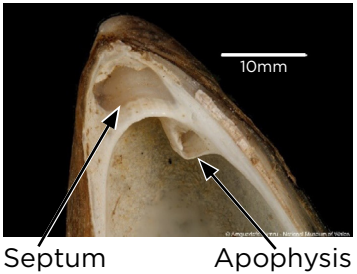
Conrad's False Mussel (*Mytilopsis leucophaeata*) A bivalve mollusc

Description: Mussel-shaped bivalve with a prominent internal "shelf" or septum inside the left valve's umbo (beak), and partly covered by this is a small triangular apophysis. True mussels do not have this septum or apophysis. Shell is rough, can reach 4 cm, marked with concentric lines, coloured cream to brown, sometimes bluish-brown and can be marked with stripes. Ventral margin is almost straight, with a curved beak, ending in a rounded knob. Right valve is larger than the left. Shell interior is white to grayish, somewhat pearly.

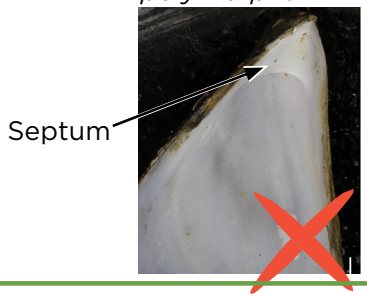
Habitat: Fresh, brackish and marine waters such as lagoons, docks and estuaries. Attaches to hard substrates such as rocks, oysters, ropes, and boats.

Also known as: Dark false mussel.

Key features



Dreissenna polymorpha



Similar to: Quagga mussel, *Dreissena bugensis* and zebra mussel, *Dreissena polymorpha* that are mostly associated with fresh/ brackish water but also in estuaries. Distinguished from *D. polymorpha* and *D. bugensis* by the presence of the apophysis, and having a more stream-lined, elongate profile. *D. bugensis* and *D. polymorpha* have a more pointed umbo and more triangular-wedge like appearance. *Mytilus edulis* can be separated from *M. leucophaeata* by its smooth periostracum and tan/blue coloured shell.

 For further information visit the non-native species information portal *www.nonnativespecies.org*

Slipper Limpet (*Crepidula fornicata*)

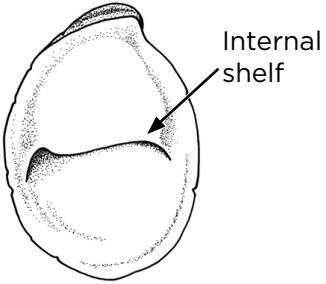
A gastropod mollusc

Description: Domed shell, oval or kidney-shaped, up to 5 cm long, with internal flat shelf. Outer surface pale, with growth lines and brown patches. Sedentary as adult, often aggregates into chains or leaning stacks of individuals (as shown left), larger towards base.

Habitat: Attached to solid surfaces, or small objects such as stones or shells on sediment, in shallow coastal waters or low intertidal.

Seasonal changes: Present year-round, broods during long breeding season.

Key features



Distinguished by: Most low-spired marine shells are symmetrical, with the apex of the shell on the midline; in *C. fornicata* the apex is to one side at the extreme end of the shell. The ormer (*Haliotis tuberculata*, currently Channel Islands only) has a somewhat similar shell shape, but with a series of holes in the upper surface (absent in *C. fornicata)*, and no internal shelf.

Images: John Bishop.

Veined Rapa Whelk (*Rapana venosa*)

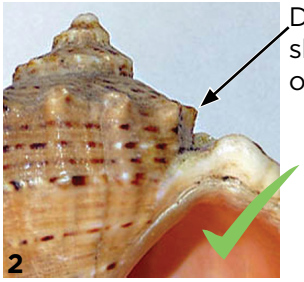
A gastropod mollusc

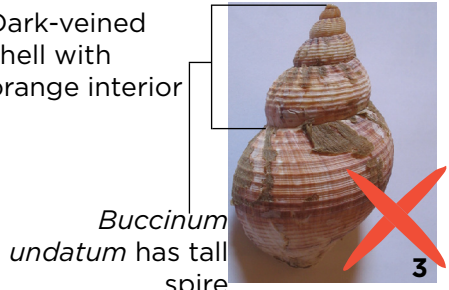
Description: Large, active, predatory snail up to 18 cm long. Knobbly, rounded shell, orange inside. Outside usually grey with dark spiral veins of colour. Shell opening large and oval with small teeth on outer lip and short, open siphon canal.

Habitat: On and under soft sediment, sometimes hard surfaces, from 3 - 20 m depth.

Seasonal changes: Congregates on hard surfaces, including rock outcrops and man-made structures, to spawn and lay eggs during late spring/summer.

Key features





Distinguished by: Larger than native marine snails. The largest buccinid snails including the common whelk *Buccinum undatum* reach sizes exceeding 10 cm, but all have tall spires. Smaller individuals may be confused with the sting winkle *Ocenebra erinaceus*, which has a more elongated, ridged shell (see *Urosalpinx cinerea* page).

Images: 1 USGS; 2 Wiki Commons; 3 Judith Oakley.

For further information visit the non-native species information portal *www.nonnativespecies.org*

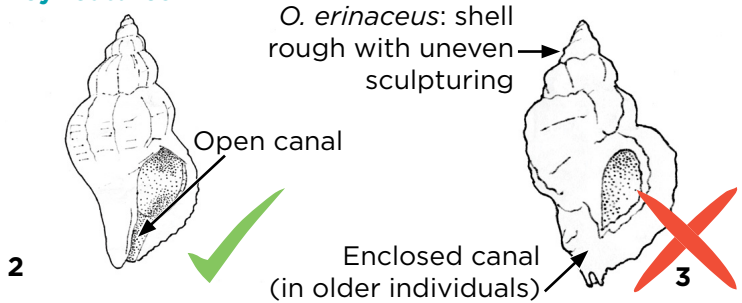
American Oyster Drill (*Urosalpinx cinerea*) A gastropod mollusc

Description: Spiral shell to 40 mm long with up to eight turns. Rounded vertical ribs (10-12 in final turn) and numerous finer spiral ridges. Shell opening oval with thickened lips in mature specimens, outer lip thinner in younger specimens; short open canal running forward from opening. Shell yellowish or grey; orange-yellow plate closes opening when snail withdraws.

Habitat: Low shore down to about 10 m in bays and estuaries, often associated with oysters. Feeds on oysters, mussels and barnacles.

Seasonal changes: Present year-round; egg capsules produced in spring and summer. May hibernate in mud during cold winter periods.

Key features

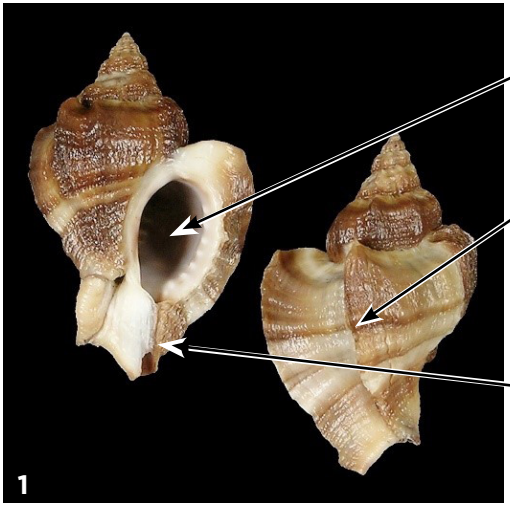


Similar to: Native sting winkle, *Ocenebra erinaceus*, in which short canal running forward from shell opening is roofed over (rather than open) in older specimens and shell is rougher, with uneven sculpturing. *Urosalpinx cinerea* also has broader and fatter shell. Second non-native oyster drill, *Ocinebrellus inornatus* (see next page), present in France and the Netherlands.

Images: 1 Marco Faasse; 2, 3 Guy Baker.

Asian/Japanese Oyster Drill (*Ocinebrellus inornatus*)

A gastropod mollusc

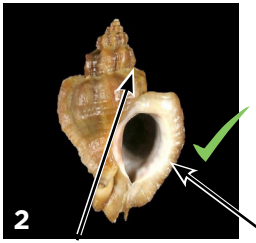


Description: Shell is irregularly sculpted, with an oval aperture, thick outer lip, and a short straight siphonal canal, which is initially open but usually closes with age. Shell has a pointed spire, grows to a maximum of 6cm in length and has 5-7 whorls, the last of which is sculpted with 4 – 12 axial ribs (ridges), colour varies from beige/ brown to orange and striped and has a flat upper projecting shelf with a deep suture between whorls. Shell morphology can vary significantly, often making it difficult to distinguish from the native oyster drill, *Ocenebra erinaceus*.

Habitat: Estuarine and benthic marine habitats in the intertidal and shallow subtidal zones, such as bivalve beds, biogenic reefs (particularly those associated with oysters), and other hard substratum.

Formerly known as: *Ocenebra inornata.*

Key features



Similar to: A second invasive drill, *Urosalpinx cinerea* is smaller (up to 4 cm) and has a short open canal. Can also be confused with native sting winkle, *Ocenebra erinaceus* (3,4). Generally, shells of *O. inornatus* are more robust, with coarser ornamentation, and ribs are more prominent and angulated around the shoulder than in *O. erinaceus*. *O. erinaceus* may reach 48 mm and the yellowish or white shell is rough with uneven sculpturing.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Ruby Bryozoan (*Bugula neritina*)

An erect bryozoan

Description: A bushy, red-brown, golden-brown or violet, flexible growth resembling a finely branched red seaweed, up to 8 cm long. In fact a colony of small (0.8 mm) externally simple individuals (each of which can extend a crown of tentacles) arranged in a double row along each branch.

Habitat: Attached to solid surfaces in shallow water, especially in harbours and marinas.

Seasonal changes: Mostly dies back in winter and re-grows in spring.

Key features

Red-brown colony, branches made up of tiny individuals in two rows

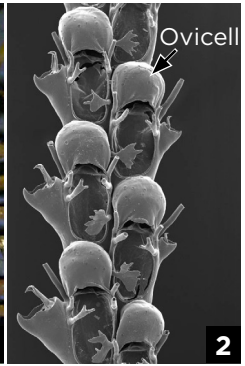
Brood chambers

Distinguished by: Presence of discrete mm-scale individual units (readily extending delicate tentacles underwater when freshly collected) separates from red seaweed. Relatively distinct from other species of Bugulidae in region, in having: individuals of only one type, lacking spines; minute, globular, whitish brood chambers that are offset from midline of individual bearing them.

Images: John Bishop.

Tufty-buff Bryozoan (*Tricellaria inopinata*)

An erect bryozoan

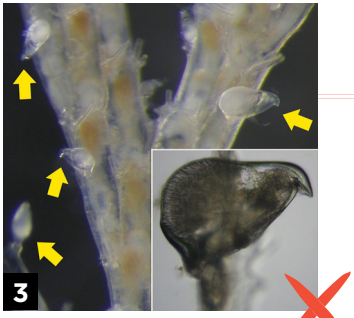


Description: Buff-brown, flexible, densely branched colony growing as a tuft 1-4 cm in height. Often accumulates silt. Branches (image 2) with two series of individuals.

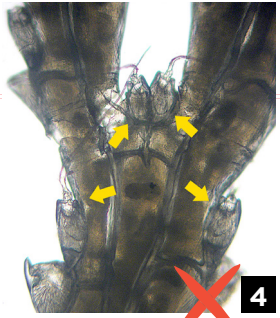
Habitat: Attached to solid surfaces in shallow water, especially in harbours and marinas, some natural shores. Extremely common on props and keels of yachts, also found on kelps and *Sargassum muticum*. Populations can be very dense.

Seasonal changes: Present year-round.

Key features



Bird's-head avicularia (arrowed and inset) in *Bugulina*



Vibracula (arrowed) in *Scrupocellaria*

Similar to: Microscopic examination required. *Scrupocellaria* and other related genera mostly have hair-like vibracula that are absent in *Tricellaria*. *Bugulina* species have articulated birds-head avicularia and some *Bugulina* have wider branches with more than two series of individuals. In *T. inopinata*, ovicells have small, round pores (not in *Bugulina*); often also a distinctive bifid spine, on outer side of individual, adjacent to ovicell (2).

Images: 1,3,4 John Bishop; 2 Anna Yunnie/John Bishop. For further information visit the non-native species information portal *www.nonnativespecies.org*

Red Ripple Bryozoan (*Watersipora subatra*) An encrusting bryozoan

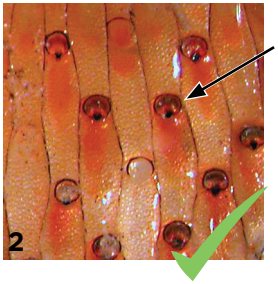
Description: Rigid but fragile encrusting colonies, up to several cm across, of 1 mm individuals arranged as a sheet, often forming rounded lobes, sometimes with erect portions formed by back-to-back growth. Colonies orange-red, especially at growing edges, sometimes dark sepia, blackish or deep purple. Individuals elongate, each with rounded, darker spot (the operculum) at far end; no avicularia or ovicells.

Habitat: Attached to solid surfaces in shallow water, especially in harbours and marinas.

Seasonal changes: Present year-round.

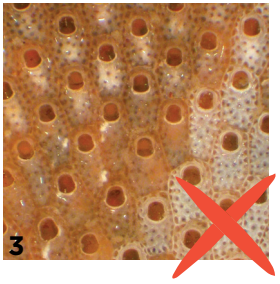
Formerly known as: *W. subtorquata*.

Key features



Elongate individuals with rounded, blackish operculum

Cryptosula pallasiana



Similar to: A suite of very similar invasive *Watersipora* species worldwide. *W. subatra* is only non-native member thought to occur in Britain. Other orange encrusting bryozoans (e.g. *Cryptosula pallasiana*, *Oshurkovia littoralis*) have individuals less elongate, operculum not blackish.

Images: 1 Richard Lord; 2,3 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

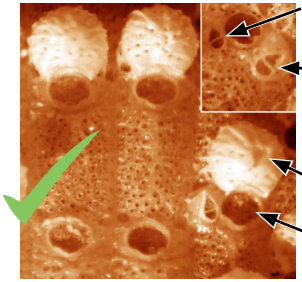
Orange Ripple Bryozoan (*Schizoporella japonica*) Encrusting bryozoan

Description: Rigid but fragile encrusting colonies, up to several cm across, of 0.75 mm individuals arranged as a sheet, often forming rounded lobes, sometimes with erect portions formed by back-to-back growth. Colonies bright orange. Individuals rectangular or polygonal.

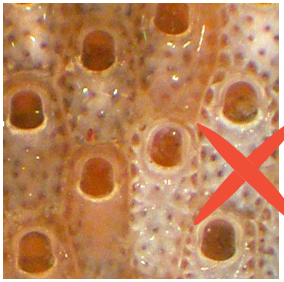
Habitat: Attached to solid surfaces in shallow water, especially in harbours and marinas.

Seasonal changes: Present year-round.

Key features



Cryptosula pallasiana



Similar to: Many other orange encrusting bryozoans. *Cryptosula pallasiana*, common in marinas, has bell-shaped orifice, less intense colour, and lacks ovicells and avicularia of *Schizoporella*. Also see *Watersipora subatra*. Other *Schizoporella* species share many features with *S. japonica*; separation may require expert advice.

Images: John Bishop.

Darwin's Barnacle (*Austrominius modestus*)

A barnacle

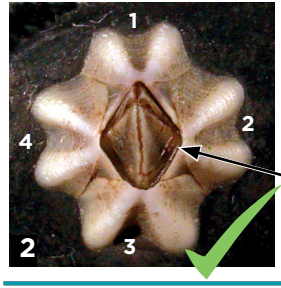
Description: A small white barnacle (to 10 mm diameter) with only four outer shell plates. Body low-conical, surmounted by large, diamond-shaped opening. Outer shell plates smooth when young but later gaining vertical ridges that produce an irregular outline. Dark wedges on larger pair of central moveable plates (scutal plates).

Habitat: Grows on hard surfaces: rocks, shells, other crustaceans and artificial structures including ships. Common intertidally on rocky shores. Tolerant of turbidity and less salty water, hence particularly common in estuaries. Also on open coasts but rarer in areas of strong wave action.

Seasonal changes: Commonly lives 3-4 years; adults thus found all year. Reproduction year-round in southern areas but concentrated in summer months and early autumn. New recruits common from June to September.

Formerly known as: *Elminius modestus*.

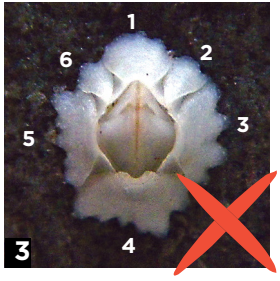
Key features



A. modestus
4 shell plates

S. balanoides
6 shell plates

Diamond-shaped opercular opening



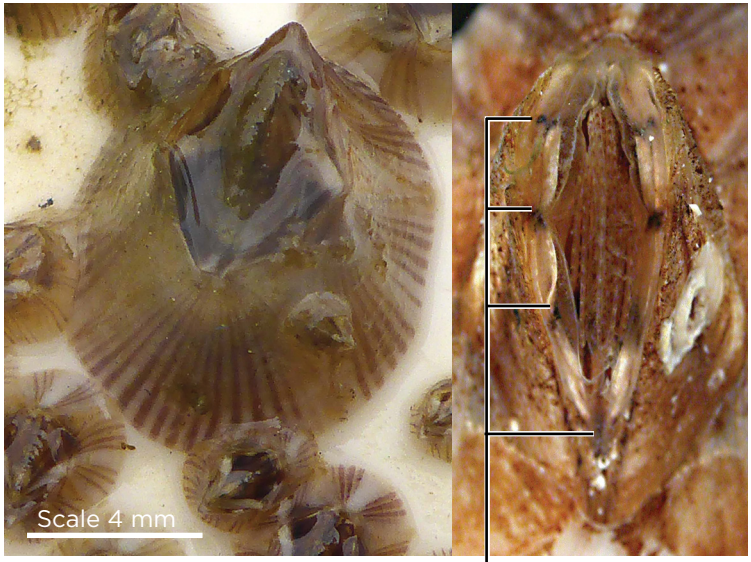
Similar to: *Semibalanus balanoides*, which also has diamond-shaped opening, and some shallow sublittoral species such as *Balanus crenatus*. *A. modestus* can be positively identified by only having four outer shell plates, other species having six.

Images: 1 Nova Mieszkowska; 2,3 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Striped Barnacle (*Amphibalanus amphitrite*)

A barnacle

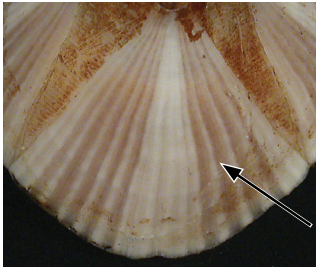


Description: A white or pinkish barnacle growing to 10 mm diameter or more (illustrated specimen 10 mm). Body low-conical, surmounted by large diamond-shaped opening. Six outer shell plates relatively smooth, bearing groups of purple or pink stripes tapering from the base. Four dark bands cross tissue flaps bordering the opening.

Habitat: A warm-water species, widespread in tropics growing on diverse hard substrata on the shore and in coastal waters and estuaries, and a common fouling species.

Seasonal changes: Present all year. Reproductive spring to early autumn.

Key features



Four dark bands crossing tissue flap bordering the opening

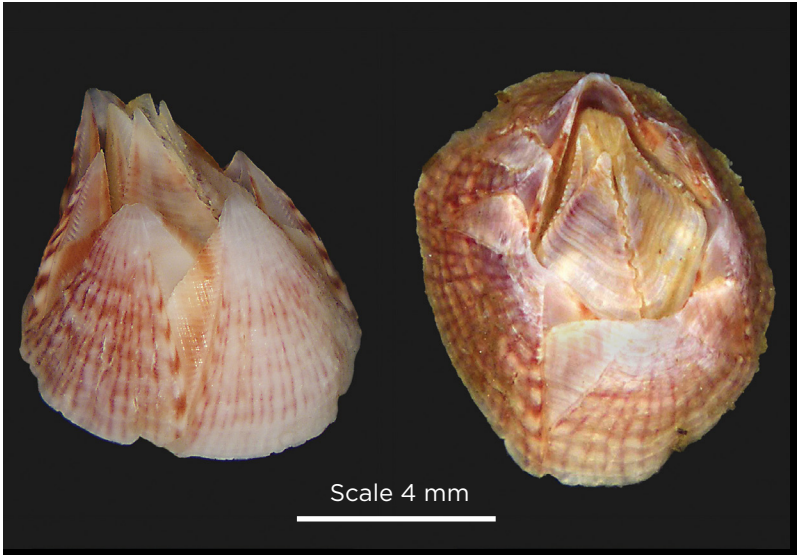
Stripes on outer shell plates

Similar to: Other six-plated barnacles with roughly diamond-shaped openings, including *Semibalanus balanoides* and *Balanus crenatus*. *A. amphitrite* identified by stripes on outer shell plates and four dark bands on tissue bordering shell opening. *Perforatus perforatus* (see *Hesperibalanus fallax* page) can be pinkish but has a much smaller opening, and hooked tips to smaller pair of moveable plates (tergal plates).

Images: John Bishop.

Rosy Hitcher Barnacle (*Hesperibalanus fallax*)

A barnacle



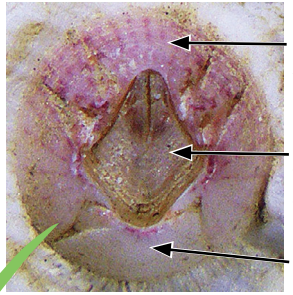
Description: Six-plated barnacle up to 12 mm diameter, but typically smaller, with relatively large opercular opening. Fixed plates with thin vertical pink or red streaks, sometimes intersected by horizontal streaks of same colour; colouration often weaker on lower end of shell (i.e. on rostrum and rostro-lateral plates).

Habitat: A warm-water species typically on small, often potentially mobile, synthetic and biological substrates: marine litter, discarded nets and pots, leisure craft, crabs, queen scallops, whelk shells used by hermit crabs, kelp holdfasts and pink sea-fans.

Seasonal changes: A summer/autumn breeder, larval settlement peaking September-November. Short-lived, probably mostly annual.

Formerly known as: *Solidobalanus fallax.*

Key features



Perforatus perforatus

Similar to: The stripes of *Amphibalanus amphitrite* (previous page) are tapering and much neater. The pink-red colouration of *Balanus spongicola* is more diffuse, but similarly decreases towards the rostral half of the shell. *Perforatus perforatus* (Volcano Barnacle) can be pale pink with narrow darker lines. The last two species are both more conical than *H. fallax,* with a smaller opercular opening.

Images: John Bishop.

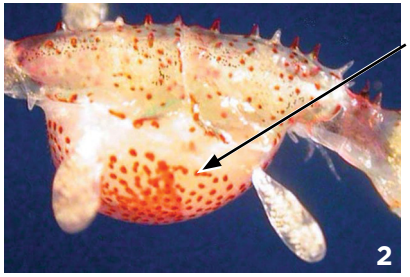
Japanese Skeleton Shrimp (*Caprella mutica*) An amphipod crustacean

Description: A very slender, reddish, shrimp-like animal which moves with a looping, inchworm gait. Males up to 45 mm long, with two elongated body segments behind the head, the hindmost of which has a pair of large grasping appendages. Females smaller (to 15 mm), without conspicuously elongated segments or enlarged appendages, but with pronounced red-spotted brood pouch on underside. Both sexes have spines along back.

Habitat: In harbours and marinas, amongst fouling growth on pontoons, yacht hulls etc.; on mooring ropes and nets in aquaculture facilities; on mussel or tube-worm reefs.

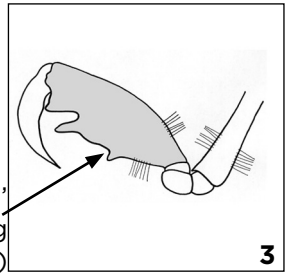
Seasonal changes: Abundant late spring to early autumn, rare in winter.

Key features



Red-spotted brood chamber (♀), and spines on back

Shape of 'palm' of grasping appendage (♂)

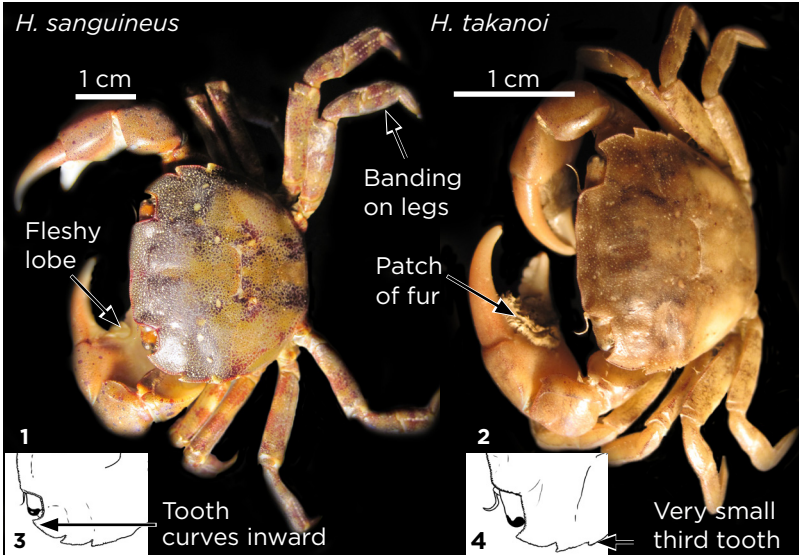


Similar to: Related species share similar basic body form. Reddish colouration, spines along back and large size (especially males) suggest this species; shape of 'palm' of grasping appendage of male is diagnostic. This appendage and first two body segments are covered in fine hairs in males.

Images: 1 Thom Nickell; 2,3 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Asian Shore Crab & Brush-clawed Crab (*Hemigrapsus sanguineus & H. takanoi*)

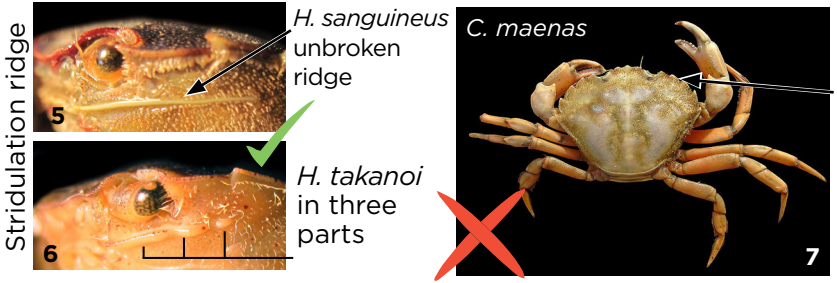


Description: Compact crabs with 3 teeth on either side of a squarish body. Shell margin between well-spaced eyes smooth. Maximum carapace width: *H.s.* 4.5 cm, *H.t.* 2.5 cm. Pincers of male at base of 'thumb': *H.s.* with fleshy lobe, *H.t.* with small patch of 'fur'. *H.s.* has clearly banded legs and purple-red spots on claws. Note also discontinuous stridulation ridge below eye of *H.t.* (continuous in *H.s.*), and differences in shape of teeth (see diagrams).

Habitat: *H.s.*: Estuarine and marine, intertidal or shallow subtidal. Typically more exposed rocky shores but also soft sediments under rocks or shells, artificial structures, mussel beds and oyster reefs. *H.t.*: Low energy, sheltered sites, intertidal mudflats, estuaries, harbours, lagoons and sheltered bays. Found under boulders and other solid structures.

Also known as: *H.s.* Japanese Shore Crab.

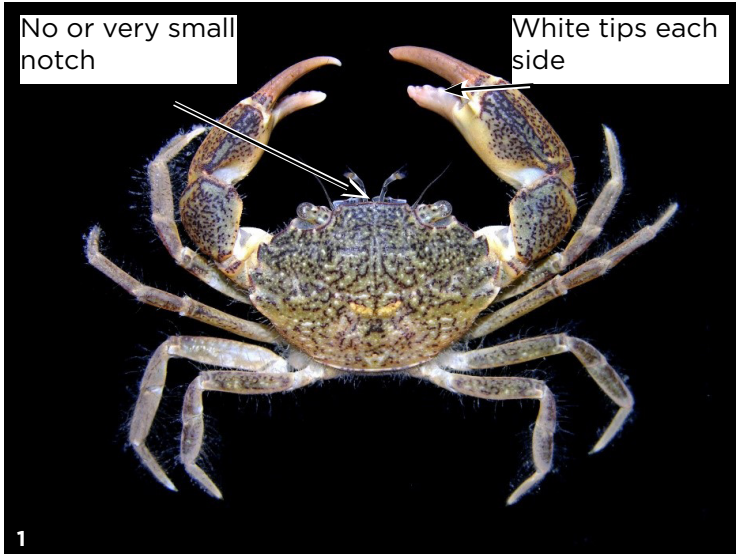
Key features



Distinguished by: Squarish body, three teeth behind each eye, smooth margin between eyes. Native shore crab *Carcinus maenas* has five teeth behind each eye and three blunt teeth between the eyes; body narrows distinctly to the rear.

Harris Mud Crab (*Rhithropanopeus harrisii*)

A crab



Description: A small, brown to olive green crab with a maximum carapace width of 26 mm and has four teeth (spines) on each side. Sometimes has dark spots on carapace. The four pairs of walking legs are long, slender, and hairy. One claw is always larger, and both have white tips. Almost smooth anterior margin of the carapace, i.e., the margin between the eyes has no or a very indistinct median notch.

Habitat: Can tolerate a wide range of salinities but prefers brackish water of estuaries and lagoons. Commonly inhabits shallow subtidal waters with muddy/sandy substrate, oyster reefs, shoreline vegetation and debris among which it can hide. Recorded to 37 m depth.

Also known as: Dwarf crab.

Key features

Similar to: Native shore crab *Carcinus maenas* (2) which has five teeth behind each eye and three blunt teeth between the eyes. Invasive crabs *Hemigrapsus sanguineus* and *H. takanoi* differ in that they have a squarish body with three teeth on each side. *R. harrisii* has white tips on claws, no/ indistinct notch between eyes and four teeth on either side of body.

Images: 1 Arthur Anker, 2 Ondřej Radosta
https://www.crabdatabase.info/en

For further information visit the non-native species information portal *www.nonnativespecies.org*

Red King Crab (*Paralithodes camtschaticus*)

A crab


1

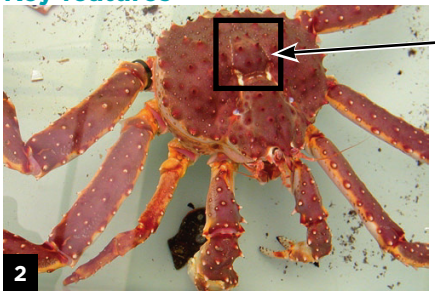
Description: Very large, long-legged crab which can grow up to 220 cm and weigh over 10 kg. Red to purple in colour, exoskeleton strongly calcified and covered in short spines. Right pincer usually larger than the left. Three pairs of walking legs, which are longer than the pincers. The fifth (posterior) pair of limbs is reduced and usually hidden in the gill chamber. Central posterior plate of the carapace has three pairs of spines.

Habitat: Adults found on sandy and muddy substrates in deep water (300 m). Juveniles use shallower areas of more complex substrate.

Seasonal changes: Shoreward migration in winter and early spring.

Formerly known as: *Maja camtschatica.*

Key features



2

Similar to: The Northern stone crab, *Lithodes maja* although this species weighs less than 2 kg, and the carapace is spinier than that of *P. camtschaticus.* In *P. camtschaticus*, the central posterior plate of the carapace has three pairs of spines compared to other *Paralithodes* species which only have two.

Images: 1 Ondřej Radosta, https://www.crabdatabase.info/en ; 2 Lis Lindal Jørgensen

Say's Mud Crab (*Dyspanopeus sayi*)

A crab

Description: Stocky crab with short, robust walking legs and large, unequally sized claws. Carapace is dark brown/ grey/ olive green, with a light cream underside, width to 3 cm. Frontal region is smooth and slightly arched. Four teeth on each side of carapace, the anterior tooth is wide and slightly concave. Chelipeds (pair of legs bearing claws) are cream/ orange on the underside, dark brown/ speckled on the upper, and have darker brown/ black tips. Shell has a light covering of hair, especially to front and sides.

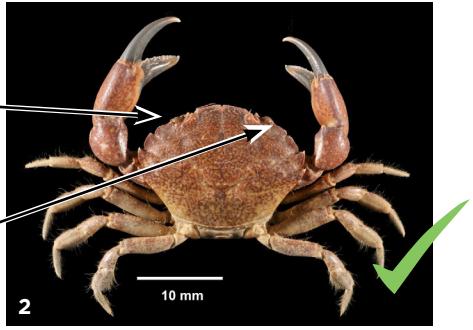
Habitat: Mid to lower estuaries and shallow coastal seas, predominantly on muddy substrates. Hides among complex biogenic habitats such as bivalve reefs. Able to tolerate a wide range of salinity and temperature.

Formerly known as: *Panopeus sayi.*

Key features

Four teeth on each side

Wide, concave anterior tooth each side



Characteristic black lobe on lower pincer

Images: Eric A. Lazo-Wasem

For further information visit the non-native species information portal *www.nonnativespecies.org*

Chinese Mitten Crab (*Eriocheir sinensis*)

A crab

Scale 2 cm

Description: Grey-green to dark brown crab with long walking legs, an approximately hexagonal body up to 75 mm across, and dense brown 'fur' on the white-tipped claws. Four teeth and deep central notch between the eyes and four large teeth behind each eye.

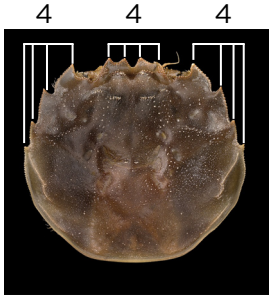
Habitat: Rivers and estuaries, occurring from the shore to depths of about 10 m.

Seasonal changes: Late summer/autumn migration down rivers to gather in estuaries to breed; over winter, females remain in lower estuary carrying developing eggs which hatch in spring; juveniles migrate back up river.

Key features

Dense 'fur' on claws

4+4+4 pattern of teeth at front of body



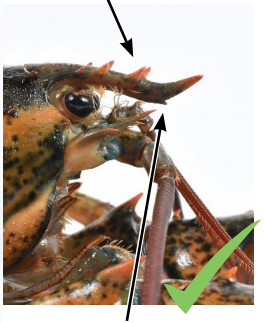
Distinguished by: Conspicuous 'fur' on claws; near-hexagonal body shape (thus narrowing slightly towards front); 4+4+4 pattern of teeth around front end of body.

Images: Phil Crabb/Natural History Museum.

For further information visit the non-native species information portal *www.nonnativespecies.org*

American Lobster (*Homarus americanus*)

A Lobster

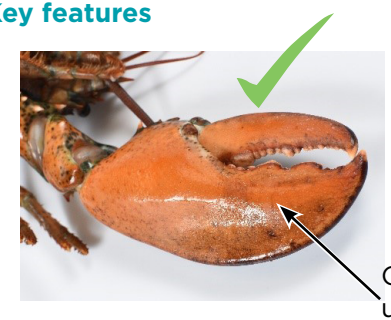


Description: A large, clawed lobster up to 64 cm in length and around 2 kg in weight with a green/ brown body colour although several colour morphs observed. Walking legs have a green tinge to them while the claws, spine tips and underside are red/brown in colour. Characteristic small tooth on the ventral margin of the rostrum which is often used to distinguish it from the European lobster (*H. gammarus*), however, the latter does also occasionally have this tooth.

Habitat: Can be found in coastal, intertidal, and littoral areas including littoral mud flats as well as brackish estuaries. Generally inhabits rocky and hard mud coastal habitats at depths of 10 - 50 m.

Seasonal changes: Present year-round.

Key features

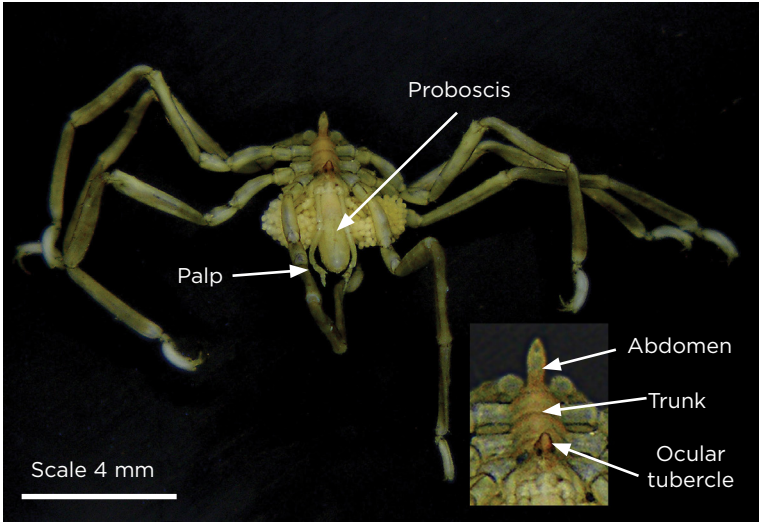


Homarus gammarus

Similar to: Often difficult to tell the difference between a *H. americanus* and the native *H. gammarus*, particularly if *H. americanus* and *H. gammarus* have bred to produce a hybrid. *H. gammarus* is smaller, has coalescing spots on a blueish carapace with a yellowish/ cream underside, spines are tipped white and there is no ventral tooth.

Japanese Sea Spider (*Ammothea hilgendorfi*)

A sea spider

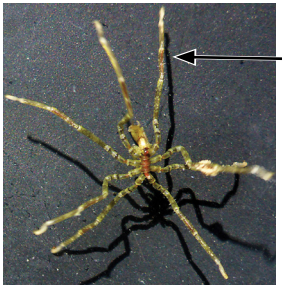


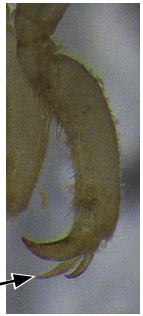
Description: Fairly slender sea spider, leg-span about 20mm. Legs colour-banded, generally including green and brown blocks. Proboscis is a bulging cylinder that can be as long as trunk, flanked by slender nine-segmented palps. Chelifores (anterior appendages) reduced in later growth stages to pair of inconspicuous tubercles above base of proboscis. Main image shows preserved male carrying eggs.

Habitat: Shallow coastal species (0 to 30 m) encountered on lower shore under boulders and amongst branching growths of hydroids (especially), bryozoans and algae, and similar growths on pontoons, fenders etc.

Seasonal changes: Reproductive individuals have been noted in mid-July and early September in NW Europe and in January to April in S. California, USA.

Key features



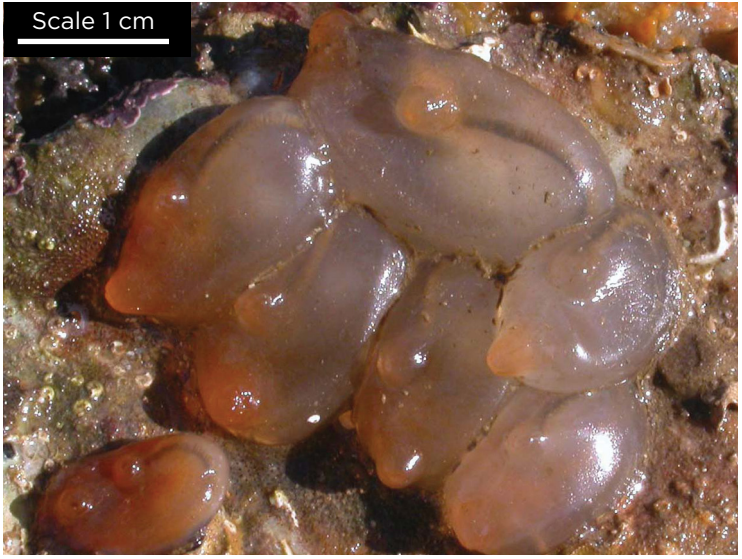


Distinguished by: Banded leg colouration (in live specimens) and general lack of tubercles on dorsal and lateral surfaces (except for the trunk's anterior ocular tubercle and posterior abdomen, typical of sea spiders). In combination, the presence of pair of palps but lack of (functional) chelifores in adult stages rules out many other sea spider species, as does presence of two auxiliary claws, at least half length of main claw, on walking legs.

Images: John Bishop.

Orange-tipped Sea Squirt (*Corella eumyota*)

A sea squirt

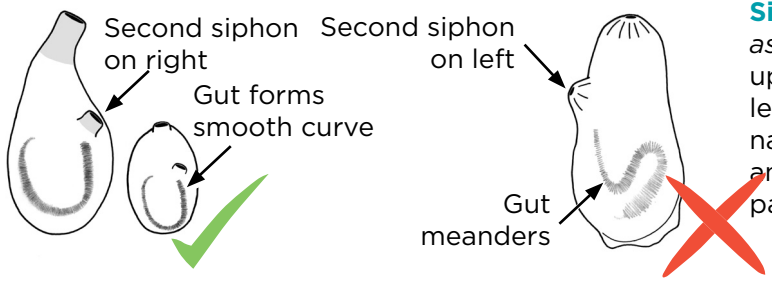


Description: A smooth, slightly translucent sea squirt up to 8 cm, generally laying flat; one siphon at free end and second on upper surface and slightly to right. Siphons vary from very short to longer and parallel-sided, and frequently have an orange tinge; do not close tightly. Some individuals are entirely off-white or orange. Silt-filled gut forms anticlockwise spiral giving smooth curve around hind end.

Habitat: Attached to solid surfaces in harbours and marinas, also on natural surfaces low on sheltered shores. (In S. Hemisphere, also occurs at depth.)

Seasonal changes: Present year-round, reproduction peaks in summer (SW England).

Key features



Similar to: Confusion possible with *Ascidiella aspersa* (often co-occur), which is generally more upright and less smooth, with second siphon on left; siphons close tightly; gut meanders. Nearest native relative, *Corella parallelogramma*, is upright and transparent (often with internal pigment patches).

Images: John Bishop.

Compass Sea Squirt (*Asterocarpa humilis*)

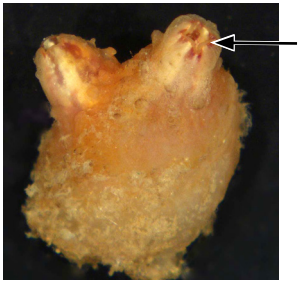
A sea squirt

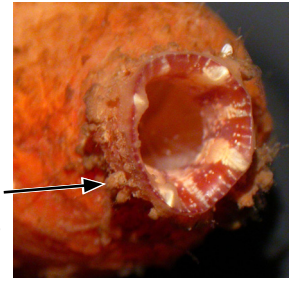
Description: Orange-red sea squirt up to 4 cm across, generally attached by broad base; one siphon at extreme end and second on upper surface a variable distance behind it; siphons and adjacent surface often bear numerous small warts. Siphons widely flared in undisturbed animal underwater, with cream/white markings, resembling divisions on face of a compass, on reddish background.

Habitat: Attached to solid surfaces in harbours and marinas, also in shellfish farms. Occasionally in natural habitats.

Seasonal changes: Present year-round; reproduction year-round.

Key features





Distinguished by: Distinctive overall colouration and siphon stripes (still discernible as parallel markings on half-closed siphons, but not when fully closed); siphon stripes occur in some other species but differ in detail. Outer surface of siphons and adjacent body surface often warty.

Images: John Bishop.

Leathery Sea Squirt (*Styela clava*)

A sea squirt

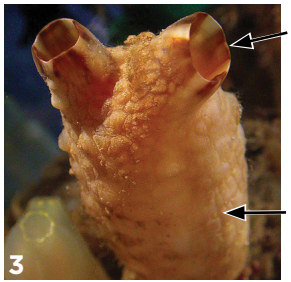
Description: A brown sea squirt up to 20 cm tall, attached by a narrow stalk (undeveloped when very small) and with two siphons close together at the free end. The surface is tough and leathery, with folds and swellings. The siphons have dark brown stripes on the inside.

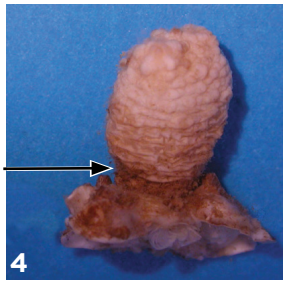
Habitat: Attached to solid surfaces in shallow water, especially in harbours and marinas but also on wrecks and natural rock bottoms. Often encrusted with other organisms.

Seasonal changes: Present year-round, spawns in autumn.

Also known as: Club or Clubbed Sea Squirt.

Key features





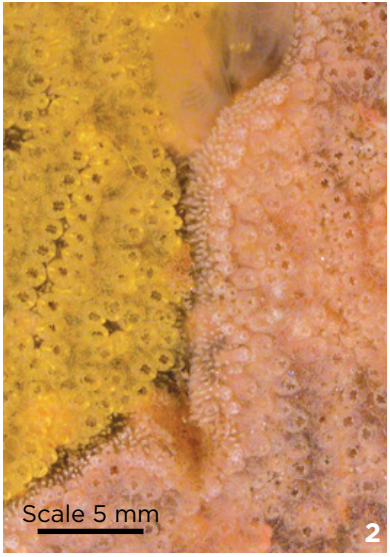
Distinguished by: No other large sea squirt in the region has a stalk, and the long, thin shape is distinctive.

Images: 1 Christine Beveridge; 2,3,4 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Orange Cloak Sea Squirt (*Botrylloides violaceus*)

A sea squirt

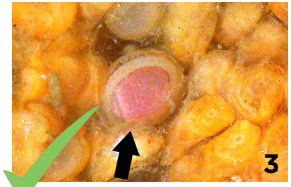


Description: Colonies form firm gelatinous sheets or cushions, with individuals arranged in oval groups and short rows embedded in colony matrix. Each colony a single colour: bright orange, violet, brick red, pink or yellow (image 2 shows two colonies touching). Large, pink or purple embryos brooded sub-surface; very large larva (body about 1.3 mm, plus tail) released.

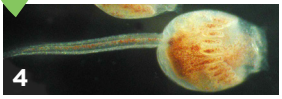
Habitat: Shallow water in harbours and marinas; intertidal on seaweeds etc. on sheltered shores.

Seasonal changes: Dies back in winter, produces larvae in summer and autumn.

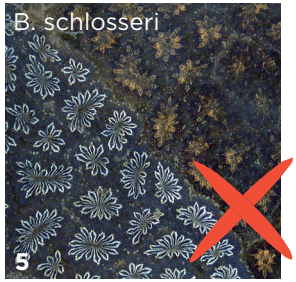
Key features



Brooded larva (arrowed) at colony surface



Tadpole larva



Similar to: Related species (family Botryllidae), which generally incorporate contrasting colours, giving marked pattern, unlike *B. violaceus*. Among these, the native *Botryllus schlosseri* has flower-like radiating groups of individuals (so that all zooids touch central exhalent orifice). Due to possible confusion with *B. diegensis* identification should only be confirmed if the large pink-purple larvae are seen.

Images: 1 Judith Oakley; 2,3,5 John Bishop; 4 Lin Baldock.

For further information visit the non-native species information portal *www.nonnativespecies.org*

San Diego Sea Squirt (*Botrylloides diegensis*)

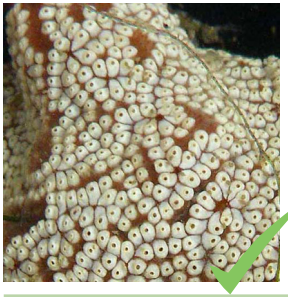
A sea squirt

Description: Colonies form firm gelatinous sheets or cushions, with individuals embedded in meandering rows in colony matrix. Each colony can be a single colour (commonly orange), thereby resembling *B. violaceus*, or (illustrated forms) each inhalant orifice can be surrounded by a discrete, circular or drop-shaped patch of solid orange, white or yellow, which contrasts strongly with darker colony background. Inconspicuous embryos brooded within colony; larva not conspicuously large (trunk about 0.5 mm, plus tail; cf. *B. violaceus*).

Habitat: Shallow water in harbours and marinas, and on sheltered shores.

Seasonal changes: Dies back in winter, produces larvae in summer and autumn.

Key features



B. diegensis, white-spotted form

B. leachii (2-colour & single-colour forms)

Similar to: Native species *Botrylloides leachii*, which can also have colour pattern highlighting the component individuals (zooids) of the colony, but not involving blobs of solid colour as in *B. diegensis. B leachii* colonies can also be single colour (in which case, resemble *B. violaceus* and some *B. diegensis*), but colony typically 'spacious', with clear spaces occupied only by tunic, and zooids generally arranged in long, double 'zipper' rows in at least some parts.

Images: John Bishop.

Carpet Sea Squirt (*Didemnum vexillum*)

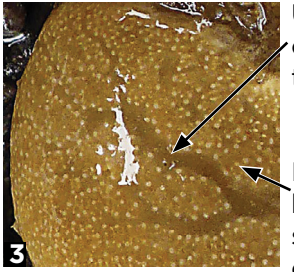
A sea squirt

Description: Pale orange, cream or off-white colonies, lacking brown or black pigment, and forming extensive, thin (2-5 mm) sheets; can form long, pendulous outgrowths (see image 2). Firm, leathery texture and veined or marbled appearance. Numerous small pores close when disturbed to produce tiny whitish spots; larger water exits occur at intervals.

Habitat: Shallow water in harbours and marinas but also in natural habitats, and potentially in deeper water. Intertidal in N Kent, Solent and Ireland (oyster tressles). Often overgrows other attached organisms.

Seasonal changes: Dies back in harsh winters, produces larvae in summer and autumn.

Key features



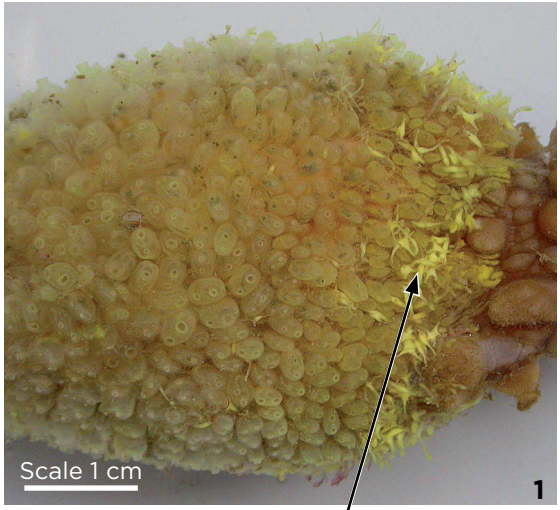
Similar to: Several close relatives (family Didemnidae) occur in region; also resembles some sponges. Definite identification requires microscope, but note firm texture, almost uniform colour with channels of darker tone separating clusters of 10 or more tiny individuals, each marked by minute whitish spot when closed out of water.

Images: 1 Fiona Crouch; 2 USGS/WHOI; 3 John Bishop.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Creeping Sea Squirt (*Perophora japonica*)

A sea squirt

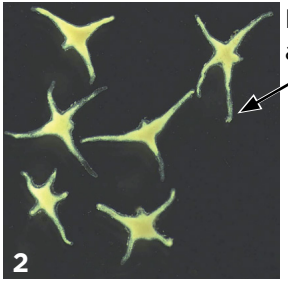


Description: Forms patches of small (about 4 mm), semi-transparent, globular individuals linked by creeping root-like stolons. Each individual has a very short stalk connecting it to the stolon, and two minute siphons. Colony tinged greenish-yellow, especially in younger parts; in summer and autumn the stolons bear clumps of bright yellow, angular, star-shaped buds.

Habitat: Attached to solid surfaces in shallow water, in harbours and marinas but more commonly in natural habitats. Often grows on other attached organisms (e.g. seaweed, larger sea squirts).

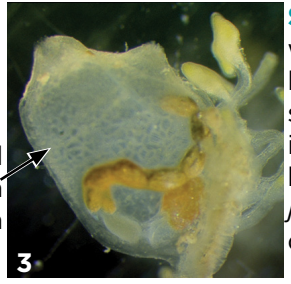
Seasonal changes: Dies back in winter, produces larvae and yellow buds in summer and autumn.

Key features



Bright yellow, angular buds

Single zooid at high magnification



Similar to: The native species *Perophora listeri*, which lacks the greenish-yellow tinge and has longer stalks connecting the individuals to the stolon, so they flop over out of water, whereas individuals of *P. japonica* remain upright. The bright yellow angular buds are only seen in *P. japonica.* These break off and re-attach after dispersal to form new colonies.

Images 1,2 John Bishop; 3 Dorothea Sommerfeldt.

For further information visit the non-native species information portal *www.nonnativespecies.org*

Sources and vectors of marine non-native species:

- Commercial shipping (ballast water and hull fouling)
- Commercial movement of shellfish
- Movement of service barges and pontoons
- Movement of recreational vessels
- Release of aquarium species
- Transport of angling bait
- Importation of research material

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How to report a marine non-native species:
If you can, take a photo and note of the location and report to one of the following:

- iRecord online - Enter non-native species records - iRecord
- iRecord App - iRecord App – Apps on Google Play
- LERC Wales App - LERC Wales – Apps on Google Play
- iNaturalist online - Enter non-native species records - iNaturalist
- iNaturalist App - iNaturalist – Apps on Google Play

Cyfoeth Naturiol Cymru
Natural Resources Wales

UNDEB EWROPEAIDD
EUROPEAN UNION
Llywodraeth Cymru
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THE MARINE BIOLOGICAL ASSOCIATION
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For further information visit the non-native species information portal
www.nonnativespecies.org