Biosecurity New Zealand
Ministry for Primary Industries
Manatū Ahu Matua

New Zealand Marine Pest ID Guide

February 2024

Ko Tātou This Is Us

CONTENTS

Report suspected marine pests or diseases online report.mpi.govt.nz/pest/
or call 0800 80 99 66

INTRODUCTION

This guide describes some of the marine pest species that have recently arrived in New Zealand, as well as some of the worst global marine pests that Biosecurity New Zealand is trying to keep out. This guide also includes information on diseases of fish, shellfish and crustaceans and what to do if you suspect a disease.

Since 2005 we have found more than 360 introduced (non-native) species, of which about half now have an established population or populations in New Zealand. These can have negative impacts on our fisheries, the environment, the aquaculture industry and be a considerable nuisance to a wide range of recreational or customary users and marine industries. Introduced species can also harbour new diseases and parasites.

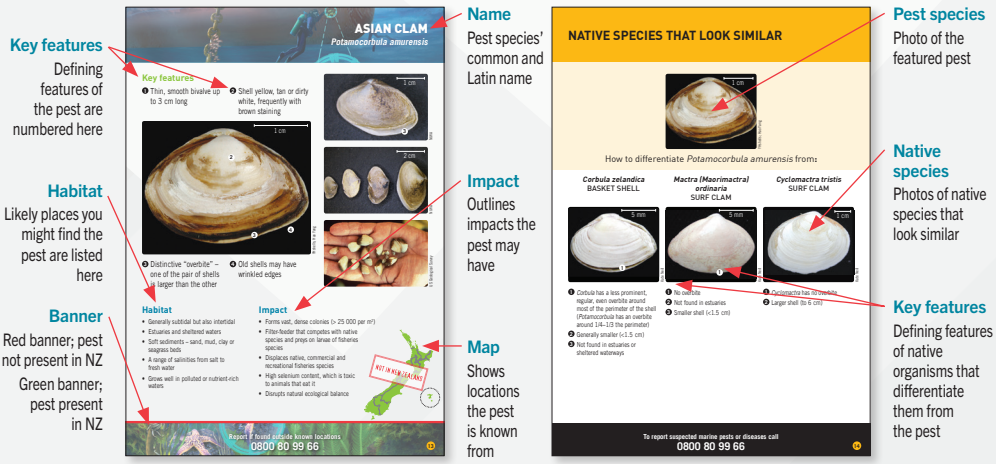
How to use this guide

Each page of this guide has information on the main marine pests of concern and is ordered alphabetically by taxonomic group. Pages with species that are established in some parts of New Zealand are green. Pages with species that have caused problems overseas and which we are actively trying to keep out are red.

Note: Distribution as depicted in the maps is accurate as of the time of printing and should be used as a guide only. If you want more information on the updated distribution of these species visit the marine biosecurity porthole, www.marinebiosecurity.org.nz.

For each species, key features and the habitat where it is likely to be found are outlined and some of its impacts are described. Native species that look similar are shown, with key distinguishing features labelled to assist with field identification.

Diseases in fish and shellfish are just as important as pests, but are harder to detect and diagnose, so information on diseases in fish and fish kills can be found in the first section of this guide.



INTRODUCTION

How you can help: be our underwater eyes

If you see anything out of the ordinary including unusual marine plants and animals, or unusual numbers of dead fish or aquatic life, call 0800 80 99 66 or report online at report.mpi. govt/nz/pest/.

If you come across a suspect non-native marine plant or animal outside of its known range (as shown on the maps in this guide), or a large number of dead or diseased fish or shellfish:

1. **Take a photo**
2. **Collect a sample**
3. **Record location and landmarks**
4. **Call 0800 80 99 66 or go to report.mpi.govt.nz/pest/ to report a find**

Remember, don't spread or introduce marine pests or diseases:

- Check, clean and dry any equipment (e.g. pots, nets, fishing or diving gear) before moving to a new location, to ensure it is free of marine life. Use fresh water and detergent or soak in a 2% bleach solution for 30 minutes. Additionally, dry your equipment then leave it for >48 hours before using it in a different area, this is especially important for equipment that is difficult to dry (e.g. diving gear).
- Inspect and clean your boat's hull, niche areas and other places that retain water before moving to a new location. This includes anchor wells, livebait wells, bilges, ballast tanks, etc. Remove any marine life contained within these areas and dispose of them to landfill.
- Seafood waste, offal and bait from non-local sources can transfer pests and diseases, so dispose of them thoughtfully. A land-based rubbish bin is best.
- Regularly apply antifouling paint to your moored vessel's hull.
- Use this guide to make yourself aware of pests that are likely to occur in your area, and ensure you don't spread these further.
- If disposing of aquarium plants, animals or other materials, treat them as a biosecurity risk. Ideally dispose of them to landfill.

DISEASES OF FISH, CRUSTACEANS AND SHELLFISH

Impact

Diseases can cause fish, crustacean and shellfish stock collapses, which in turn can affect the entire ecosystem. Stock collapses can have severe effects on commercial, cultural and recreational fisheries and diseases may also be of concern to human health.

Mass mortality events

Mass mortality events involve the death of an unusually large number of organisms. A mass mortality is usually unexpected and there may be a number of species involved (including but not limited to fish, invertebrates and marine plants, including farmed or wild species). A mass mortality of commercially or recreationally valuable species is often known as a "fish kill", and it is this type of event that is of particular concern. If you see a fish kill, please call 0800 80 99 66 as soon as possible.

The following information is useful when investigating a fish kill and should be recorded whenever possible:

- Date and time of the event
- When animals were collected
- Location and size of the fish kill
- Species and number of individuals affected (photos are often useful)
- Abnormal behaviour of animals
- Abnormal environmental conditions (e.g. river flooded, algal bloom present, unusually high temperature)
- Condition of the animals when found (e.g. near death, dead, decomposing)
- Any lesions or other marks on animals

DISEASES OF FISH

Key diagnostic features

A fish kill may be obvious: a large number of a single species of fish dead or dying, over a wide area. Fish respond to diseases in a fairly consistent way. The signs of disease may be subtle, but more obvious indications of disease may be behavioural or visible on the organism itself.

External signs:

- Obvious lesions on the fish (ulcers, loss of fins, strange lumps or growths, red streaks or spots)
- Reddening at the base of the fins or in the eyes
- Bulging eyes
- Gills swollen or covered in mucus
- Fish fat or bloated
- Rash on the body

Behavioural signs:

- Fish displaying abnormal swimming behaviour (lethargy, swimming in circles)
- Gasping for air, especially near surface (open mouth)
- Quick spinning movements and/or scratching or rubbing against objects

Some examples of diseased fish

Chris Speirs

A snapper with redding beneath the skin on its underbelly, in this case caused by a common opportunistic bacterium.

Cara Brosnahan

A wild-caught rainbow trout with unusual skin discolouration as may be observed in a diseased fish

DISEASES OF CRUSTACEANS

Key diagnostic features

Mass mortality of crustaceans may be obvious: large number of dead individuals of a single species washed up on the beach, or recently dead or dying over a wide area in the water. Signs of disease in crustaceans can be subtle and in many circumstances present as abnormal behaviour.

External signs:

- Wasting away of muscle tissue – atrophy
- Opaque abdominal muscles
- Soft shell
- Visible spots or lesions within shell or tissue

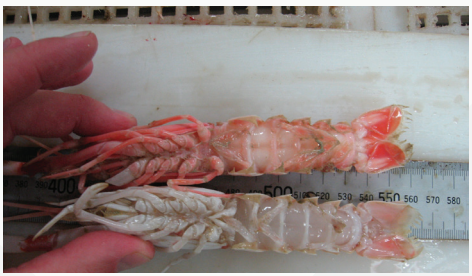
Behavioural signs:

- Reduced feeding and movement
- Increased growth of organisms (fouling) on shell and gills
- Erratic swimming

Example of diseased crustaceans

Grant Stentiford CEFAS

Infected scampi (top) has different shell pigmentation and body tissue is more opaque compared to the uninfected scampi (bottom).



Grant Stentiford CEFAS

Viewing the underside of the scampi also highlights the differences between infected (top) and uninfected (bottom) individuals.

DISEASES OF SHELLFISH

Key diagnostic features

A mass mortality may be obvious: a large number of a single species of recently dead shellfish washed up on the beach, or recently dead or dying over a wide area in the water. Except in cases of mass mortality, signs of disease are usually more subtle.

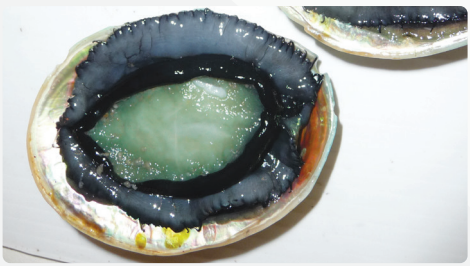
External signs:

- Shellfish such as paua may be retracting from the shell with the edges of the mantle curling away
- There may be visible pustules, lesions or hard nodules present
- Shellfish may look watery or in poor condition
- Bivalves may not be able to stay shut
- Excess mucus production may be evident

Behavioural signs:

- Shellfish such as paua may not be able to stay attached to substrate
- Shellfish such as paua may not be able to right themselves when turned upside down
- Bivalves may be gaping or slow to react when touched

Some examples of diseased shellfish



Paua retracting its mantle away from its shell.

Watery, sick-looking oyster.

Anjali Pande, Biosecurity New Zealand

Shucked paua with nodules associated with *Perkinsus*.

Watery, sick-looking scallops infected with several pathogenic species of bacteria.

Anjali Pande, Biosecurity New Zealand

DISEASES OF FISH AND SHELLFISH

Collecting samples for investigation

Call Biosecurity New Zealand on 0800 80 99 66 – they will advise on whether samples are required, how to pack them and where to send them. Otherwise, as a general rule:

- Collect 5–10 whole animals that are moribund (dying but not dead) or freshly dead
- Chill them on ice or in a refrigerator (but do not freeze)
- Talk to Biosecurity New Zealand about how to package and send the animals to the lab

Information to collect

- Date and time of the observation, and when the animals were collected
- Location and approximate size of area affected
- Species and number of individuals affected (a photo is often useful)
- Whether the animals were dead or moribund when collected (or both)
- Any abnormal environmental conditions (e.g. river flooded, algal bloom present, unusually high water temperature)

If you suspect you have seen signs of disease in captive or wild fish or shellfish call Biosecurity New Zealand immediately on 0800 80 99 66.

AQUARIUM CAULERPA

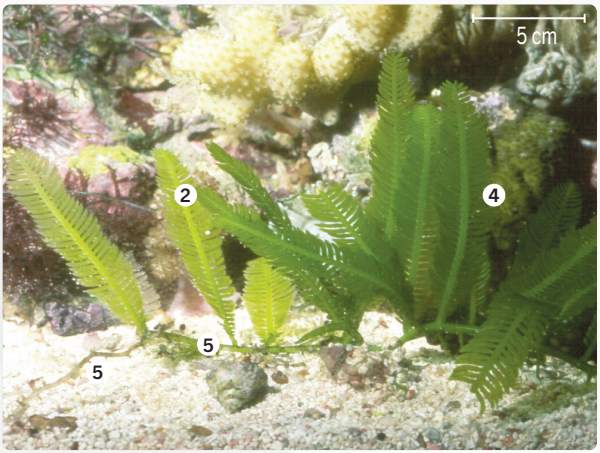
Caulerpa taxifolia

Key features

❶ Bright green

❷ Fronds have a smooth midrib

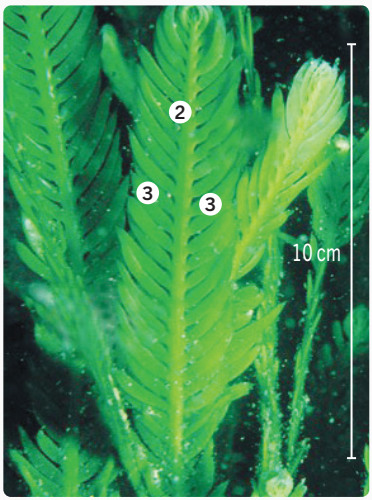
❸ Paired branchlets, all flattened in the same plane



Bob Fenner

❹ Fronds up to 15 cm (tropical form) or 40+ cm (Mediterranean form) in length

❺ Long horizontal runners (stolons) with many upright, flattened fronds



Australian Institute of Marine Science

Government of South Australia, Biosecurity SA

Habitat

- Marine aquaria

If Caulerpa was to be released into the environment, then it would be found in:

- Sand, mud, rock or seagrass beds
- Estuaries, harbours and coasts
- Sheltered to semi-exposed environments
- Low tide to 100 m depth

Impact

- Forms vast, dense beds
- Smothers and displaces native and fisheries species
- Fast-growing
- Disrupts natural ecological processes
- Accumulates toxins

Report suspected marine pests or diseases online report.mpi.govt.nz/pest/

or call 0800 80 99 66

EXOTIC CAULERPA

Caulerpa brachypus & *Caulerpa parvifolia*

Both exotic *Caulerpa* species look the same

Key features

1. Bright green
2. Fronds (leaves) are shaped as "solid" oar blades
3. Fronds grow from long horizontal runners (stolons)
4. Fronds are up to 10 cm in length

Oliver Evans, NIWA

Oliver Evans, NIWA

Habitat

- Sand, mud, reef or seagrass beds
- Estuaries, harbours and coasts
- Reaches highest densities in sheltered, low wave energy environments
- Low tide to approximately 50 m water depth

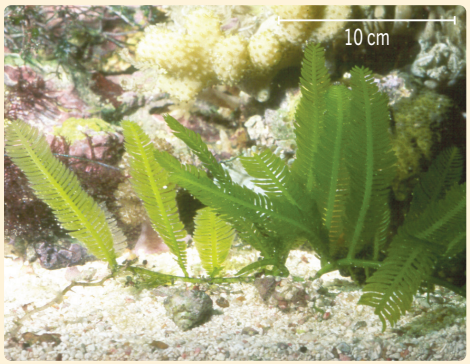
Impact

- Forms vast, dense beds
- Smothers and displaces native species
- Fast-growing
- Disrupts natural ecological processes

Report suspected marine pests or diseases online report.mpi.govt.nz/pest/

or call 0800 80 99 66

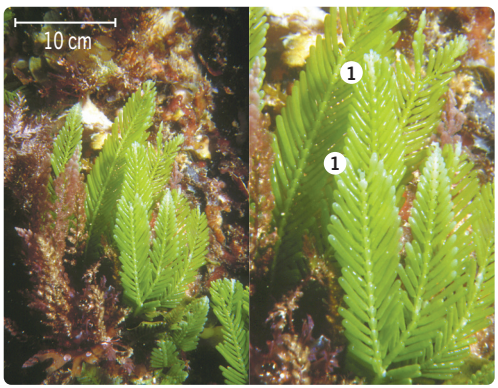
NATIVE SPECIES THAT LOOK SIMILAR



Bob Fenner

How to differentiate between *Caulerpa taxifolia* (left) and exotic *Caulerpa* (right) species from native species below:

Caulerpa articulata

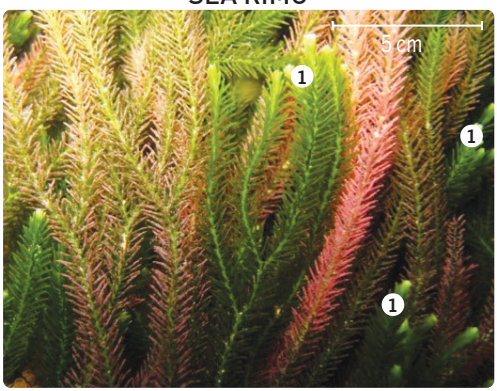


J.M. Hülsman

❶ *C. articulata* has cylindrical, turgid, bead-like vesicles along the midrib, not flattened like *C. taxifolia*

❷ *C. articulata* is found in the North Island and offshore islands, and the northern South Island

Caulerpa brownii
SEA RIMU



Richard Kinsey

❶ *C. brownii* has distinctively three-dimensional shaggy fronds; they are not flattened in cross-section

❷ *C. brownii* is found in the southern North Island, South Island and offshore islands

Additional information: the most likely way of *Caulerpa taxifolia* arriving in New Zealand is through importation with other aquarium species. Aquarium caulerpa is an unwanted organism, so if you suspect you've seen it in aquaria, or anywhere, please call **0800 80 99 66** immediately.

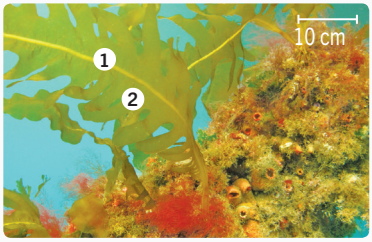
WAKAME/UNDARIA

Undaria pinnatifida

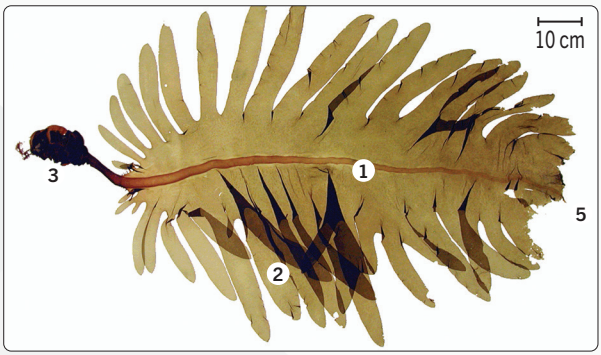
Key features

❶ Strap-like midrib in plants larger than 10 cm

❷ Smooth, thin, laminar blade, with side lobes, that starts just above the holdfast, or above the frilly reproductive tissue in mature plants

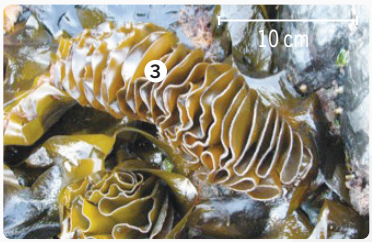


Kath Blakemore



Kate Neill

Lesley Paston



Serena Cox

❸ Base of mature plant is frilly (reproductive tissue), with a root-like holdfast

❹ Adult plants brown to yellowish, up to 3 m tall

❺ Tops of mature plants are often eroded

Habitat

- Intertidal to 40 m depth
- Wharves, pontoons and buoys
- Rocky coasts and reefs
- Boat hulls
- Sheltered to exposed environments
- Grows well in polluted or nutrient-enriched waters

Impact

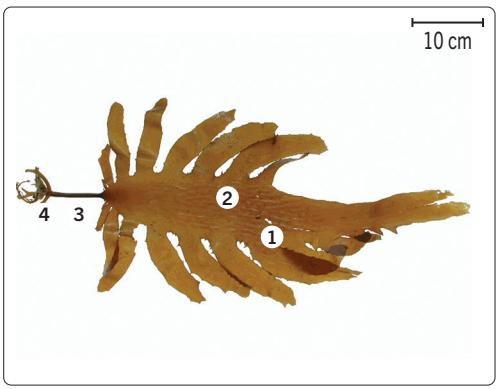
- Very fast growing and can form dense colonies displacing native and fisheries species
- Fouls boats, aquaculture installations and other marine structures

NATIVE SPECIES THAT LOOK SIMILAR

Kate Neill

How to differentiate *Undaria pinnatifida* from:

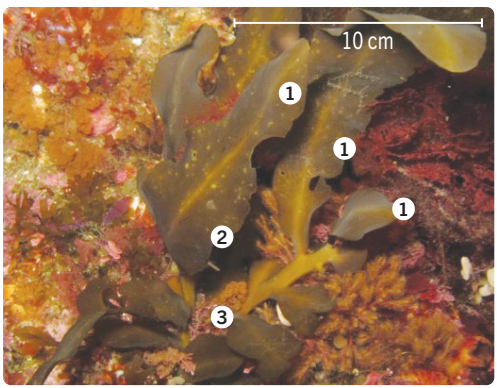
Ecklonia radiata
ECKLONIA



Kate Neill

1. *Ecklonia* has rough, leathery blade, often with many small, raised bumps; *Undaria* has smooth, thin and fragile blades
2. *Ecklonia* has no midrib (Note: plants are difficult to differentiate before this character develops in *Undaria* at about 10 cm length)
3. *Ecklonia* has a cylindrical trunk-like stipe. *Undaria* has a flattened, strap-like stipe
4. *Ecklonia* has no frilly reproductive tissue at base

Carpophyllum flexuosum



Richard Kinsey

1. *Carpophyllum* has multiple ribbed leaves; *Undaria* has only a single midrib and blade
2. *Carpophyllum* has stiff, tough, leathery leaves
3. *Carpophyllum* has no frilly base

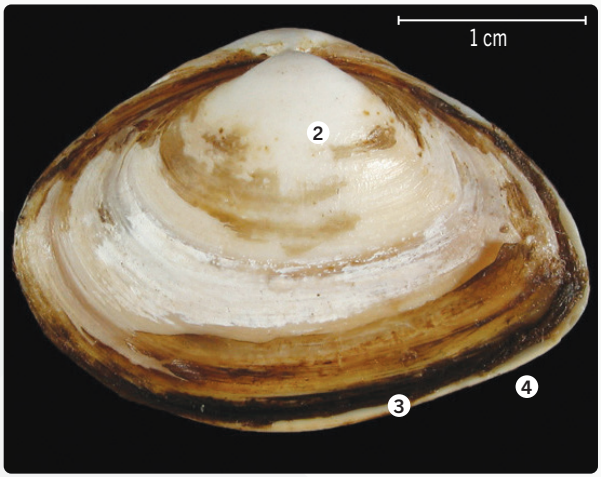
ASIAN CLAM

Potamocorbula amurensis

Key features

❶ Thin, smooth bivalve up to 3 cm long

❷ Shell yellow, tan or dirty white, frequently with brown staining



YHshells; Hao Yang

❸ Distinctive "overbite" – one of the pair of shells is larger than the other

❹ Old shells may have wrinkled edges

NIWA

NIWA

US Geological Survey

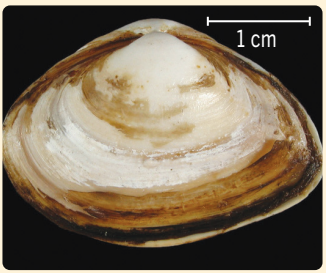
Habitat

- Generally subtidal but also intertidal
- Estuaries and sheltered waters
- Soft sediments – sand, mud, clay or seagrass beds
- A range of salinities from salt to fresh water
- Grows well in polluted or nutrient-rich waters

Impact

- Forms vast, dense colonies (> 25 000 per m^2)
- Filter-feeder that competes with native species and preys on larvae of fisheries species
- Displaces native, commercial and recreational fisheries species
- High selenium content, which is toxic to animals that eat it
- Disrupts natural ecological balance

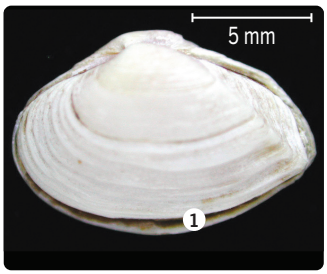
NATIVE SPECIES THAT LOOK SIMILAR



YHshells; Hao Yang

How to differentiate *Potamocorbula amurensis* from:

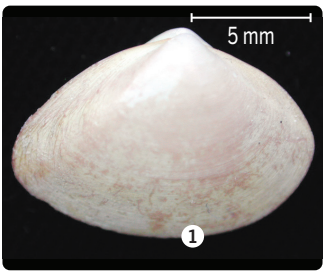
Corbula zelandica
BASKET SHELL



Kate Neill

❶ *Corbula* has a less prominent, regular, even overbite around most of the perimeter of the shell (*Potamocorbula* has an overbite around 1/4–1/3 the perimeter)
❷ Generally smaller (<1.5 cm)
❸ Not found in estuaries or sheltered waterways

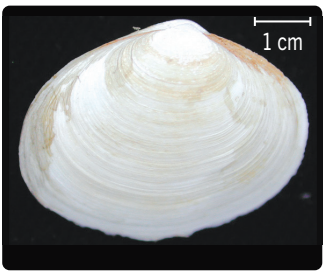
Mactra (Maorimactra) ordinaria
SURF CLAM



Kate Neill

❶ No overbite
❷ Not found in estuaries
❸ Smaller shell (<1.5 cm)

Cyclomactra tristis
SURF CLAM



Kate Neill

❶ *Cyclomactra* has no overbite
❷ Larger shell (to 6 cm)

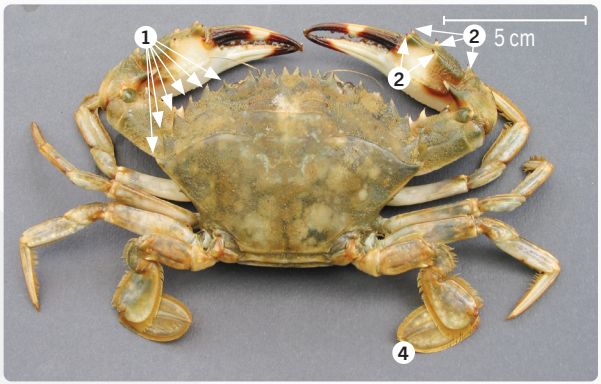
ASIAN PADDLE CRAB

Charybdis japonica

Key features

❶ Six prominent spines on each side of the carapace

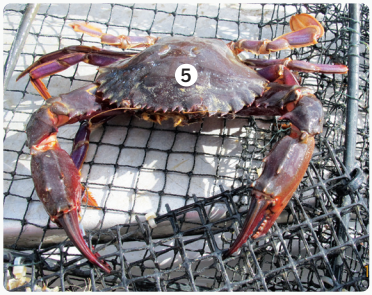
❷ Five prominent spines on upper surface of each claw



Colin McLay

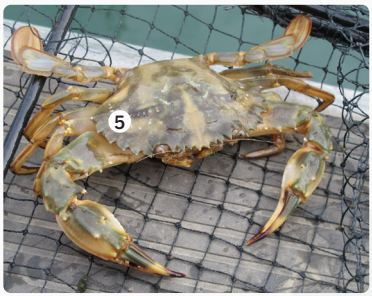
❸ Carapace up to 12 cm wide

❹ Flattened swimming paddles on back legs



Serena Cox

❺ Colour ranges from off-white and pale green, through olive-green to a deep chestnut brown with purplish markings



Serena Cox

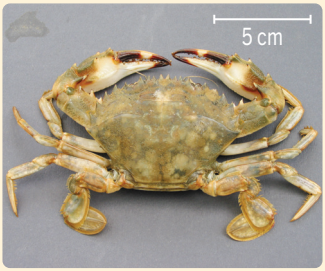
Habitat

- Low tide to 15 m depth
- Sand and mud
- Estuaries, harbours and and most coastal habitats

Impact

- Highly detrimental to shellfish aquaculture
- Aggressive predator
- Displaces native and fisheries species
- Can carry diseases that affect crab, lobster, shrimp and prawn fisheries

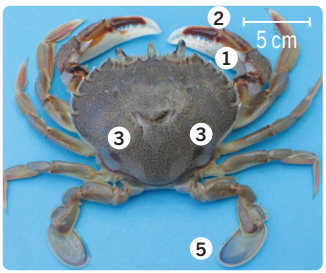
NATIVE SPECIES THAT LOOK SIMILAR



Colin McLay

How to differentiate *Charybdis japonica* from:

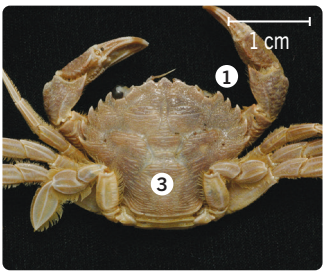
Ovalipes catharus SWIMMING/PADDLE CRAB



Colin McLay

1. *Ovalipes* has five flattened spines on each side along the front and extending around the sides (not six pointed spines along the front as in *C. japonica)*
2. One prominent spine on the claw
3. Two distinct reddish "spots" on the carapace
4. Pale sandy-grey with orange-red highlights
5. Swimming paddles often with purplish tint

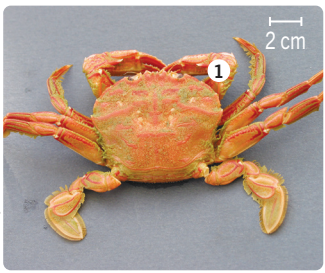
Liocarcinus corrugatus DWARF SWIMMING CRAB



Colin McLay

1. *Liocarcinus* has five spines on each side (not six)
2. Much smaller – maximum 2.5 cm wide
3. Fine corrugations over most of the shell

Nectocarcinus antarcticus HAIRY RED SWIMMING CRAB



Colin McLay

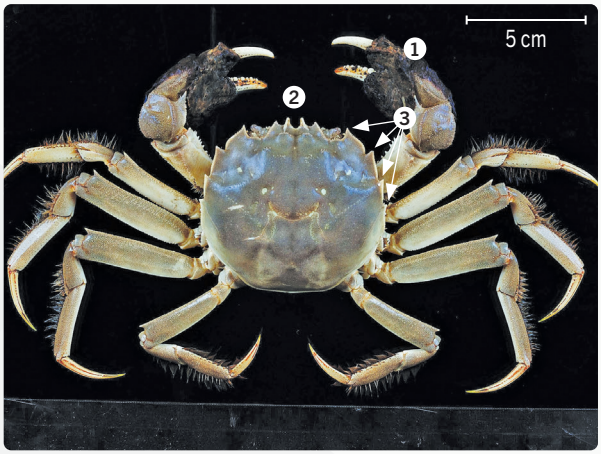
1. *Nectocarcinus* has four spines on each side (not six)
2. Red to pinkish-red colouration

CHINESE MITTEN CRAB

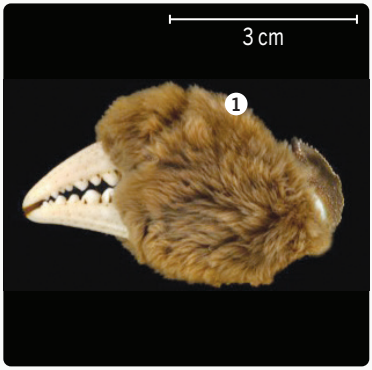
Eriocheir sinensis

Key features

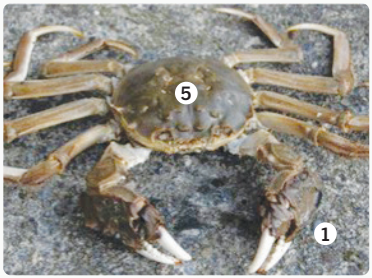
1. Hairy "mittens" with white tips on front claws
2. Distinctive notches between the eyes
3. Four spines on each side of the carapace
4. Carapace 0.5-10 cm wide but generally >3 cm
5. Light brown to olive-green carapace



University of Valencia



Phil Crabb, Natural History Museum



Central Fisheries Board., Ireland

Habitat

- Above high tide to subtidal
- Burrows in sand, mud, silt or clay
- Freshwater, brackish, estuarine and marine waters
- Prefers polluted or nutrient-enriched waters

Impact

- Can form dense colonies
- Disrupts natural ecological balance
- Accumulates toxins
- Aggressive, highly effective predator
- Displaces native and fisheries species
- Damages fishing nets and catches
- Burrowing weakens and collapses river/estuary banks
- Can carry a liver fluke that harms humans

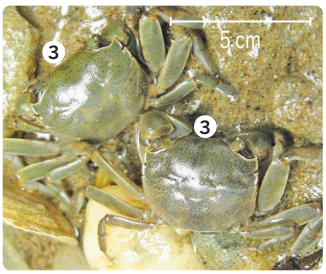
Report suspected marine pests or diseases online report.mpi.govt.nz/pest/
or call 0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR

University of Valencia

How to differentiate *Eriocheir sinensis* from:

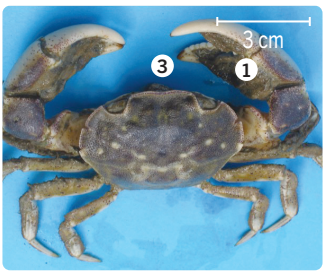
Austrohelice crassa TUNNELLING MUD CRAB



Chris Woods

1. *A. crassa* has large, rounded claws – not furry or white-tipped
2. *A. crassa* is much smaller – carapace width 4 cm max and distinctly oblong/square-shaped
3. *A. crassa* has no spines on the front edge of the carapace

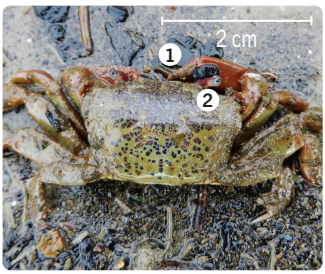
Hemigrapsus crenulatus HAIRY-HANDED CRAB



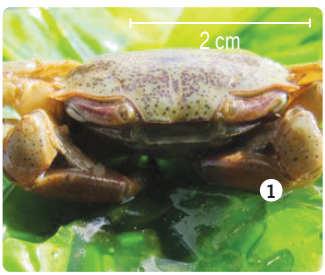
Colin McLay

1. *H. crenulatus* claws are only slightly hairy and the hairs are on the inner side only
2. *H. crenulatus* is a much smaller crab – carapace width less than 4 cm
3. *H. crenulatus* has no spines on the front edge of the carapace

Hemiplax hirtipes STALK-EYED MUD CRAB



Serena Cox



Chris Woods

1. *Hemiplax* claws are small, fringed with hairs and with long slender pincers
2. *Hemiplax* has eyes on long stalks
3. *Hemiplax* is a much smaller crab – carapace width less than 3 cm

EUROPEAN SHORE CRAB

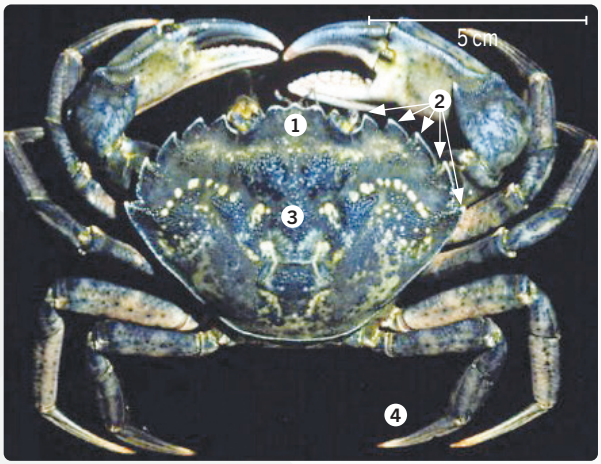
Carcinus maenas

Key features

❶ Three rounded "teeth" or lobes between the eyes

❷ Five spines on each side

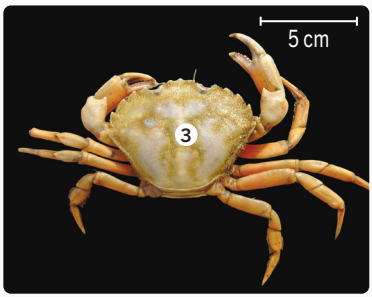
❸ Adult up to 8 cm wide



Michael Marmach

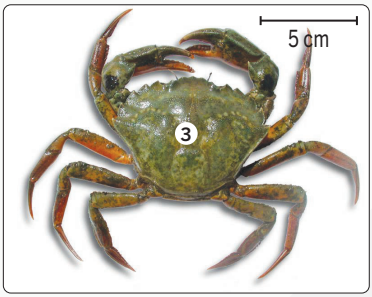
❹ No swimming paddles on legs

❺ Juveniles generally lighter in colour than adults



Hans Hillewaert

❻ Adult colour varies from green on top and yellowish underneath, to mottled red and orange above and orange or partly red underneath



A.M. Arias

Habitat

- Intertidal to 60 m depth
- Sand, mud, rock or seagrass beds
- Estuaries, harbours and coasts
- Generally nocturnal

Impact

- Can form dense colonies (up to 200 per m^2)
- Aggressive and highly effective predator
- Displaces native and fisheries species
- Highly detrimental to shellfish aquaculture
- Can collapse wild-harvest shellfisheries
- Facilitates other pest invasions

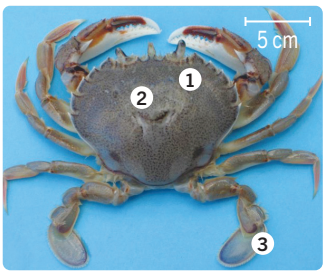
Report suspected marine pests or diseases online report.mpi.govt.nz/pest/
or call 0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR

Michael Marmach

How to differentiate *Carcinus maenas* from:

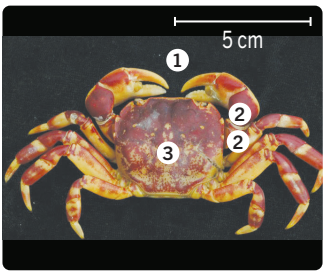
Ovalipes catharus SWIMMING/PADDLE CRAB



Colin McLay

1. *O. catharus* is larger – carapace width up to 15 cm, compared to 8 cm in *Carcinus*
2. *O. catharus* is sandy grey in colour with orange-red highlights
3. *O. catharus* has paddles on rear legs for swimming

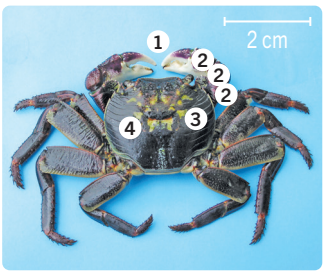
Hemigrapsus sexdentatus COMMON ROCK/ SHORE CRAB



Colin McLay

1. *H. sexdentatus* has no spines/lobes between the eyes
2. *H. sexdentatus* has two (not five) spines on outer edges of carapace
3. *H. sexdentatus* has a distinctive square purple-and-cream carapace
4. *H. sexdentatus* is smaller – maximum width about 4 cm

Leptograpsus variegatus PURPLE ROCK CRAB



Colin McLay

1. *L. variegatus* has no spines/lobes between the eyes
2. *L. variegatus* has three spines on each side of the carapace behind the eyes
3. *L. variegatus* has grooves on the surface of the carapace
4. The carapace is variegated with many colours including green, brown, purple and cream
5. *L. variegatus* has a carapace less than 7.5 cm wide

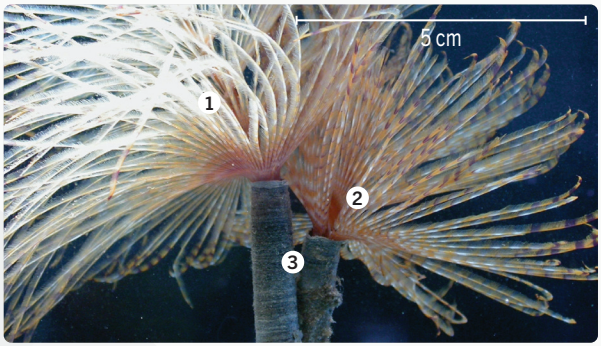
MEDITERRANEAN FANWORM

Sabella spallanzanii

Key features

❶ Single spiral crown of elongated filaments projects from tube

❷ Spiral appears yellow-orange, made of bands of white, yellow and brown

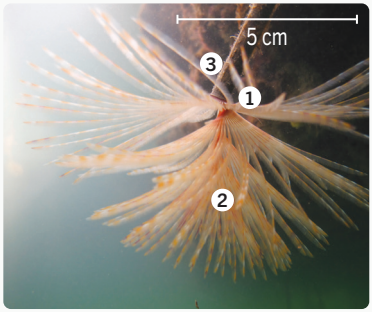


Geoff Read

❸ Tube is brown to grey, finely banded, muddy-looking, made of a leathery, flexible material; normally 10–50 cm but rarely up to 1 m long

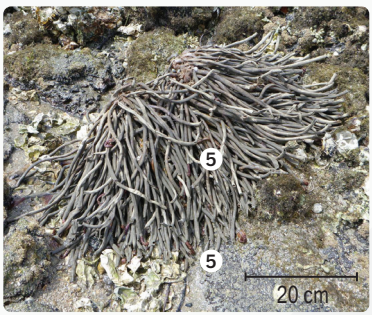
❹ Bristle lobes on body segments with bristles set in a spiral pattern (evident when worm removed from tube)

❺ Tubes may be evident at low tide



Serena Cox

❻ Can form dense clumps of many individuals, creating a large area of feeding fans



Richard Taylor

Habitat

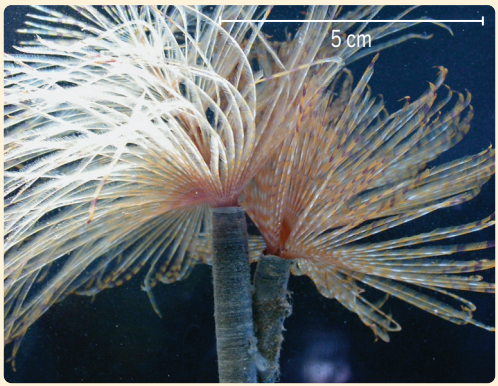
- Low tide to 30 m depth
- Sheltered harbours to semi-exposed rocky coasts and reefs
- Wharves, pontoons and aquaculture structures
- Boat hulls
- Attaches to hard surfaces in soft sediments

Impact

- Can form dense colonies (1000 individuals per m^2)
- Displaces native and fisheries species
- Highly effective filter-feeder
- Preys on larvae of fisheries species
- Disrupts natural ecological balance
- Fouls boats, aquaculture installations and other marine structures

Report suspected marine pests or diseases online report.mpi.govt.nz/pest/
or call 0800 80 99 66

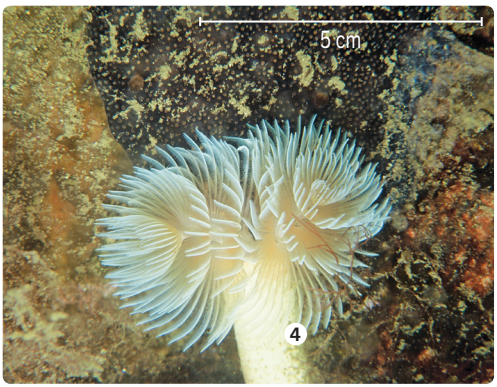
NATIVE SPECIES THAT LOOK SIMILAR



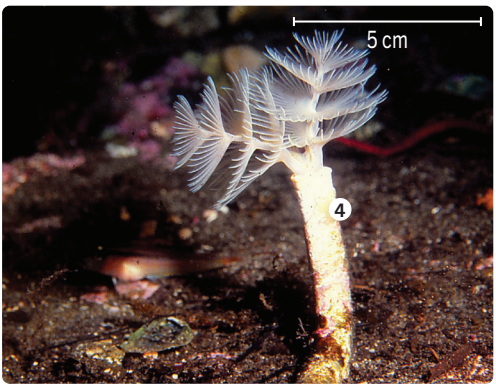
Geoff Read

How to differentiate *Sabella spallanzanii* from:

Native sabellid and serpulid tubeworms



Department of Conservation



Ken Grange

❶ No native sabellids have a banded yellow-orange crown like *Sabella spallanzanii*

❷ Native sabellids have a non-elongate, more flower-like, denser crown, not usually spiralled; and none of them have spiralled body bristles

❸ All native sabellid fanworms are smaller, with tubes rarely longer than 20 cm

❹ All serpulid fanworms have a hard whitish calcareous tube that is attached to the substrate along much or all of its length; *Sabella* has a flexible tube and is only attached at one end

NORTHERN PACIFIC SEASTAR

Asterias amurensis

Key features

❶ Five arms

❷ Pointed, often upturned tips

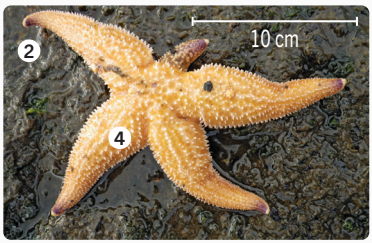
❸ Yellow to orange, often with purple markings on top; yellow underneath

Serena Cox

❹ Arms covered with numerous small, irregularly-arranged chisel-like spines

❺ Usually up to 24 cm across, but can reach 50 cm

❻ Reaches high densities



Serena Cox

Creative commons Flikr – Saspotato

CSIRO

Habitat

- Low intertidal to 25 m, occasionally to 200 m
- Rocky reef, mud, sand or pebbles
- Wharves, pontoons and buoys
- Aquaculture structures
- Estuaries, harbours and coasts
- Sheltered to semi-exposed environments

Impact

- Fast-growing
- Forms vast, dense colonies
- Displaces native and fisheries species
- Voracious predator
- Highly detrimental to shellfish aquaculture and wild-harvest shellfisheries

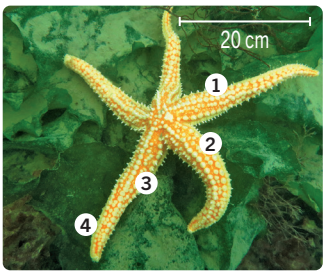
Report suspected marine pests or diseases online report.mpi.govt.nz/pest/
or call 0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR

Serena Cox

How to differentiate *Asterias amurensis* from:

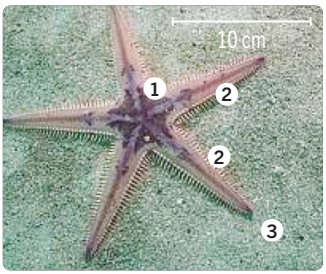
Sclerasterias mollis APRICOT SEASTAR/ CROSS FISH



Chris Woods

1. Well-defined rows of spines extending down the arms
2. Pale red to orange, with yellow bands and cream spines
3. Thin arms
4. Generally does not have prominently upturned armtips unless it's moving along the substrate

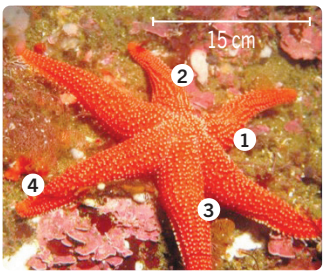
Astropecten polyacanthus COMB SEASTAR



seafriends.org.nz

1. *A. polyacanthus* is generally brownish red to fawn with a darker centre
2. Has a row of spines extending laterally around the edges of the arms
3. *A. polyacanthus* does not generally have prominently upturned armtips unless it's moving along the substrate

Allostichaster insignis THREE-AND-THREE SEASTAR



Paddy Ryan

1. *A. insignis* is orange, red or purple
2. *A. insignis* usually has six arms (occasionally five); *Asterias* always has five arms
3. *A. insignis* has groups of ~3 spines in rows extending down the arms, which *Asterias* lacks
4. *A. insignis* does not generally have prominently upturned armtips unless it's moving along the substrate
5. Smaller body (< 35 cm across)

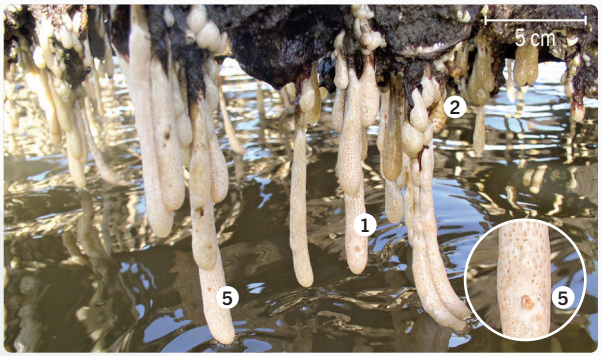
AUSTRALIAN DROPLET TUNICATE

Eudistoma elongatum

Key features

❶ White or cream-coloured cylindrical tubes (tunics)

❷ Sometimes with short, wartlike processes at the base

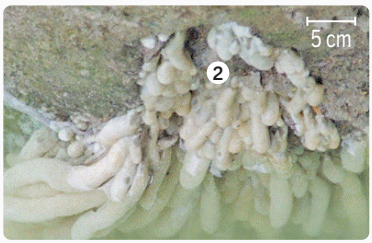


Sean Handley

❸ Generally 5–20 mm in diameter

❹ Tunic generally 5–30 cm long but can reach 1.5 m

❺ Tunic contains many small individual organisms and can sometimes appear orange-flecked owing to the presence of bright orange larvae



Northland RC


Sean Handley

H Blomfield

Habitat

- Intertidal to subtidal
- Sand, mud, rock or seagrass beds
- Aquaculture structures
- Wharves, pontoons and buoys
- Estuaries, harbours and coasts
- Sheltered/semi-sheltered environments

Impact

- Can form dense colonies
- Displaces native and fisheries species
- Smothers beaches, rocks, tidepools
- Fouls boats, aquaculture installations and other marine structures

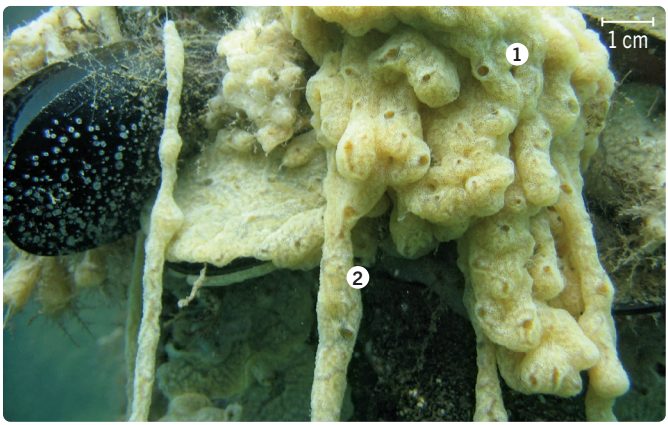
Report suspected marine pests or diseases online report.mpi.govt.nz/pest/
or call 0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR

Sean Handley

How to differentiate *Eudistoma elongatum* from:

***Didemnum* spp.**
COLONIAL SEA SQUIRT



Paul Barter, Cawthron Institute

1. *Didemnum* forms mats with messy interconnected drooping entwined tendrils, whereas *Eudistoma* consists of discrete circular tubes
2. A fine network of regular canals is visible on the surface of *Didemnum* but not on *Eudistoma,* where the pores are more irregularly distributed and lack visible canals
3. *Eudistoma* is firm and gelatinous to the touch; *Didemnum* less so and is also easily torn

SPECKLED AND LIGHT-BULB ASCIDIANS

Clavelina oblonga & Clavelina lepadiformis

Key features

❶ Are transparent and gelatinous to touch

❷ White rings and vertical lines give a "light bulb" appearance (*Clavelina lepadiformis*)

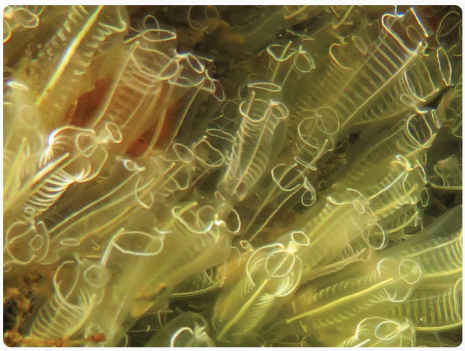
❸ Form colonies and can reach high densities

❹ Zooids (top part) reach a maximum height of 20 mm and are attached to substrate via a stolon

Clavelina oblonga

S. Happy, Auckland Council

Clavelina lepadiformis



C. Woods, NIWA

Habitat

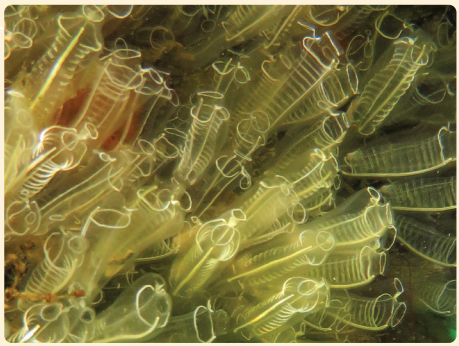
- Wharves, pontoons and buoys
- Grows on other organisms (e.g. mussels)
- Estuaries, harbours and coasts
- Sheltered/semi-sheltered environments
- Present to 50 m depth

Impact

- Can reach high densities and smother other species especially in summer months (*Clavelina oblonga*)
- Fouls boats and other structures

NATIVE SPECIES THAT LOOK SIMILAR

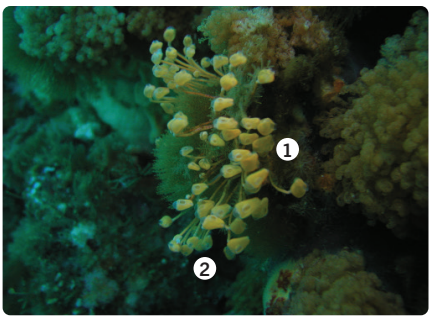
S. Happy, Auckland Council



Michael Marmach

How to differentiate *Clavelina oblonga* (left) and *Clavelina lepadiformis* (right) from:

Pycnoclavella kottae

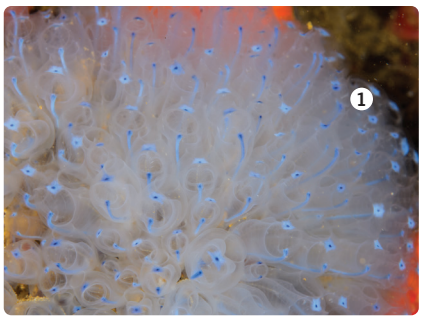


Sean Handley, NIWA

❶ Gold coloured rather than translucent

❷ Pod like heads at the end of long narrow stalks (appox. 10 cm), *Clavelina* is much smaller

Clavelina sp.
BLUEBELLS



Crispin Middleton, Seacology NZ

❶ Blue coloured rather than translucent

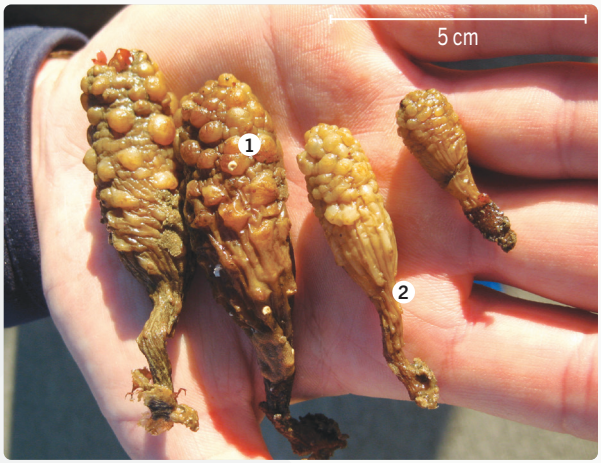
CLUBBED TUNICATE/LEATHERY SEA SQUIRT

Styela clava

Key features

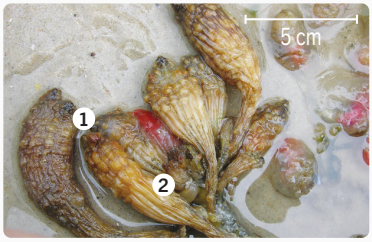
❶ Brown with lumpy, leathery skin

❷ Woody stalk, generally longer than the body, with longitudinal folds

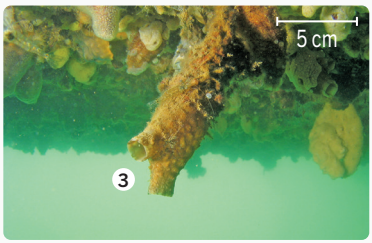


Jeannine Fischer

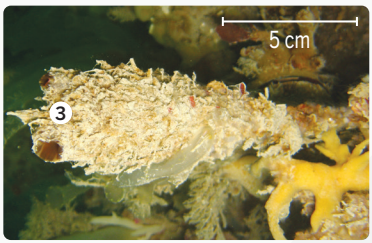
❸ Two closely spaced siphons at the top of the body, usually surrounded by warty projections



Biopix: JC Schou



Northland RC



Chris Woods

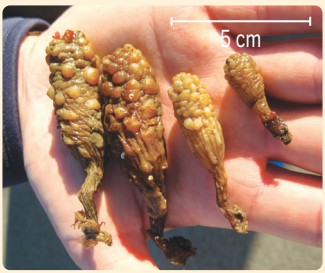
Habitat

- Low intertidal to 25 m depth
- Rocky coast and reef
- Boat hulls
- Wharves, pontoons and aquaculture structures
- Grows on other organisms

Impact

- Can form dense colonies excluding other organisms
- Highly effective filter-feeder
- Preys on larvae of commercially important fisheries species
- Displaces native and fisheries species
- Fouls boats, aquaculture installations and other marine structures

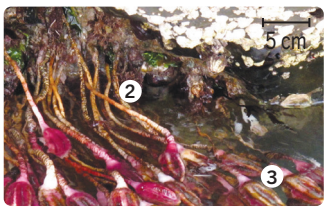
NATIVE SPECIES THAT LOOK SIMILAR



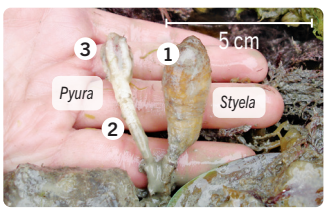
Jeannine Fischer

How to differentiate *Styela clava* from:

Pyura pachydermatina SEA TULIP



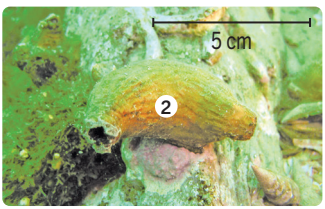
John Barkla



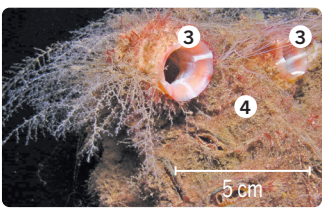
Chris Woods

1. *S. clava* is light or dark brown; *Pyura* is white to purplish-red
2. *P. pachydermatina* has a much longer stalk – up to three-quarters of its overall length – and can grow to over half a metre long; *Styela* only reaches 16cm
3. *P. pachydermatina* has a bulbous body with ridges along its length; *Styela's* body lacks ridges along its length

Cnemidocarpa bicornuta and *C. nisiotis*



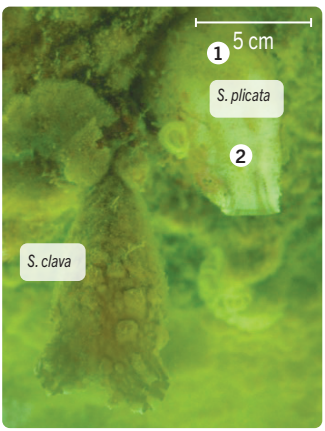
Mike Page



Mike Page

1. Neither *Cnemidocarpa* species has a stalk
2. *C. biornuta* has a wide saddle between the siphons, whereas *Styela's* siphons are close together
3. *C. nisiotis* has siphons at opposite ends of the body. The body is flattened against the substrate, not stalked
4. The body of *C. nisiotis* can be obscured by heavy fouling, whereas *Styela* is always prominent

Styela plicata



Serena Cox

1. *S. plicata* has no stalk
2. Generally has a smooth, white to cream-coloured body and is not usually fouled with other species such as hydroids and bryozoans

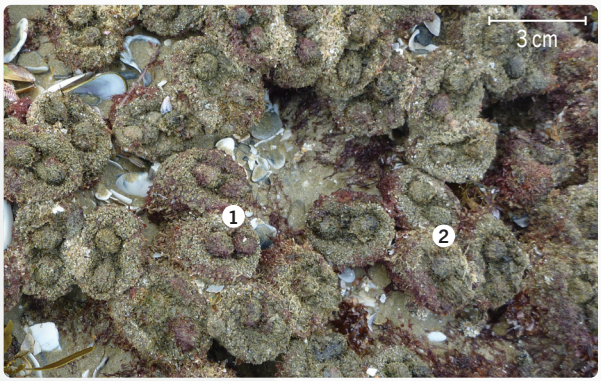
PYURA

Pyura doppelgangera

Key features

❶ Flattened upper surface surrounded by a ridge with two siphons projecting slightly from the centre

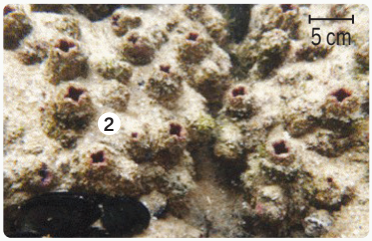
❷ Hard, sac-like body with brown or reddish-brown leathery skin, often incorporating sand and shell fragments



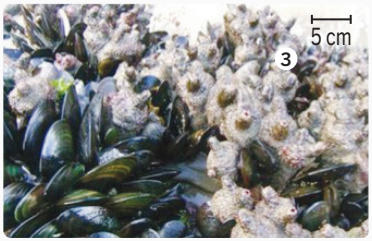
Roger Grace

❸ Adults 1.5–6 cm high and 3–5 cm in diameter, squat and globular in shape

❹ Colonies may form a dense mat, which may be visible at low tide



NRC



Serena Cox

Bruce Hayward

Habitat

- Rocky intertidal and shallow subtidal
- Grows on hard surfaces in soft sediments

Native species that look similar:

- No native species look similar to pyura

Impact

- Forms dense populations or mats, and can survive over a wide geographical range
- Could displace important native New Zealand species, including greenshell mussels

Acknowledgements

Many people provided valuable input to the content, design and production of this document, from Biosecurity New Zealand and the wider science community, and we thank you all for your invaluable input. Of particular note, Rose Bird (Biosecurity New Zealand), Abraham Growcott (Biosecurity New Zealand), Lisa Maria (Biosecurity New Zealand), Bruce Marshall (NIWA), Colin McLay (University of Canterbury), Kate Neill (NIWA), Wendy Nelson (NIWA), Mike Page (NIWA), Anjali Pande (Biosecurity New Zealand), Geoff Read (NIWA), Serena Cox (NIWA), Rissa Williams (Biosecurity New Zealand), Crispin Middleton (SeacologyNZ) plus all the photo contributors who have graciously allowed us to use their images.
Front cover illustration by AriseCreations Colombia.

Collated by Tim Riding & Hernando Acosta.

Edited by Mike Bradstock, Bradstock Editorial Services.

Publication Citation

If using text contained within this publication, please reference appropriately:

Ministry for Primary Industries (2024). *New Zealand Marine Pest ID Guide*. Biosecurity New Zealand, Wellington. 34pp.

ISBN numbers:
978-1-991120-89-2 (print)
978-1-991120-90-8 (online)

February 2024

Te Kāwanatanga o Aotearoa
New Zealand Government

KO TĀTOU THIS IS US