

# Pacific Island sea cucumber and beche-de-mer identification cards





**These sea cucumber and beche-de-mer identification cards are produced by the Secretariat of the Pacific Community (SPC), with financial assistance from the Australian Centre for International Agricultural Research (ACIAR)**

Some underwater photographs of live sea cucumbers are reproduced with kind permission from the French Institute of Research for Development (IRD) and the WorldFish Center. Photographs of dried beche-de-mer are by Eric Aubry and Jipé LeBars, Noumea, New Caledonia.

English common names for sea cucumbers are the ones recommended by the Food and Agriculture Organization of the United Nations (FAO).

The information presented in these identification cards was gathered from personal communications with fishermen, processors and traders, and from the following publications:

- Conand C. 1998. Holothurians. In: K.E. Carpenter and V.H. Niem (eds). FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Volume 2. Cephalopods, crustaceans, holothurians and sharks. FAO, Rome.
- Guille P., Laboute P. and Menou J.-L. 1986. Handbook of the sea-stars, sea-urchins and related echinoderms of New Caledonia lagoon. Éditions de l'ORSTOM, Paris, France (in French).
- SPC. 1994. Sea cucumbers and beche-de-mer of the tropical Pacific. A handbook for fishers. Handbook N° 18. Secretariat of the Pacific Community, Noumea.

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# Amberfish

*Thelenota anax*

**Habitat:** Reef slopes, outer lagoon and near passes, on hard bottoms, large rubble and sand patches.

**Depth range** : 10–30 m

**Length commonly to** : 55 cm

**Average weight** : 3.5 kg

**Body thickness** : 15 mm

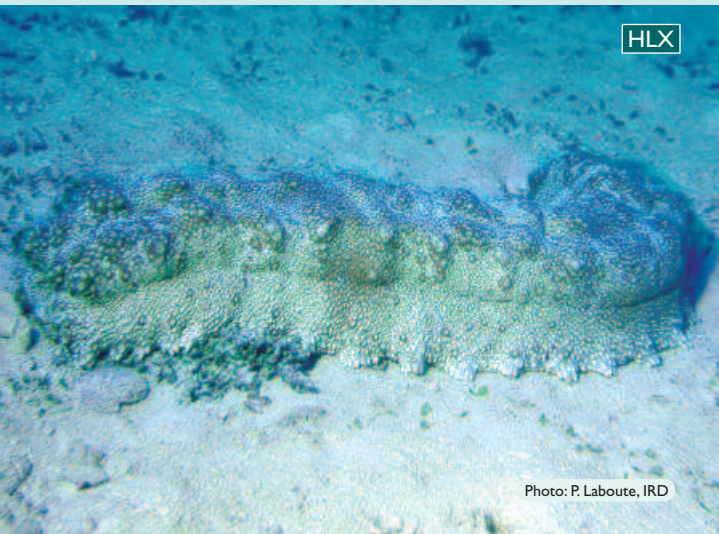


Photo: P. Laboute, IRD

# Amberfish

*Thelenota anax*

## Processed appearance:

- Long shape with a rectangular cross-section.
- Upperside rough, covered with irregular warts.
- Underside grainy.
- Entire body different shades of brown.
- Small cut across mouth, or one single long cut in the underside for large specimens.
- Common size: 15–20 cm.



# Black teatfish

*Holothuria (Microthele) nobilis*

**Habitat:** Reef flats, slopes and shallow seagrass beds.

**Depth range** : 0–20 m, but mostly in 0–5 m

**Length commonly to** : 37 cm

**Average weight** : 1.7 kg

**Body thickness** : 12 mm

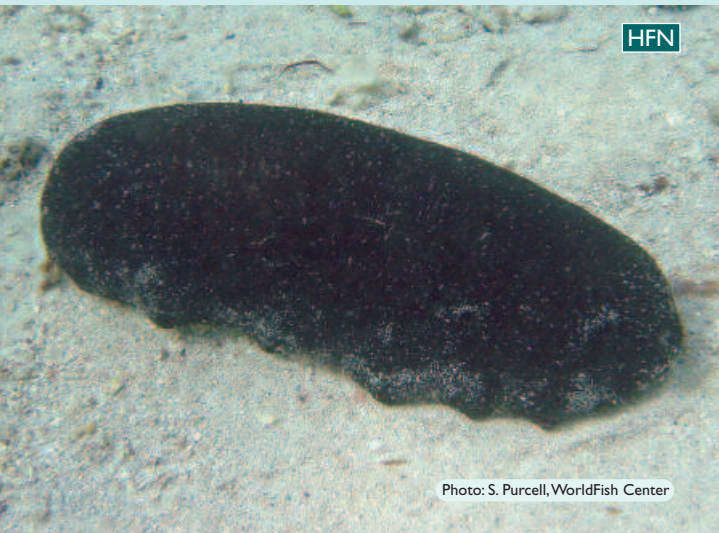


Photo: S. Purcell, WorldFish Center

# Black teatfish

*Holothuria (Microthele) nobilis*

## Processed appearance:

- Flat and chunky shape with obvious teats along each side.
- Surface powdery, smooth to slightly wrinkled.
- Powdery cover greyish-brown, but skin underneath black.
- One single long straight cut in the upperside.
- Common size: 16–20 cm.



# Blackspotted sea cucumber

*Pearsonothuria graeffei*

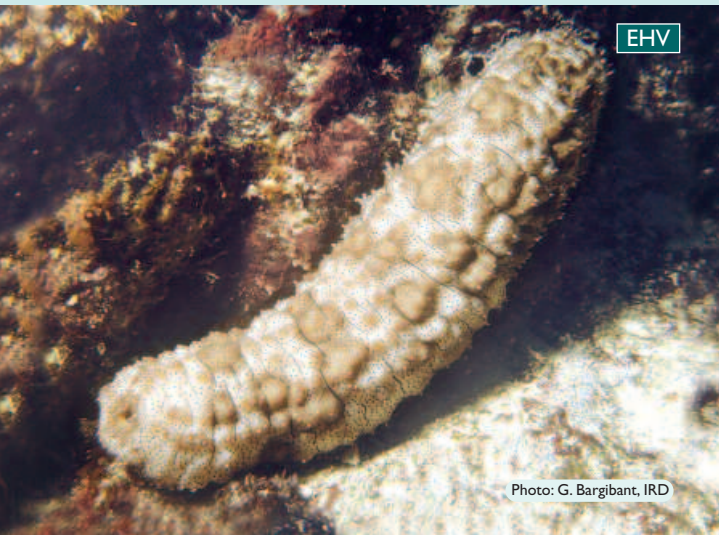
**Habitat:** Reef slopes, close to the coast. Abundant on bottoms of mixed corals and calcareous red algae.

**Depth range** : 0–25 m, but mostly in 0–10 m

**Length commonly to** : 35 cm

**Average weight** : 0.7 kg

**Body thickness** : 4 mm



EHV

Photo: G. Bargibant, IRD



# Blackspotted sea cucumber

*Pearsonothuria graeffei*

## Processed appearance:

- Narrow shape with a rectangular cross-section.
- Upperside rough, black to black-brown.
- Underside grainy, black to black-brown.
- No cuts or small cut across mouth.
- Common size: 15–18 cm.

EHV



# Brown sandfish

*Bohadschia vitiensis*

**Habitat:** Coastal lagoons and inner reef flats, often burrowed in sandy-muddy bottoms.

**Depth range** : 0–20 m, but mostly in 0–10 m

**Length commonly to** : 32 cm

**Average weight** : 1.2 kg

**Body thickness** : 7 mm



Photo: S. Purcell, WorldFish Center

# Brown sandfish

*Bohadschia vitiensis*

## Processed appearance:

- Cylindrical shape with an arched upperside and a flat underside.
- Upperside slightly wrinkled, brown to brown-black.
- Underside grainy, brown to brown-black.
- No cuts or small cut across mouth.
- Common size: 14–18 cm.

BDV



0cm 5 10 15 20

# Brownspotted sandfish

*Bohadschia similis*

**Habitat:** Coastal lagoons and inner reef flats, often burrowed in sandy-muddy bottoms.

**Depth range** : 0–3 m

**Length commonly to** : 18 cm

**Average weight** : 0.3 kg

**Body thickness** : 4 mm

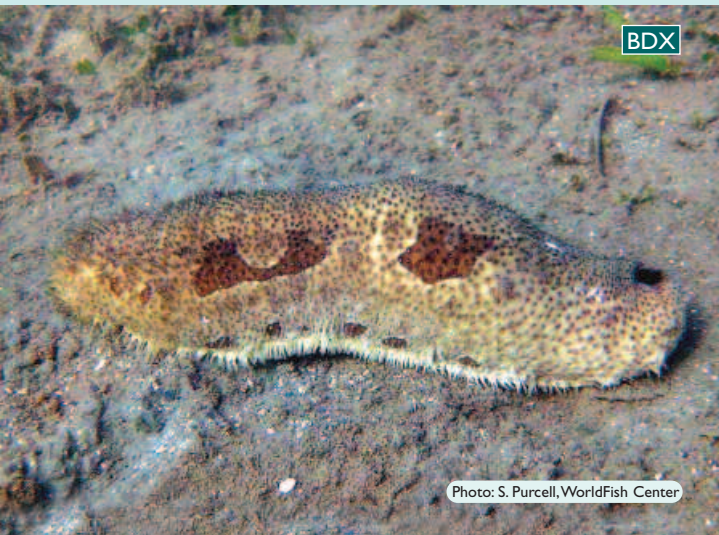


Photo: S. Purcell, WorldFish Center

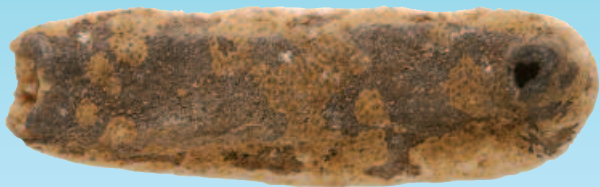
# Brownspotted sandfish

*Bohadschia similis*

## Processed appearance:

- Bent, narrow cylindrical shape, slightly flattened underside.
- Upperside granular, light beige (chalky).
- Underside smooth, black with brown marks.
- No cuts or small cut across mouth.
- Common size: 8–10 cm.

BDX



# Curryfish

*Stichopus hermanni*

**Habitat:** Seagrass beds, rubble and sandy-muddy bottoms.

**Depth range** : 0–25 m

**Length commonly to** : 35 cm

**Average weight** : 1.0 kg

**Body thickness** : 8 mm

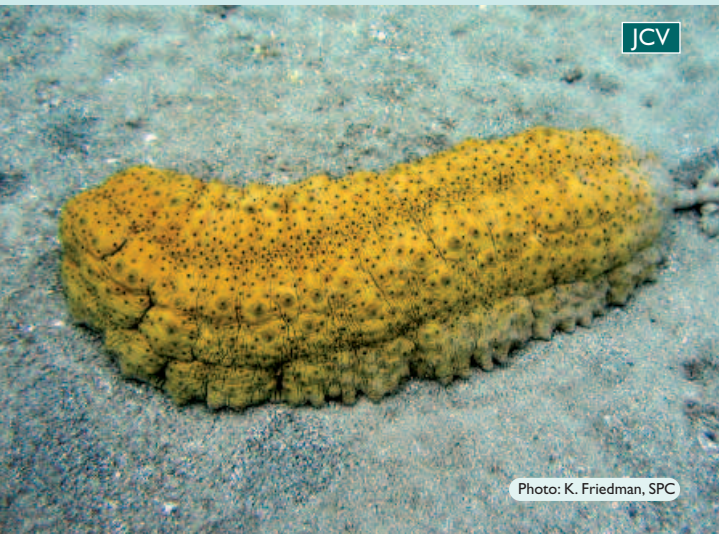


Photo: K. Friedman, SPC

# Curryfish

*Stichopus hermanni*

## Processed appearance:

- Long shape with a rectangular cross-section.
- Upperside wrinkled or deeply ridged with small black bumps.
- Underside smoother.
- Entire body different shades of beige to brown.
- No cuts or small cut across mouth.
- Common size: 15–19 cm.

JCV



0cm 5 10 15 20

# Deep-water redfish

*Actinopyga echinites*

**Habitat:** Reef flats of fringing and lagoon-islet reefs, seagrass beds, rubble reef flats and compact flats.

**Depth range** : 0–12 m

**Length commonly to** : 20 cm

**Average weight** : 0.3 kg

**Body thickness** : 7 mm

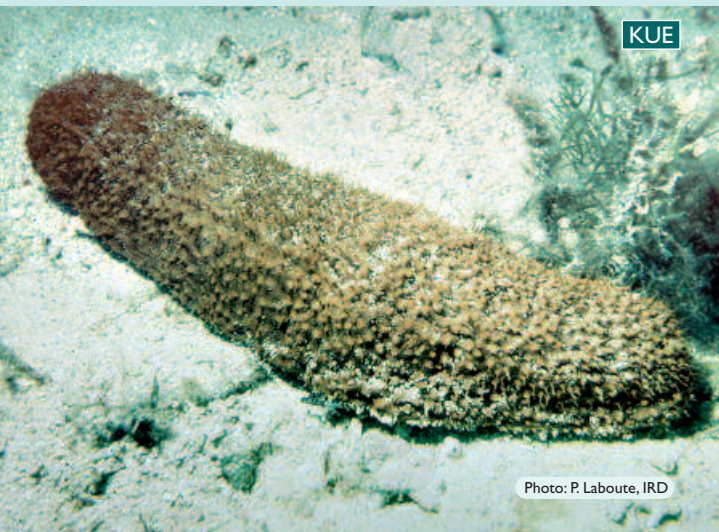


Photo: P. Laboute, IRD



# Deep-water redfish

*Actinopyga echinites*

## Processed appearance:

- Oval shape, with arched upside and flat underside.
- Upperside rough and slightly ridged, grey-brown.
- Underside granular, grey-brown.
- No cuts.
- Common size: 8–12 cm.

KUE



# Elephant trunkfish

*Holothuria (Microthele) fuscopunctata*

**Habitat:** Reef slopes and shallow seagrass beds.

**Depth range** : 0–25 m

**Length commonly to** : 36 cm

**Average weight** : 1.5 kg

**Body thickness** : 10 mm



Photo: WorldFish Center

# Elephant trunkfish

*Holothuria (Microthele) fuscopunctata*

## Processed appearance:

- Long cylindrical shape with an arched upperside and a flat underside.
- Upperside with deep grooves, of different shades of light brown to beige with tiny black spots.
- Underside smoother, of different shades of light brown to beige with tiny black spots.
- Small cut across mouth or one single long cut in the underside on large specimens.
- Common size: 16–20 cm.

HOZ



0cm 5 10 15 20

# Golden sandfish

*Holothuria (Metriatyla) scabra* var. *versicolor*

**Habitat:** Inner reef flats of coastal lagoons; burrows in mud and sandy-muddy bottoms. Generally deeper than sandfish.

**Depth range** : 0–30 m

**Length commonly to** : 30 cm

**Average weight** : 1.1 kg

**Body thickness** : 7 mm



Photo: S. Purcell, WorldFish Center

# Golden sandfish

*Holothuria (Metriatyla) scabra* var. *versicolor*

## Processed appearance:

- Cylindrical shape with an arched upper side and a flat underside.
- Upperside brown with numerous tiny black spots.
- Underside smooth, amber-brown.
- No cuts or small cut across mouth.
- Common size: 12–16 cm.



# Greenfish

*Stichopus chloronotus*

**Habitat:** Reef flats and upper slopes, mostly on hard substrates.

**Depth range** : 0–15 m, but mostly in 0–5 m

**Length commonly to** : 18 cm

**Average weight** : 0.1 kg

**Body thickness** : 2 mm

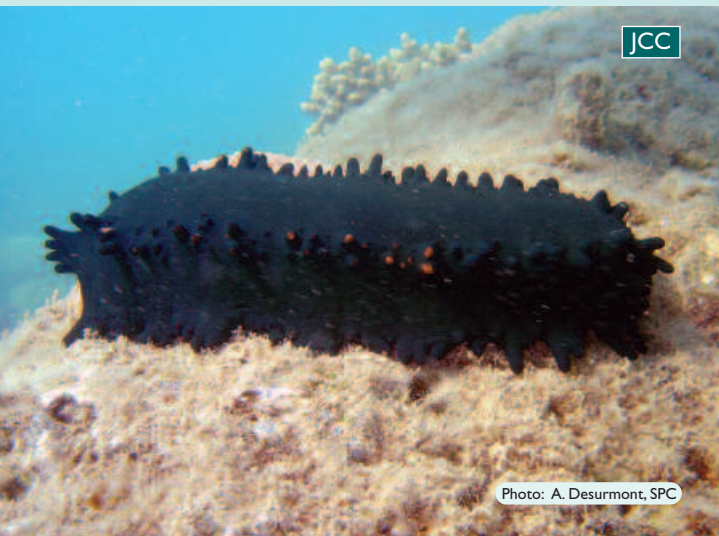


Photo: A. Desurmont, SPC

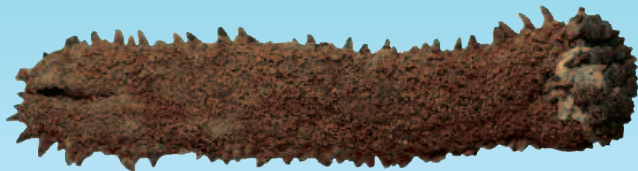
# Greenfish

*Stichopus chloronotus*

## Processed appearance:

- Narrow shape with a squarish cross-section.
- Each of the four edges covered with pointy warts.
- Entire body greenish black to black-brown.
- No cuts or small cut across mouth.
- Common size: 7–9 cm.

JCC



# Hairy blackfish

*Actinopyga miliaris*

**Habitat:** Found in high densities in inshore shallow waters and at lower densities in deeper more oceanic-influenced waters. Mostly a nocturnal species.

**Depth range** : 0–15 m

**Length commonly to** : 25 cm

**Average weight** : 0.4 kg

**Body thickness** : 6 mm



KUQ



# Hairy blackfish

*Actinopyga miliaris*

## Processed appearance:

- Roughly oval shape with a round cross-section.
- Entire body surface smooth and black.
- No cuts.
- Common size: 10–14 cm.

KUQ



# Leopardfish

*Bohadschia argus*

**Habitat:** Barrier reef flats and slopes, or outer lagoons on white sand.

**Depth range** : 0–30 m, but mostly in 0–10 m

**Length commonly to** : 36 cm

**Average weight** : 1.8 kg

**Body thickness** : 10 mm



Photo: P. Laboute, IRD

# Leopardfish

*Bohadschia argus*

## Processed appearance:

- Cylindrical shape slightly tapered at one end.
- Upperside smooth, brown to light-brown with obvious small white spots.
- Underside smooth, brown to light-brown.
- No cuts or small cut across mouth.
- Common size: 16–20 cm.

KUW



0cm

5

10

15

20

# Lollyfish

*Holothuria (Halodeima) atra*

**Habitat:** Found in high densities in inshore shallow waters and at lower densities in deeper oceanic-influenced waters. Average size of inshore specimens less than those of outer reef specimens (sometimes named “reef lolly”).

**Depth range** : 0–20 m, but mostly in 0–5 m

**Length commonly to** : 20 cm (inshore), 30 cm (outer reefs)

**Average weight** : 0.2 kg

**Body thickness** : 4 mm



Photo: S. Purcell, WorldFish Center

# Lollyfish

*Holothuria (Halodeima) atra*

## Processed appearance:

- Narrow cylindrical shape.
- Entire body surface smooth and black.
- No cuts or small cut across mouth.
- Common size: 8–15 cm.

HFA



# Pinkfish

*Holothuria (Halodeima) edulis*

**Habitat:** Inner reef flats of fringing and lagoon-islets reefs, and shallow coastal lagoons, sandy-muddy grounds with rubble or coral patches.

**Depth range** : 0–30 m, but mostly in 0–10 m

**Length commonly to** : 20 cm

**Average weight** : 0.2 kg

**Body thickness** : 3 mm



Photo: WorldFish Center

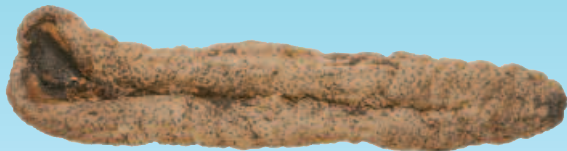
# Pinkfish

*Holothuria (Halodeima) edulis*

## Processed appearance:

- Narrow cylindrical shape, slightly flattened underside.
- Upperside with small wrinkles, dark brown.
- Underside smoother, light to medium brown.
- No cuts or small cut across mouth.
- Common size: 8–10 cm.

HFE



# Prickly redfish

*Thelenota ananas*

**Habitat:** Reef slopes and near passes, on hard bottoms with large rubble and coral patches.

**Depth range** : 0–25 m

**Length commonly to** : 45 cm

**Average weight** : 2.5 kg

**Body thickness** : 15 mm



Photo: S. Purcell, WorldFish Center



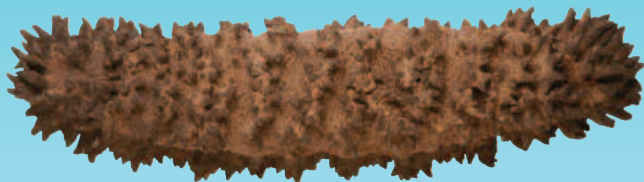
# Prickly redfish

*Thelenota ananas*

## Processed appearance:

- Long shape with a squarish cross-section.
- Upperside covered with spikes, brown to black-brown.
- Underside granular, lighter brown.
- Small cut across mouth, or one single long cut in the underside of large specimens.
- Common size: 20–25 cm.

TFQ



0cm 5 10 15 20 25

# Sandfish

*Holothuria (Metriatyla) scabra*

**Habitat:** Inner reef flats of fringing reefs, lagoon-islet reefs, coastal areas affected by sediments, and near mangroves.

**Depth range** : 0–10 m, but mostly in 0–5 m

**Length commonly to** : 22 cm

**Average weight** : 0.3 kg

**Body thickness** : 6 mm



HFC

Photo: S. Purcell, WorldFish Center

# Sandfish

*Holothuria (Metriatyla) scabra*

## Processed appearance:

- Cylindrical shape with an arched upper side and a flat underside.
- Upperside with grooves across entire body, black-brown to black.
- Underside smooth, amber-brown.
- No cuts or small cut across mouth.
- Common size: 10–12 cm.

HFC



0cm

5

10

15

# Selenka's sea cucumber

*Stichopus horrens*

**Habitat:** Rubble or hidden in reef flats; mostly a nocturnal species

**Depth range** : 0–15 m

**Length commonly to** : 20 cm

**Average weight** : 0.2 kg

**Body thickness** : 2 mm

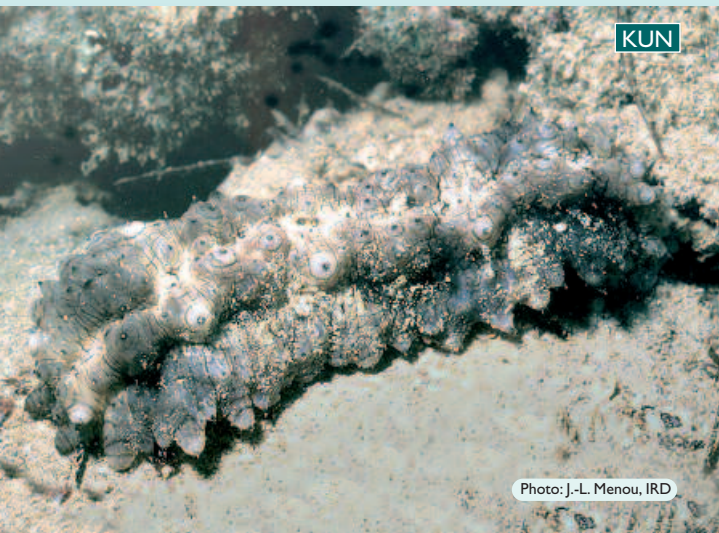


Photo: J.-L. Menou, IRD

# Selenka's sea cucumber

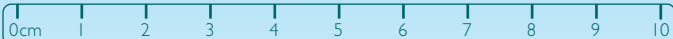
*Stichopus horrens*

## Processed appearance:

- Narrow shape with a squarish cross-section.
- Upperside wrinkly, black to black-brown.
- Underside smoother, black to black-brown.
- No cuts or small cut across mouth.
- Common size: 8–10 cm.



KUN



# Snakefish

*Holothuria (Acanthotrapeza) coluber*

**Habitat:** Inner and outer reef flats and back reefs or shallow coastal lagoons. Abundant on sandy-muddy bottoms with rubble or coral patches and in seagrass beds.

**Depth range** : 0–15 m, but mostly in 0–5 m

**Length commonly to** : 40 cm

**Average weight** : 0.3 kg

**Body thickness** : 4 mm

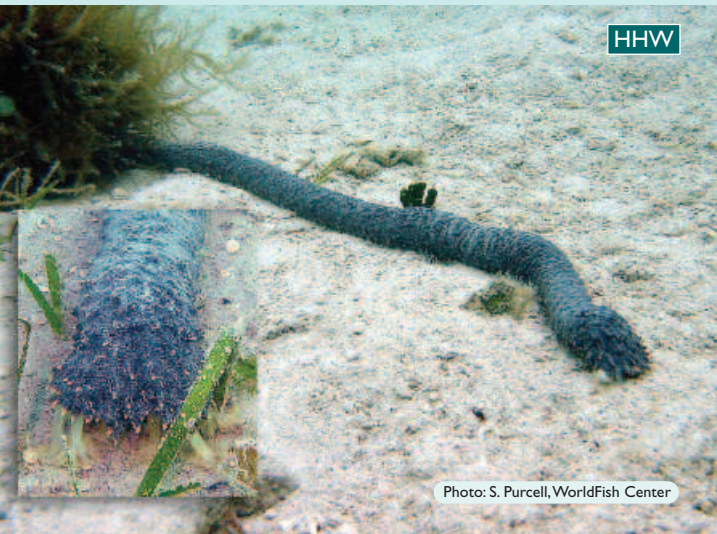


Photo: S. Purcell, WorldFish Center

# Snakefish

*Holothuria (Acanthotrapeza) coluber*

## Processed appearance:

- Long irregular skinny shape, clearly tapered at one end.
- Brown body covered with tiny white bumps.
- Small cut across mouth and/or in the middle of body.
- Common size: 18–22 cm.

HHW



# Stonefish

*Actinopyga lecanora*

**Habitat:** Hard substrates. Nocturnal species. In daytime, found under large stones, in gaps in reef slopes or in sheltered areas.

**Depth range** : 0–20 m, but mostly in 0–10 m

**Length commonly to** : 25 cm

**Average weight** : 0.4 kg

**Body thickness** : 6 mm



Photo: A. Desurmont, SPC



# Stonefish

*Actinopyga lecanora*

## Processed appearance:

- Roughly oval shape, with arched upper side and flat underside.
- Upperside with shallow grooves across body, brown-black.
- Underside smooth, brown-black.
- No cuts.
- Common size: 10–14 cm.



0cm

5

10

15

# Surf redfish

*Actinopyga mauritiana*

**Habitat:** Outer reef flats and fringing reefs, mostly in the surf zone.

**Depth range** : 0–20 m, but mostly in 0–5 m

**Length commonly to** : 20 cm

**Average weight** : 0.3 kg

**Body thickness** : 6 mm



Photo: J.-L. Menou, IRD

# Surf redfish

*Actinopyga mauritiana*

## Processed appearance:

- Roughly oval shape, with arched upper side and flat underside.
- Upperside with grooves across body, black-brown.
- Underside granular, lighter reddish-brown.
- No cuts.
- Common size: 8–12 cm.



0cm

5

10

15

# White teatfish

*Holothuria (Microthele) fuscogilva*

**Habitat:** Oceanic influenced lagoons and passes.

**Depth range** : 1–40 m, but mostly in 20+ m

**Length commonly to** : 42 cm

**Average weight** : 2.4 kg

**Body thickness** : 12 mm



Photo: J.-L. Menou, IRD

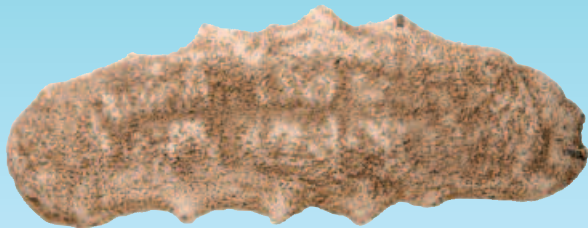
# White teatfish

*Holothuria (Microthele) fuscogilva*

## Processed appearance:

- Flat and chunky shape with obvious teats along each side.
- Surface smooth to slightly wrinkled and powdery.
- Entire body different shades of grey-brown.
- One single long straight cut in the upperside.
- Common size: 18–24 cm.

HFF



# Beche-de-mer processing methods

Several processing methods are used throughout the Pacific Islands region; these can be divided in two main categories: processing with and without salt. The methods described here are the most commonly used as they require only basic equipment. Processing should be done according to buyer specifications as each beche-de-mer market has its own requirements. But, for all markets, the quality of the processing will greatly influence the selling price of the final product.

## Processing recommendations

No salt method:

- Before cooking in seawater, lay live animals on a flat surface for 20 minutes so they can straighten themselves and expel most of the sand they contain (some species will also eviscerate).
- Monitor carefully the first cooking time; if is too long, the stomach will form a carbuncle, expand and burst.

All processing methods:

- All animals must be alive before processing.
- If cutting is needed to clean out the sea cucumber gut, use sharp knives and make cuts carefully.
- Don't mix species or sizes when cooking.
- Stir gently, regularly and keep an eye on the beche-de-mer while cooking.
- If the water is too hot when cooking, the skin will peel off. The water temperature should be such that you can hold your finger in it for two seconds.
- Some species — brown sandfish, curryfish, greenfish, leopardfish and Selenka's sea cucumber — are fragile and need extra care with handling and processing as their body walls can easily degrade.
- If the weather is rainy or humid, keep smoking (or hot air drying) until sun drying is possible.
- Store the dried beche-de-mer in cardboard boxes or rice/copra bags, in a dry place.

# Beche-de-mer processing methods

## Processing using salt

Cut and gut the sea cucumbers soon after they have been fished:

- black and white teatfish: make a long slit along the upper dorsal side, up to 3 cm from each end.
- large amberfish, elephant trunkfish and prickly redfish: make a long slit along the ventral side, up to 3 cm from each end.
- all others: make a small cut across the mouth, or in the middle of the ventral side.

For animals gutted with a long cut, place a handful of salt inside the gut cavity. For animals gutted with a short mouth or belly cut, push the salt into the cut to fill the gut cavity.

Place the animals in a sealed container with a layer of salt, a layer of sea cucumber, a layer of salt, etc. (on average, 5 kg of sea cucumbers require 1 kg of salt). The salt will cause the animals to expel liquid. This liquid needs to be drained off daily with a little extra salt added over the surface of exposed sea cucumbers. Remember: too much salt is better than not enough. If insufficient salt is used, the product will rot.

If possible, store containers in a chiller; otherwise, store them in a shady spot out of direct sunlight. If the product is salted correctly, there should be no bad odour and you should be able to wait for up to three weeks before you do the final processing.

The final part of the processing (cooking in water, smoking and/or drying) is nearly the same as when processing with no added salt (see other card), except skip the first cooking and gutting, and start from the second cooking in water. If the product has been correctly salted, it can be cooked in fresh water.

Finally, as salted sea cucumber dries, a crust of salt forms on the flesh, which should be washed off. If it is not removed, the product will not dry correctly.

# Beche-de-mer processing methods

## Processing with no added salt

### Method 1

Cook in seawater for a very short time (2–5 minutes) until it swells. Remove body content by gently pressing the beche-de-mer (if necessary, make a very small cut through the mouth). Put back in hot water until hard and rubbery (should bounce like a ball when thrown on the ground). Bury in a sandpit for 12–18 hours. Rub to remove decomposed outer surface. Cook a third time in clean seawater until hard and rubbery. Hot air dry (most markets require non-smoked sandfish) ( $\approx$  2 days). Sun dry (4 days to 2 weeks).

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### Method 2

Cook in seawater for a very short time (2–5 minutes) until it swells. Remove body content by gently pressing the beche-de-mer (if necessary, make a very small cut through the mouth). Put back in hot water until hard and rubbery (should bounce like a ball when thrown on the ground). Wash in seawater. Cook a third time in clean seawater until hard and rubbery. Hot air dry or smoke ( $\approx$  2 days). Sun dry (4 days to 2 weeks).

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### Method 3

Cook in seawater until it swells (this first cooking may take up to 10 minutes as this method is used for animals with very thick body walls). Slit upper dorsal side, up to 3 cm from each end, and remove body content, but don't remove the three longitudinal string muscles. Wash in seawater. Cook again, in clean seawater, until hard and rubbery ( $\approx$  1/2 h). Remove remaining guts. Place sticks across the slit to keep it open. Hot air dry or smoke (12–48 h) then sun dry (1–2 days) with the slit downwards. Remove sticks and tie with string or vines. Sun dry again (4 days to 2 weeks). Remove strings/vines before packing.

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### Method 4

Same as Method 3, but slit along ventral side, not upper dorsal side.

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# Beche-de-mer processing methods

Common name	Method	
	Small sp.	Large sp.
Amberfish	2	4
Black teatfish	3	3
Blackspotted sea cucumber	2	2
Brown sandfish	2	2
Brownspeckled sandfish	2	2
Curryfish	2	2
Deep-water redfish	2	2
Elephant trunkfish	2	4
Golden sandfish	1	1
Greenfish	2	2
Hairy blackfish	2	2
Leopardfish	2	2
Lollyfish	2	2
Pinkfish	2	2
Prickly redfish	2	4
Sandfish	1	1
Selenka's sea cucumber	2	2
Snakefish	2	2
Stonefish	2	2
Surf redfish	2	2
White teatfish	3	3

# Sea cucumber biology

Sea cucumbers are echinoderms, and are related to starfish and sea urchins. There are more than 1000 species of sea cucumbers in the world, but only around 20 species are commercially important in the Pacific.

Sea cucumbers have a mouth with small tentacles and a long digestive system. Their diet is mainly composed of dead organic matter, bacteria and single-cell algae that are mixed with sand and mud. By foraging through great quantities of sand, they clean and turn the sediment, recycling nutrients necessary to marine organisms and ecosystems. The reef species feed on the fine layer of sediment or algae on reef surfaces. Some sea cucumbers burrow in sand at certain times of the day, while others hide in reef crevices. A few species release white “cuvierian” tubules (sticky filaments) when disturbed, as a defensive response.

Sea cucumbers mainly reproduce sexually, with males releasing sperm and females releasing eggs at the same time into the water column. Once fertilised, the eggs hatch into planktonic larvae that can drift with the current to other areas. After 2–4 weeks, the larvae attach themselves to the bottom and change (metamorphose) into young sea cucumbers. To ensure successful reproduction, males and females need to be present in high numbers in the same area. If overfishing occurs and remaining individuals are too far apart, eggs and sperm may never mix. Recovery of depleted stocks may take several years to decades.

Many sea cucumbers are long lived and have a late maturity. Setting size limits to avoid harvesting juveniles until they are large enough to breed (for many species, this is around 500 g in live weight) will help to protect stocks.

Exploited fisheries will typically comprise smaller individuals of the high-value species, whereas severely exploited fisheries will comprise only low-value species.





Australian Government

Australian Centre for  
International Agricultural Research



**For more information on these identification cards, please contact:**

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