



New Zealand Marine Pest ID Guide



CONTENTS

INTRODUCTION	1
---------------------	----------

DISEASES OF FISH AND SHELLFISH	2
---	----------

ALGAE

Aquarium caulerpa	7
Wakame/Undaria	9

BIVALVES

Asian clam	11
------------	----

CRABS

Asian paddle crab	13
Chinese mitten crab	15
European shore crab	17

POLYCHAETE WORMS

Mediterranean fanworm	19
-----------------------	----

SEASTARS

Northern Pacific seastar	21
--------------------------	----

SEASQUIRTS

Australian droplet tunicate	23
Clubbed tunicate	25
Pyura	27



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 MPI is trying to keep out. The guide also includes information on how to recognise common diseases of fish and shellfish.

Since 2005 we have found more than 330 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 bring various 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.

Key features

Defining features of the pest are numbered here

Habitat

Likely places you might find the pest are listed here

Banner

Red banner: pest not present in NZ
Green banner: pest present in NZ

ASIAN CLAM
Potamocorbula amurensis

Name
Pest species' common and Latin name

Impact
Outlines impacts the pest may have

Map
Shows locations the pest is known from



NATIVE SPECIES THAT LOOK SIMILAR

How to differentiate *Potamocorbula amurensis* from:

<i>Corbula planidica</i> BASKET SHELL	<i>Maoricorbula antipodaria</i> SURF CLAM	<i>Cyclonacorbula triolitis</i> SURF CLAM
- Corbula has a low prominent, regular, more oval/round shape (most of the perimeter of the shell) - Generally smaller (<1.5 cm) - Not found in estuaries or sheltered waterways	- Not build in estuaries - Smaller shell (<1 cm)	- Corbula has no overbite - Not build in estuaries - Smaller shell (<1 cm)

Key features
Defining features of native species that look similar

Pest species
Photo of the featured pest

Native species
Photos of native species that look similar

© 2018 Crown copyright. All rights reserved. New Zealand, immediately call 0800 80 99 66

To report suspected marine pests or diseases call
0800 80 99 66

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.

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
to report find**

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

- Check and clean any equipment (e.g. pots, nets, fishing or diving gear) before moving to a new location, to ensure it is clean and free of marine life. Use fresh water and detergent or soak in a 2% bleach solution for 30 minutes, or use a specific biological treatment product. Alternatively, dry your equipment then leave it for >48 hours before using it in a different area.
- 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 and treat any marine life contained within these areas and dispose of any marine fouling to an appropriate rubbish bin ashore.
- Seafood waste and offal and bait from non-local sources can be vectors for transferring 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. Dispose of them to a landfill or (if your sewerage goes to a treatment plant) you can flush them down the toilet.

To report suspected marine pests or diseases call

0800 80 99 66



DISEASES OF FISH AND SHELLFISH

Impact

Diseases can cause fish and shellfish stock collapses, which in turn can affect the natural balance of an ecosystem. Fish 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 or both). A mass mortality of commercially and/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 external.

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 Speers

A snapper with dermal/subdermal haemorrhaging on the ventral side, in this case attributable to a septicæmia caused by *Vibrio* bacteria



Cara Brosnahan

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

DISEASES OF SHELLFISH

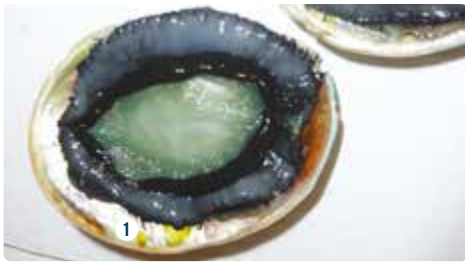
Key diagnostic features

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.

Signs a shellfish is sick:

- ❶ Shellfish such as paua may be retracting away from the shell with the edges of the mantle curling away
- ❷ There may be visible pustules, lesions or hard nodules present
- ❸ Shellfish may look watery or in poor condition
- ❹ Shellfish such as paua may not be able to stay attached to the substrate
- ❺ Shellfish such as paua may not be able to right themselves when turned upside down
- ❻ Bivalves may be gaping or slow to react when touched
- ❼ Bivalves may not be able to stay shut
- ❽ Excess mucus production may be evident

Some examples of diseased shellfish



Paua retracting its mantle away from its shell.



Watery, sick-looking oyster.



Shucked paua with nodules associated with *Perkinsus*.



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



DISEASES OF FISH AND SHELLFISH

Collecting samples for investigation

Call MPI 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 MPI about how to package and send the animals to the lab

Information to collect

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

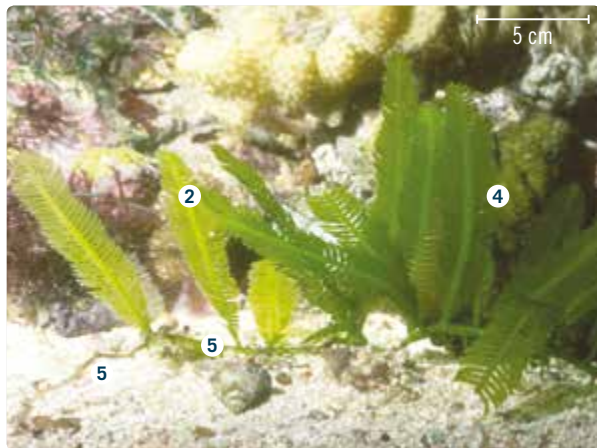
If you suspect you have seen signs of disease in captive or wild fish or shellfish call MPI immediately on 0800 80 99 66.

AQUARIUM CAULERPA

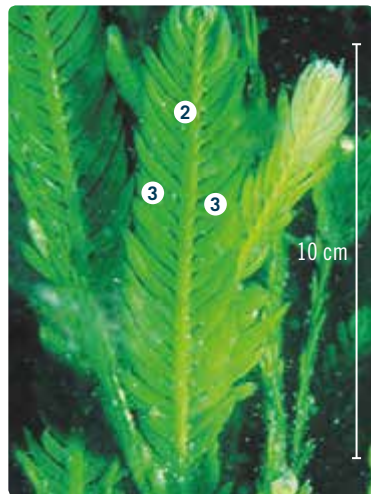
Caulerpa taxifolia

Key features

- ❶ Bright green
- ❷ Fronds have a smooth midrib
- ❸ Paired branchlets, all flattened in the same plane



- 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 balance
- Accumulates toxins



***If found anywhere in New Zealand, immediately call**

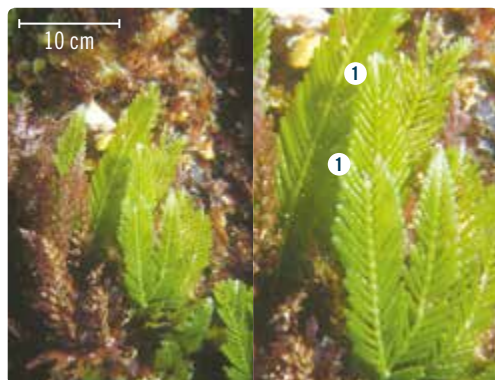
0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR



How to differentiate *Caulerpa taxifolia* from:

Caulerpa articulata



- ❶ *C. articulata* has cylindrical, turgid, bead-like vesicles that are 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



- 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.

To report suspected marine pests or diseases call

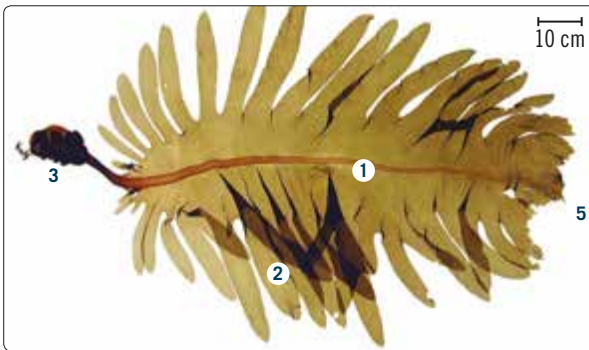
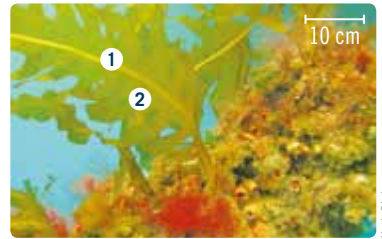
0800 80 99 66

WAKAME/UNDARIA

Undaria pinnatifida

Key features

- ➊ Strap-like midrib in plants larger than 10 cm
- ➋ Smooth, thin, laminar blade, with side lobes, that starts just above the holdfast, or above the frilly reproductive tissue in mature plants
- ➌ Base of mature plant is frilly (reproductive tissue), with a root-like holdfast
- ➍ Adult plants brown to yellowish, up to 3 m tall
- ➎ 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



Report if found outside known locations

0800 80 99 66

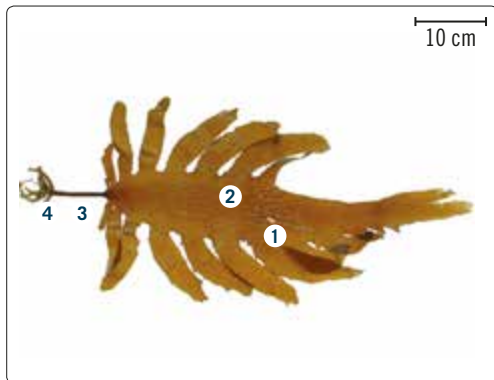
NATIVE SPECIES THAT LOOK SIMILAR



Kate Neill

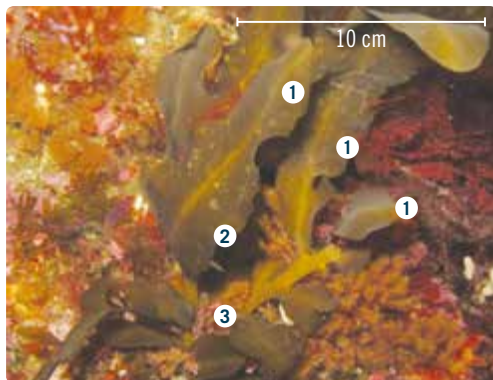
How to differentiate *Undaria pinnatifida* from:

Ecklonia radiata ECKLONIA



Kate Neill

Carpophyllum flexuosum



Richard Kinsey

- 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

- 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

To report suspected marine pests or diseases call

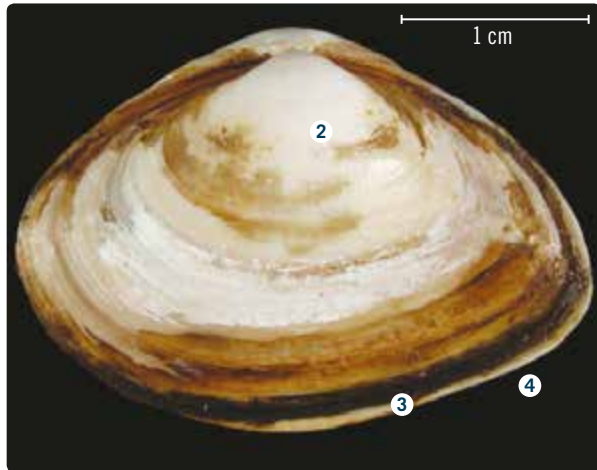
0800 80 99 66

ASIAN CLAM

Potamocorbula amurensis

Key features

- 1 Thin, smooth bivalve up to 3 cm long
- 2 Shell yellow, tan or dirty white, frequently with brown staining



- 3 Distinctive “overbite” – one of the pair of shells is larger than the other
- 4 Old shells may have wrinkled edges



NIVA



NIVA



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



'If found anywhere in New Zealand, immediately call

0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR



How to differentiate *Potamocorbula amurensis* from:

Corbula zelandica
BASKET SHELL



Mactra (Maorimactra) ordinaria
SURF CLAM



Cyclomactra tristis
SURF CLAM



- 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

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

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

To report suspected marine pests or diseases call

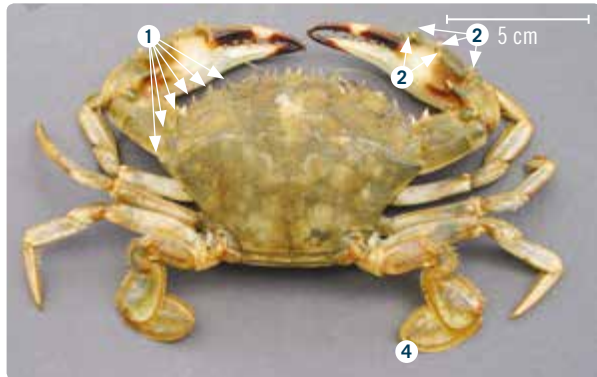
0800 80 99 66

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 Willkens

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



Serena Willkens

Habitat

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



Report if found outside known locations

0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR



How to differentiate *Charybdis japonica* from:

Ovalipes catharus SWIMMING/PADDLE CRAB



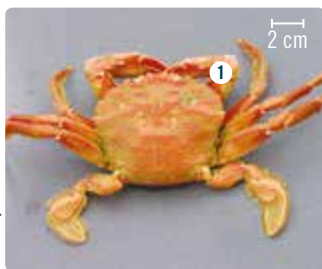
- ❶ *Ovalipes* has five flattened spines on each side along the front and extending around the sides (not six pointed spines along the front as in *C. japonica*)
- ❷ One prominent spine on the claw
- ❸ Two distinct reddish “spots” on the carapace
- ❹ Pale sandy-grey with orange-red highlights
- ❺ Swimming paddles often with purplish tint

Liocarcinus corrugatus DWARF SWIMMING CRAB



- ❶ *Liocarcinus* has five spines on each side (not six)
- ❷ Much smaller – maximum 2.5 cm wide
- ❸ Fine corrugations over most of the shell

Nectocarcinus antarcticus HAIRY RED SWIMMING CRAB



- ❶ *Nectocarcinus* has four spines on each side (not six)
- ❷ Red to pinkish-red colouration

To report suspected marine pests or diseases call

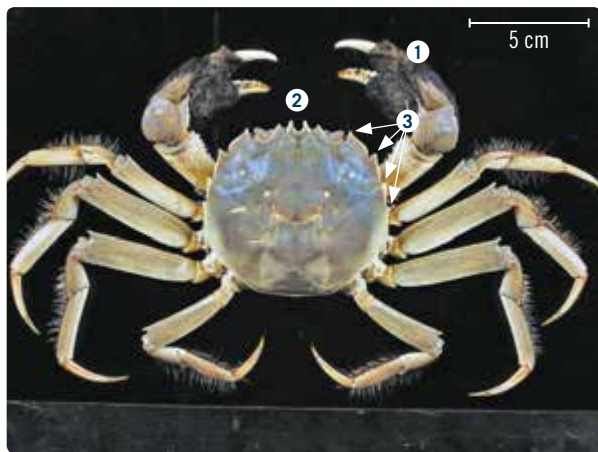
0800 80 99 66

CHINESE MITTEN CRAB

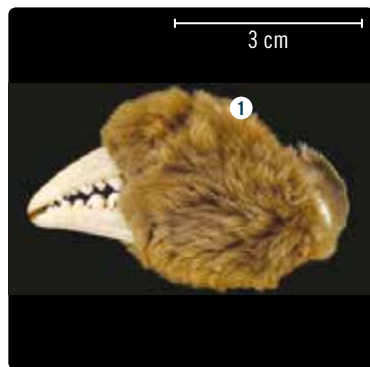
Eriocheir sinensis

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



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



'If found anywhere in New Zealand, immediately 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 Wilkens



Chris Woods

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

To report suspected marine pests or diseases call

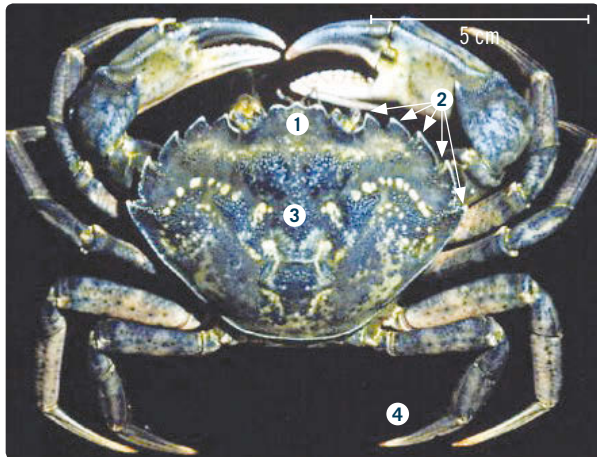
0800 80 99 66

EUROPEAN SHORE CRAB

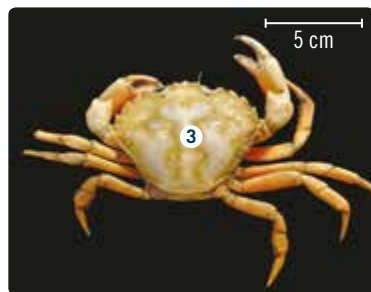
Carcinus maenas

Key features

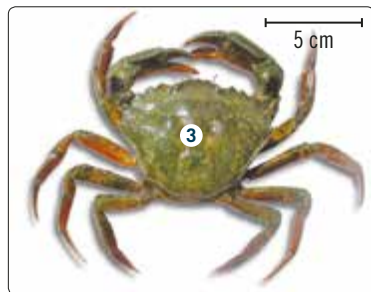
- ① Three rounded “teeth” or lobes between the eyes
- ② Five spines on each side
- ③ Adult up to 8 cm wide



- ④ No swimming paddles on legs
- ⑤ Juveniles generally lighter in colour than adults



- ⑦ Adult colour varies from green on top and yellowish underneath, to mottled red and orange above and orange or partly red underneath



Habitat

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

Impact

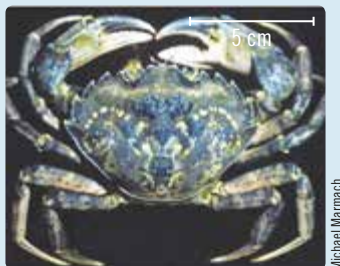
- Can form dense colonies (up to 200 per m²)
- Aggressive and highly effective predator
- Displaces native and fisheries species
- Highly detrimental to shellfish aquaculture
- Can collapse wild-harvest shellfisheries
- Facilitates other pest invasions



'If found anywhere in New Zealand, immediately call

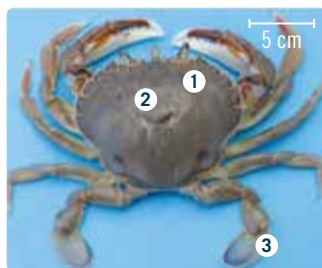
0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR



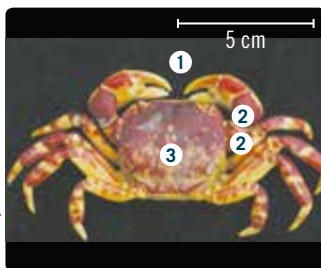
How to differentiate *Carcinus maenas* from:

Ovalipes catharus SWIMMING/PADDLE CRAB



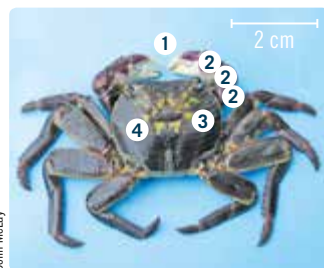
- ❶ *O. catharus* is larger – carapace width up to 15 cm, compared to 8 cm in *Carcinus*
- ❷ *O. catharus* is sandy grey in colour with orange-red highlights
- ❸ *O. catharus* has paddles on rear legs for swimming

Hemigrapsus sexdentatus COMMON ROCK/ SHORE CRAB



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

Leptograpsus variegatus PURPLE ROCK CRAB



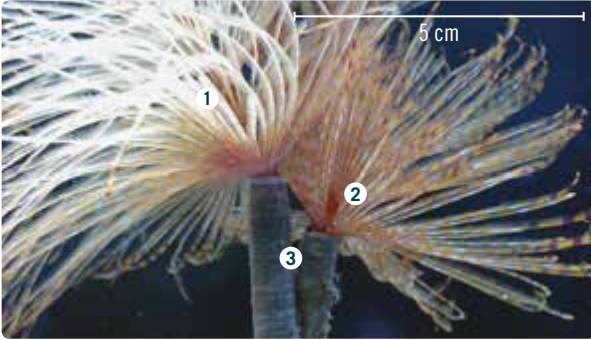
- ❶ *L. variegatus* has no spines/lobes between the eyes
- ❷ *L. variegatus* has three spines on each side of the carapace behind the eyes
- ❸ *L. variegatus* has grooves on the surface of the carapace
- ❹ The carapace is variegated with many colours including green, brown, purple and cream
- ❺ *L. variegatus* has a carapace less than 7.5 cm wide

MEDITERRANEAN FANWORM

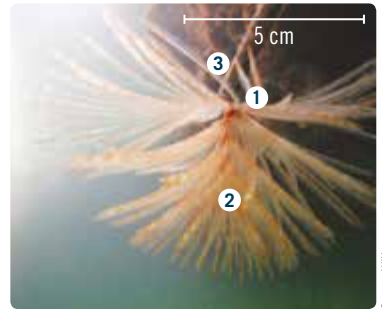
Sabella spallanzanii

Key features

- 1 Single spiral crown of elongated filaments projects from tube
- 2 Spiral appears yellow-orange, made of bands of white, yellow and brown
- 3 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
- 4 Bristle lobes on body segments with bristles set in a spiral pattern (evident when worm removed from tube)
- 5 Tubes may be evident at low tide



Geoff Read



Serena Wilkens

- 6 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
- Prefers polluted/nutrient-enriched waters

Impact

- Can form dense colonies (1000 individuals per m²)
- 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 if found outside known locations

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

To report suspected marine pests or diseases call

0800 80 99 66

NORTHERN PACIFIC SEASTAR

Asterias amurensis

Key features

- 1 Five arms
- 2 Pointed, often upturned tips
- 3 Yellow to orange, often with purple markings on top; yellow underneath
- 4 Arms covered with numerous small, irregularly-arranged chisel-like spines
- 5 Usually up to 24 cm across, but can reach 50 cm
- 6 Reaches high densities



Serena Wilkens



Serena Wilkens



Creative commons Flickr – Sasopetelo



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



'If found anywhere in New Zealand, immediately call

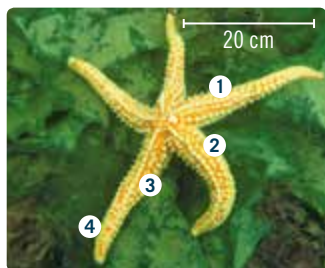
0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR



How to differentiate *Asterias amurensis* from:

Sclerasterias mollis APRICOT SEASTAR/ CROSS FISH



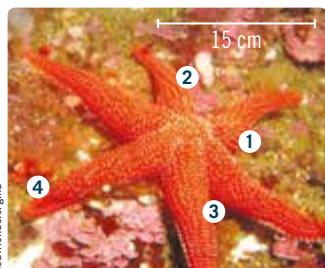
- 1 Well-defined rows of spines extending down the arms
- 2 Pale red to orange, with yellow bands and cream spines
- 3 Thin arms
- 4 Generally does not have prominently upturned armtips unless it's moving along the substrate

Astropecten polyacanthus COMB SEASTAR



- 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

Allotrichaster insignis THREE-AND-THREE SEASTAR



- 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)

To report suspected marine pests or diseases call

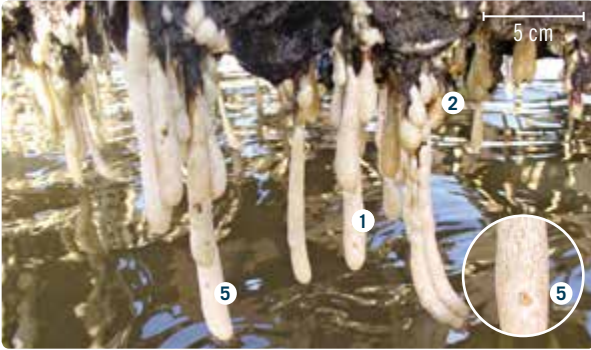
0800 80 99 66

AUSTRALIAN DROPLET TUNICATE

Eudistoma elongatum

Key features

- ❶ White or cream-coloured cylindrical tubes (tunics)
- ❷ Sometimes with short, wartlike processes at the base
- 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



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 if found outside known locations

0800 80 99 66

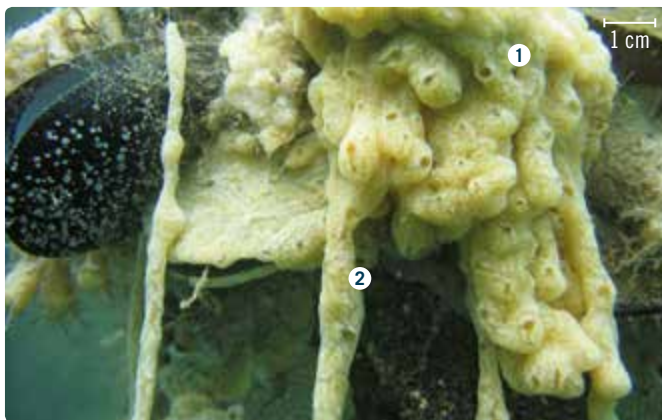
NATIVE SPECIES THAT LOOK SIMILAR



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

To report suspected marine pests or diseases call

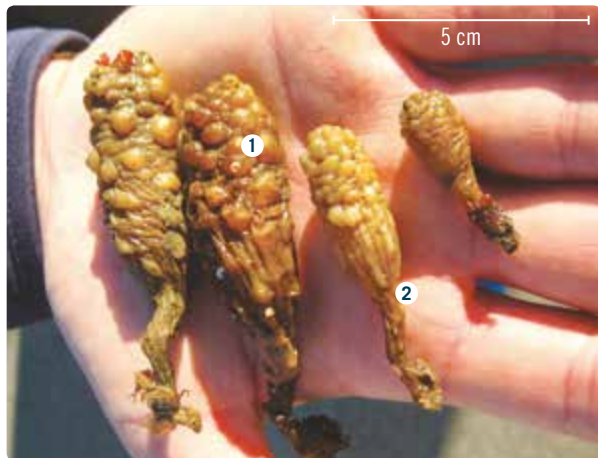
0800 80 99 66

CLUBBED TUNICATE/LEATHERY SEA SQUIRT

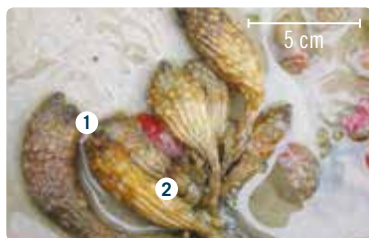
Styela clava

Key features

- ① Brown with lumpy, leathery skin
- ② Woody stalk, generally longer than the body, with longitudinal folds



- ③ Two closely spaced siphons at the top of the body, usually surrounded by warty projections



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



Report if found outside known locations

0800 80 99 66

NATIVE SPECIES THAT LOOK SIMILAR



Jeannine Fischer

How to differentiate *Styela clava* from:

Pyura pachydermatina SEA TULIP

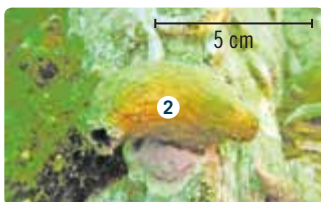


John Barkla

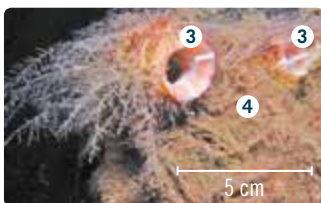


Chris Woods

Cnemidocarpa bicornuta and *C. nisiotis*



Mike Page



Mike Page

Styela plicata



Serena Wilkens

- 1 *Styela* is light or dark brown; *Pyura* is white to purplish-red
- 2 *Pyura* 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 16 cm
- 3 *Pyura* has a bulbous body with ridges along its length; *Styela*'s body lacks ridges along its length

- 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

- 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

To report suspected marine pests or diseases call

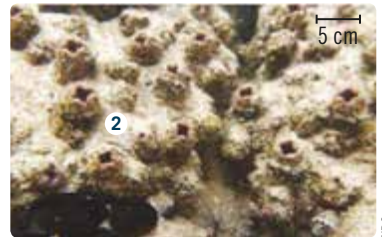
0800 80 99 66

PYURA

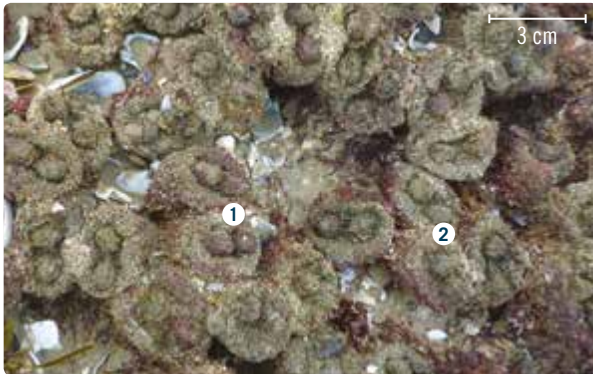
Pyura doppelganger

Key features

- 1 Flattened upper surface surrounded by a ridge with two siphons projecting slightly from the centre
- 2 Hard, sac-like body with brown or reddish-brown leathery skin, often incorporating sand and shell fragments



NRC



Roger Grace



Serena Wilkens

- 3 Adults 1.5–6 cm high and 3–5 cm in diameter, squat and globular in shape
- 4 Colonies may form a dense mat, which may be visible at low tide



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



Report if found outside known locations

0800 80 99 66



Acknowledgements

Many people provided valuable input to the content, design and production of this document, from MPI and the wider science community, and we thank you all for your invaluable input. Of particular note, in alphabetical order, Rose Bird (MPI), Lisa Maria (MPI), Bruce Marshall (NIWA), Colin McLay (University of Canterbury), Kate Neill (NIWA), Wendy Nelson (NIWA), Mike Page (NIWA), Anjali Pande (MPI), Geoff Read (NIWA), Serena Wilkens (NIWA), Rissa Williams (MPI), 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.

Designed by Dink Design Ltd.

Publication Citation

All text licensed under the Creative Commons Attribution 4.0 New Zealand Licence unless otherwise stated.
All non-text content is subject to specific conditions.

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

Ministry for Primary Industries (2015). *New Zealand Marine Pest ID Guide*. Ministry for Primary Industries, Wellington. 30pp.

ISBN numbers:
978-1-77665-112-2 (print)
978-1-77665-113-9 (online)

0 cm

1 cm

2 cm

3 cm

4 cm

5 cm

6 cm

7 cm

8 cm

9 cm

10 cm

11 cm

12 cm

13 cm

14 cm

15 cm