

Fact sheets and identification guide for commercial sea cucumber species

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The sustainable harvesting and conservation of sea cucumbers has been the subject of debate in various fora in recent years (e.g. ASCAM and CITES workshops). Such discussions have led to the identification of a need to develop a comprehensive guide to help enforcement officials and researchers. Although the original idea for this FAO publication was a simple identification guide for major commercial sea cucumber species, it was decided that this guide would also be the perfect opportunity to gather available scientific information on the biology, ecology, marketing and processing activities, as well as photos and descriptions of commercial species at different processing levels.

Jointly, with Alessandro Lovatelli from FAO, a two-page questionnaire has been developed, asking users about information on the topics mentioned above. The format allows users to fill in information using a computer, with the questionnaire then returned to me via email or regular mail. The information would then be later collated into a book to be published by FAO, under direct collaboration with the Charles Darwin Foundation. The questionnaire has already been distributed by email to fellow colleagues working on sea cucumbers (i.e. scientists, managers). However, if you feel you can contribute to this project but have not been contacted, please let me know and I will email you a questionnaire.

A short description of the information required for each species is included in Box 1, and respondents can contact me if they have any questions. Even species for which there is little or no information will be included in the guide, using the best available data. All contributions will be duly acknowledged in the book and a complimentary copy of the book sent for personal use.

So far, 43 species have been identified, based on the work of Prof Chantal Conand and further work carried out during the CITES workshop held in Kuala Lumpur in March 2004. This list of species (Table 1) is not final, however, and species can be amended, deleted and changed. This is where fellow colleagues conducting sea cucumber research will have a very important role, as I would appreciate any input you may have on a particular species. If you know of any other species that should be in-

cluded, fill in and return the questionnaire. If you know of other species, but are not able to contribute all of the information required, send me the contact details of an expert on that species so that I can contact them for the necessary information.

Besides specific information for each species, photos are also necessary of 1) the live animal, 2) the processed animal (in different forms), and 3) the calcareous spicules.

The procedure for obtaining spicules is rather simple and can be done in a few hours by following the steps below.

- Cut a slice (1 cm² x 1 mm thickness) from the dorsal area.
- Place the sample in a small test tube with 3 mL of commercial bleach (NaOCl) and label it for further identification.
- Leave the sample sit for approximately 30 min or until the body wall has dissolved and the spicules have settled on the bottom as fine white sediment.
- Using a pipette, transfer the fine white sediment onto a microscope slide, cover it with a cover slip, and examine using a microscope with 100 x magnification.
- Organise the spicules on your microscope slide and take a photograph. Please make sure that the picture size is *at least* 12 cm x 9 cm in 350 dpi resolution (or 1600 x 1200 pixels).

To avoid mistakes and deliver the highest quality product as possible, FAO asked Drs Jean-Francois Hamel, Annie Mercier, Sven Uthicke, Steve Purcell and Prof Chantal Conand to be part of a scientific committee that will oversee this work and amend errors as needed.

Some of you were present at the FAO-ASCAM workshop (Dalian, China, October 2003), some at the CITES workshop (Kuala Lumpur, Malaysia, March 2004), and some of you are regular contributors to the *SPC Beche-de-Mer Information Bulletin*, thus your feedback and help is important. Also, any suggestions are greatly appreciated. I kindly ask for your support, which will yield an invaluable tool for the well-being of commercial sea cucumbers species.

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Our very ambitious goal is to have all the information for this guide ready by the end of August 2006; therefore, I ask you to please fill in your question-

naire as soon as possible, so that all of the relevant information can be collated and submitted to FAO. I look forward to your help.

Box 1: Description of the information required

1. **Scientific name:** The genus and species of your species in trade, including who named the species.
2. **English name:** The English name of your species in trade. If unavailable, provide the best translation of the local name.
3. **Local name:** The name under which your species in trade is known locally. Identify the language in which it is named (i.e. Pepino de mar, Spanish).
4. **Prepared/compiled by:** Your name as a contributor to this book. Further details on your affiliation and contact details will be provided at the end of the card.
5. **Family:** Taxonomic family to which your species in trade belongs to (e.g. Holothuriidae, Stichopodidae, Cucumaridae)
6. **Origin:** The region or area from where the information for your species in trade is provided. Please include country and continent.
7. **FAO region:** Code number of the FAO region where the information for your species in trade is provided.
8. **Photo:** Photograph of live specimen of your species in trade in the card. If possible, in its natural environment. Include name of photographer.
9. **Live appearance:** Written description of your live species in trade. Include colour, texture and general appearance.
10. **Average fresh weight (g):**
11. **Average fresh length (cm):**
12. **Growth:**
13. **Distribution range:** Geographical range where your species in trade is found.
14. **Habitat:** Include preferred substratum and depth range.
15. **Reproductive biology:** Information on size of maturity (SOM), or size at which 50% of the population is reproductive. Please specify if size corresponds to weight or length, and to fresh, gutted or dry specimens; reproductive season if annual, bi annual, continuous; and when in the year (months) reproduction occurs. Mean fecundity estimates, average number of eggs per gonad, larval development if lecithotrophic or planktotrophic, average egg diameter in microns (mm).
16. **Type of fishery:** (i) **Subsistence** fishery is when the product caught is consumed directly by the families of the fishers, rather than being bought by middle-(wo)men and sold at the next larger market; or, "a fishery where the fish caught are shared and consumed directly by the families and kin of the fishers rather than being bought by middle-(wo)men and sold at the next larger market";^a (ii) **Artisanal** fisheries involve skilled but non-industrialised operators; typically, a small-scale, decentralized operation; normally subsistence fisheries although sometimes the catch may be sold. Usually fishing trips are short and inshore and fishing vessels are small;^b or, "traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amount of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption. Artisanal fisheries can be

a. <http://www.fao.org/glossary>

b. <http://www.fishbase.org/Glossary>

subsistence or commercial fisheries, providing for local consumption or export. They are sometimes referred to as small-scale fisheries;^a (iii) **Semi-industrial** fisheries are those when some sort of mechanization of the fishing method occurs, the fishing vessels are bigger and have a bigger storing capacity; and, (iv) **Industrial** fisheries include bigger vessels with more storing capacity and non-artisanal fishing techniques. The produce is sold.

17. **To the author's knowledge, the population status is:** This represents the author's knowledge on the health of the population of your species in trade.
18. **Main market:** This is where most of the species are exported to, as a start of the chain of trade, if any.
19. **Main use:** The main human use for your species in trade. If "other", please specify. If needed, provide further information in # 30.
20. **Management of the fishery (if marked, please specify):** This will provide information on the different regulations used to control a sea cucumber fishery. Whenever you mark one, please specify.
21. **Fishing methods/fishing gear used:** This could be by means of scuba diving, hookah (an air compressor on the surface, which provides air by means of a hose) diving, hand collecting, weighted hooks, etc.
22. **Domestic consumption:** Please identify if your species in trade is also consumed locally. Please provide quantitative values (e.g. 30% of the total catch is consumed domestically).
23. **Processing technique:** Explain how you obtained your final product (i.e. beche-de-mer, gamat oil, viscera, etc).
24. **Conversion factors:** This refers to the weight change from live animal to brine, or live animal to dry.
25. **Photo of processed animal:** Photograph of processed specimen of your species in trade. Include name of photographer.
26. **Processed appearance:** Written description of what your live species in trade looks like. Include colour, texture and general appearance.
27. **Local price (in USD):**
28. **Photo of spicules:** Photograph of spicules specimen of your species in trade. Include name of photographer.
29. **Spicule description:** Specify the types of spicules found in the dorsal body wall of your species.
30. **Other useful information:** Please feel free to add any information you think would be valuable for this guide. Expand on any item number.

References: Please include references in the above items as this is a scientific guide. Provide full reference of the work cited. This will be included at the end of the guide.

Author contact details: Please specify your contact details, as this will be included at the end of the guide as a quick reference on sea cucumber experts and collaborators to the guide.

Authorisation: In order to publish this information, FAO requires your authorisation for the use of the information and photos provided in your card. The authorisation included in this guide is intended only for this guide. If you are not the photographer for the illustration, please provide contact details of the photographer, and I will contact them directly.

Photo quality: Please make sure that picture size is at least 12 cm x 9 cm in 350 dpi resolution (or 1600 x 1200 pixels). Please save each photo with the species name, region and author (for example: LIVE-I.fuscus-Galapagos-VTorral.jpg), and send them as a .jpg files. Include a scale in cm.

Table 1. Main commercial species with their commercial value, conservation concern and common name(s).

#	Species ^a	Family	Commercial value	Conservation concern ^b	Common name(s)
1	<i>Athyonidium chilensis</i>	Cucumariidae		3	Pepino de mar
2	<i>Cucumaria frondosa</i>	Cucumariidae		3	Pumpkins; Orange footed cucumber
3	<i>Pattalus mollis</i>	Cucumariidae		5	Pepino de mar
4	<i>Actinopyga lecanora</i>	Holothuriidae	Medium	3	Stonefish
5	<i>A. agassizi</i>	Holothuriidae		4	
6	<i>A. echinites</i>	Holothuriidae	Low	2	Deep-water redfish
7	<i>A. mauritiana</i>	Holothuriidae	Medium	2	Surf redfish
8	<i>A. miliaris</i> ^a	Holothuriidae	Medium	2	Blackfish; Hairy blackfish
9	<i>A. palauensis</i>	Holothuriidae	Medium	4	
10	<i>Bohadschia argus</i>	Holothuriidae	Low	3	Tigerfish; Leopardfish
11	<i>B. atra</i>	Holothuriidae	Low	5	
12	<i>B. marmorata vitiensis</i> ^a	Holothuriidae	Low	4	
13	<i>B. similis</i>	Holothuriidae	Low	4	Chalkfish; Brownspeckled sandfish
14	<i>B. subrubra</i>	Holothuriidae	Low	5	
15	<i>B. vitiensis</i> ^a	Holothuriidae	Low	4	Brown sandfish
16	<i>Holothuria arenicola</i>	Holothuriidae	Low	5	
17	<i>H. (Halodeima) atra</i>	Holothuriidae	Low	4	Lollyfish
18	<i>H. cinerascens</i>	Holothuridae	Low	5	
19	<i>H. coluber</i>	Holothuridae	Low	4	Snakefish
20	<i>H. edulis</i>	Holothuridae	Low	4	Pinkfish
21	<i>H. fuscogilva</i> ^a	Holothuriidae	High	1	White teatfish
22	<i>H. fuscopunctata</i>	Holothuriidae	Low	3	Elephant trunkfish
23	<i>H. impatiens</i>	Holothuriidae	Low	5	
24	<i>H. leucospilota</i>	Holothuriidae	Low	4	
25	<i>H. mexicana</i>	Holothuriidae		4	Donkey dung
26	<i>H. nobilis</i> ^a	Holothuriidae	Medium	1	Black teatfish
27	<i>H. scabra</i>	Holothuriidae	High	1	Sandfish
28	<i>H. scabra versicolor</i> ^a	Holothuriidae	High	2	Golden sandfish
29	<i>H. whitmaei</i>	Holothuriidae			Black teatfish
30	<i>Pearsonothuria graeffei</i>	Holothuriidae	Low	4	Flowerfish; Blackspotted sea cucumber
31	<i>Astichopus multifidus</i>	Stichopodidae		4	
32	<i>Isostichopus badionotus</i>	Stichopodidae		3	
33	<i>I. fuscus</i>	Stichopodidae	Medium	1	Brown sea cucumber
34	<i>Parastichopus californicus</i>	Stichopodidae		3	Giant red sea cucumber
35	<i>P. parvimensis</i>	Stichopodidae		4	Warty sea cucumber
36	<i>Stichopus mollis</i>	Stichopodidae		5	Pepino de mar
37	<i>S. (Apostichopus) japonicus</i>	Stichopodidae	High	4	
38	<i>S. chloronotus</i>	Stichopodidae	Medium	2	Greenfish
39	<i>S. hermannii (S. variegatus)</i> ^a	Stichopodidae	Medium	2	Curryfish
40	<i>S. horrens</i>	Stichopodidae	Medium	2	Warty sea cucumber; Selenka's sea cucumber
41	<i>Thelenota anax</i>	Stichopodidae	Medium	3	Amberfish
42	<i>T. ananas</i>	Stichopodidae	High	1	Prickly redfish
43	<i>T. rubralineata</i>	Stichopodidae	Low	4	

a. Species taxonomy to be revised

b. Conservation concern: 1 = high concern, 2 = concern in certain countries of its range, 3 = potential for future concern as harvest increases, 4 = no concern, and 5 = minor species of little commercial importance. Modified from Bruckner (2006).