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Papua New Guinea sea cucumber and beche-de-mer identification cards

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Introduction

Since September 2001, the Papua New Guinea beche-de-mer fishery has been governed by the National Beche-de-mer Fishery Management Plan. Management measures include regulations on access, size and catch limits, storage and export. To facilitate the monitoring of this fishery and enforcement of the regulations, the National Fisheries Authority (NFA) decided to produce a booklet showing the different sea cucumber species traded in the region. They approached the Secretariat of the Pacific Community (SPC) Marine Resources Division Information Section to seek their assistance for this project.

During the last 19 years, SPC has published several versions of a sea cucumber identification guide: *Bêche-de-mer of the South Pacific Islands* (1975); *Bêche-de-mer of the tropical Pacific* (1979); and *Sea cucumbers and beche-de-mer of the tropical Pacific – A handbook for fishers* (1984). This last edition presents pictures, in full colour, of 15 holothurian species and their corresponding beche-de-mer (dried) product. Thousands of copies of have been distributed through the Pacific, and copies of the last edition are still regularly sent upon request. Unfortunately,

it is now almost out of print and some of the information it contains is out of date: several species that were not listed as of commercial value in 1994 are now traded and some of the species that were categorised as low value in the handbook have since “climbed the ladder”. The handbook was not fully adapted to NFA needs, so it was decided to produce a new sea cucumber identification guide, specially designed for PNG.

An identification guide is mostly used in the field, so it has to be easy to carry around and waterproof. Therefore, instead of a handbook, we decided to make a set of pocket-size (95 x 135 mm) cards printed on plastic (as in credit cards) and bound together by a plastic pin. Each card presents one species of sea cucumber, with a full-colour underwater picture of the live animal on one side and two pictures (ventral and dorsal views) of the corresponding dried product (beche-de-mer) on the other side (Fig. 1). It also contains some basic information on the species (preferred habitat and depth, average sizes) and a short description of the dried product. The complete set contains 24 cards, presenting 20 different species, giving some basic information on beche-de-mer processing and listing the main regulations pertaining to the beche-

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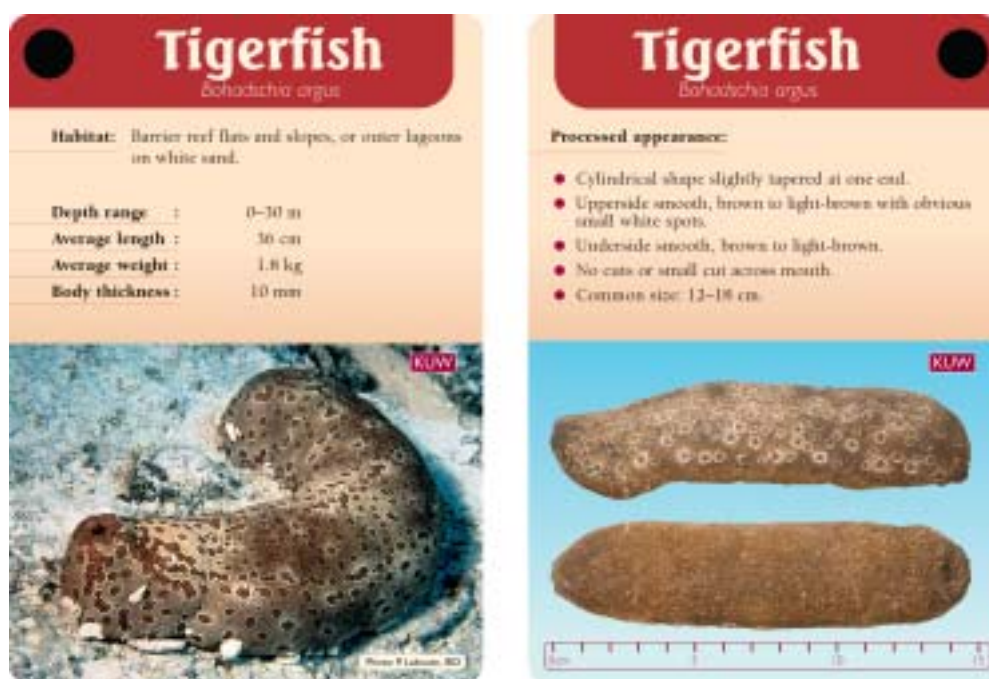


Figure 1.

Both sides of one sea cucumber identification card (scaled at 2/3)

de-mer fishery in PNG. As the fishery regulation information is presented on a separate card, it will always be possible to print a replacement card if the regulations change.

We present below the information given in this new set of identification cards.

Amberfish²

Thelenota anax

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

Depth range: 10–30 m
 Average length: 55 cm
 Average weight: 3.5 kg
 Body thickness: 15 mm

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.³

Blackfish

Actinopyga miliaris

Habitat: Reef flats of fringing and lagoon-islet reefs; never found on barrier reefs.

Depth range: 0–10 m
 Average length: 25 cm
 Average weight: 0.4 kg
 Body thickness: 6 mm

Processed appearance:

- Roughly oval shape with a round cross-section.
- Entire body surface smooth and black.
- No cuts.
- Common size: 10–12 cm.

Black teatfish

Holothuria (Microthele) nobilis

Habitat: Reef flats, slopes and shallow seagrass beds.

Depth range: 0–20 m
 Average length: 37 cm
 Average weight: 1.7 kg
 Body thickness: 12 mm

Processed appearance:

- Flat and chunky shape with obvious teats along

2. The English common names are the ones used in the PNG National Beche-de-mer Fishery Management Plan. They are also the names most commonly used in the PNG trade.

3. The average sizes given for dried products are consistent with the minimum size regulations in PNG. They are the sizes that a fishery enforcement officer should come across.

- 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: 18–24 cm.

Brown sandfish

Bohadschia vitiensis

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

Depth range: 0–20 m
Average length: 32 cm
Average weight: 1.2 kg
Body thickness: 7 mm

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: 12–15 cm.

Chalkfish

Bohadschia similis

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

Depth range: 0–3 m
Average length: 18 cm
Average weight: 0.3 kg
Body thickness: 4 mm

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: 7–9 cm.

Curryfish

Stichopus hermanni

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

Depth range: 0–25 m
Average length: 35 cm
Average weight: 1.0 kg
Body thickness: 8 mm

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: 12–18 cm.

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
Average length: 20 cm
Average weight: 0.3 kg
Body thickness: 7 mm

Processed appearance:

- Oval shape, with arched upperside and flat underside.
- Upperside rough and slightly ridged, grey-brown.
- Underside granular, grey-brown.
- No cuts.
- Common size: 15–18 cm.

Dragonfish

Stichopus horrens

Habitat: Rubble or hidden in reef flats.

Depth range: 0–15 m
Average length: 20 cm
Average weight: 0.2 kg
Body thickness: 2 mm

Processed appearance:

- Narrow shape with a squarish cross-section.
- Upperside knobbly, black-brown to brown.
- Underside smoother with two rows of tiny bumps, black-brown to brown.
- No cuts or small cut across mouth.
- Common size: 8–12 cm.

Elephant trunkfish

Holothuria (Microthele) fuscopunctata

Habitat: Reef slopes and shallow seagrass beds.

Depth range: 0–25 m
Average length: 36 cm
Average weight: 1.5 kg
Body thickness: 10 mm

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: 20–25 cm.

Flowerfish*Pearsonothuria graeffei*

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

Depth range: 0–25 m
 Average length: 35 cm
 Average weight: 0.7 kg
 Body thickness: 4 mm

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: 15–20 cm.

Greenfish*Stichopus chloronotus*

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

Depth range: 0–15 m
 Average length: 18 cm
 Average weight: 0.1 kg
 Body thickness: 2 mm

Processed appearance:

- Narrow shape with a squarish cross-section.
- Each of the four edges covered with pointy warts.
- Entire body light greenish brown.
- No cuts or small cut across mouth.
- Common size: 10–12 cm.

Lollyfish*Holothuria (Halodeima) atra*

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

Depth range: 0–20 m
 Average length: 20 cm
 Average weight: 0.2 kg
 Body thickness: 4 mm

Processed appearance:

- Narrow cylindrical shape.
- Entire body surface smooth and black.
- No cuts or small cut across mouth.
- Common size: 15–20 cm.

Pinkfish*Holothuria (Halodeima) edulis*

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

Depth range: 0–30 m
 Average length: 20 cm

Average weight: 0.2 kg
 Body thickness: 3 mm

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: 10–14 cm.

Prickly redfish*Thelenota ananas*

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

Depth range: 0–25 m
 Average length: 45 cm
 Average weight: 2.5 kg
 Body thickness: 15 mm

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.

Sandfish*Holothuria (Metriatyia) scabra*

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

Depth range: 0–10 m
 Average length: 22 cm
 Average weight: 0.3 kg
 Body thickness: 6 mm

Note: The golden sandfish (*H. scabra* var. *versicolor*) is also present in PNG waters, but the two species are not differentiated by traders.

Processed appearance:

- Cylindrical shape with an arched upperside 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. No smoky smell.
- Common size: 10–12 cm.

Snakefish*Holothuria (Acanthotrapeza) coluber*

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

Depth range: 0–15 m
Average length: 40 cm
Average weight: 0.3 kg
Body thickness: 4 mm

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: 18–25 cm.

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
Average length: 25 cm
Average weight: 0.4 kg
Body thickness: 6 mm

Processed appearance:

- Roughly oval shape, with arched upperside and flat underside.
- Upperside with shallow grooves across body, brown-black.
- Underside smooth, brown-black.
- No cuts.
- Common size: 10–12 cm.

Surf redfish

Actinopyga mauritiana

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

Depth range: 0–20 m
Average length: 20 cm
Average weight: 0.3 kg
Body thickness: 6 mm

Processed appearance:

- Roughly oval shape, with arched upperside and flat underside.

- Upperside with grooves across body, black-brown.
- Underside granular, lighter reddish-brown.
- No cuts.
- Common size: 8–15 cm.

Tigerfish

Bohadschia argus

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

Depth range: 0–30 m
Average length: 36 cm
Average weight: 1.8 kg
Body thickness: 10 mm

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: 12–18 cm.

White teatfish

Holothuria (Microthele) fuscogilva

Habitat: Outer barrier reefs and passes, but also on shallow seagrass beds.

Depth range: 10–40 m
Average length: 42 cm
Average weight: 2.4 kg
Body thickness: 12 mm

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.

Beche-de-mer processing methods

Method 1

Boil 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 boiling 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. Boil a third time in clean water until hard and rubbery. Hot air dry (≈ 2 days), but DO NOT SMOKE. Sun dry (4 days to 2 weeks).

Method 2

Boil 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 boiling water until hard and rubbery (should bounce like a ball when thrown on the ground). Wash in seawater. Boil a third time in clean water until hard and rubbery. Hot air dry or smoke (≈ 2 days). Sun dry (4 days to 2 weeks).

Method 3

Boil until it swells (this first boil 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. Boil again, in clean water, 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.

Method 4

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

Processing recommendations

- All animals must be alive before processing.
- Before boiling, lay 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).
- 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 boiling.
- If the water is too hot when boiling, the skin will peel off. The water temperature should allow you to hold your finger in it for two seconds.
- Some species — dragonfish, curryfish, brown sandfish, tigerfish and greenfish — are fragile and need extra care during handling and processing as their body wall can easily degrade.

PNG trade name	Method	
	Small specimens	Large specimens
Amberfish	2	4
Black teatfish	3	3
Blackfish	2	2
Brown sandfish	2	2
Chalkfish	2	2
Curryfish	2	2
Deep-water redfish	2	2
Dragonfish	2	2
Elephant trunkfish	2	4
Flowerfish	2	2
Greenfish	2	2
Lollyfish	2	2
Pinkfish	2	2
Prickly redfish	2	4
Sandfish	1	1
Snakefish	2	2
Stonefish	2	2
Surf redfish	2	2
Tigerfish	2	2
White teatfish	3	3

- Stir gently, regularly and keep an eye on the beche-de-mer while boiling. If the very first boil is too long, the stomach will form a carbuncle, and expand and burst.
- 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.

PNG beche-de-mer fishery management measures

The PNG beche-de-mer (BDM) fishery is governed by the National Beche-de-mer Fishery Management Plan. Management measures cover the areas of access, size and catch limits, storage and export. These measures include:

Access

- Open to PNG citizens only.
- Closed every year from 1 October to 15 January.
- The use of hookah, scuba and lights are prohibited for the harvesting of BDM.

Size and catch limits

- Each province is allocated a total allowable catch (TAC) for each of the two value groups (high and low) during the season.
- The fishery is closed when the TAC or the TAC of one value group is reached. If the allocated TAC for a province is exceeded by more than 5 tonnes, the excess amount will be taken off their next season's TAC.

- Minimum sizes are set for live and dry specimens of 17 species. Undersized and broken pieces of BDM cannot be traded and will be confiscated.

Storage and export

- A license is required for storing or exporting BDM.
- Exporters must provide NFA with a monthly summary of their purchases, including species trade names, weights in kg for each species, suppliers' and ward names.
- BDM product for export must be clearly labelled. Exporters must declare their stored holdings to NFA within 5 days after the season closing date.
- BDM movement between provinces is prohibited unless authorised by NFA Managing Director.
- Export samples are limited to two pieces of each species.
- Export for self-consumption is limited to 2 kg.

Value groups, trade names and minimum size restrictions for the PNG beche-de-mer fishery*

PNG trade name	Scientific name	Minimum sizes	
		Live	Dry
High grade species (value group H)			
Black teatfish	<i>Holothuria nobilis</i>	22 cm	10 cm
Blackfish	<i>Actinopyga miliaris</i>	15 cm	10 cm
Curryfish	<i>Stichopus hermanni</i>	25 cm	10 cm
Greenfish	<i>Stichopus chloronotus</i>	20 cm	10 cm
Prickly redfish	<i>Thelenota ananas</i>	25 cm	15 cm
Sandfish	<i>Holothuria scabra</i>	22 cm	10 cm
Stonefish	<i>Actinopyga lecanora</i>	15 cm	10 cm
Surf redfish	<i>Actinopyga mauritiana</i>	20 cm	8 cm
White teatfish	<i>Holothuria fuscogilva</i>	35 cm	15 cm
Low grade species (value group L)			
Amberfish	<i>Thelenota anax</i>	20 cm	10 cm
Brown sandfish	<i>Bohadschia vitiensis</i>	20 cm	10 cm
Chalkfish	<i>Bohadschia similis</i>	25 cm	7 cm
Deep-water redfish	<i>Actinopyga echinites</i>	25 cm	15 cm
Dragonfish	<i>Stichopus horrens</i>	none	none
Elephant trunkfish	<i>Holothuria fuscopunctata</i>	45 cm	15 cm
Flowerfish	<i>Pearsonothuria graeffei</i>	none	none
Lollyfish	<i>Holothuria atra</i>	30 cm	15 cm
Pinkfish	<i>Holothuria edulis</i>	25 cm	10 cm
Snakefish	<i>Holothuria coluber</i>	none	none
Tigerfish	<i>Bohadschia argus</i>	20 cm	10 cm

* This information is partly extracted from the PNG National Beche-de-mer Fishery Management Plan. It is current at the date of printing (April 2003) but subject to change.

The information presented in these identification cards was gathered from personal communications with scientists, fishermen, processors and traders,⁴ 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.

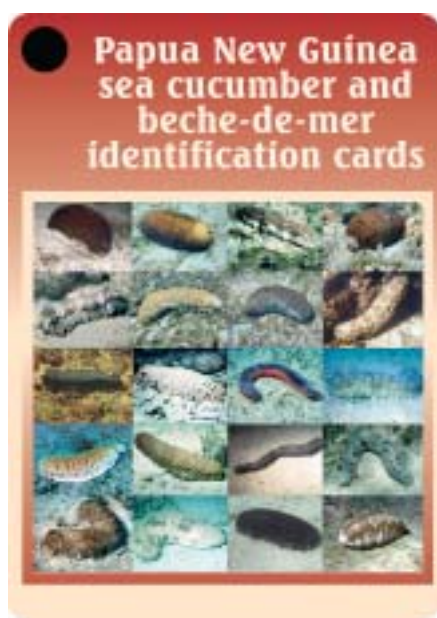
Guille, P., P. Laboute and J.-L. Menou. 1986. Handbook of the sea-stars, sea-urchins and related echinoderms of New Caledonia lagoon. Éditions de l'ORSTOM, Paris, France. (in French).

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, New Caledonia.

For more information on the PNG beche-de-mer fishery, please contact:

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