

# Abstracts and new publications...

## CITES Notification (Geneva, 1 March 2013)

### No. 2013/007 Concerning: *Sea cucumbers*

#### *Convention on the International Trade in Endangered Species Of Wild Fauna And Flora*

1. At its 26<sup>th</sup> meeting (AC26, Geneva, 15–20 March 2012), the Animals Committee requested the Secretariat to issue a notification drawing the attention of the Parties to publications of the Food and Agriculture Organization of the United Nations (FAO) on sea cucumbers.
2. The following provides a list of recent publications by FAO on sea cucumbers, with links to online versions:
  - Lovatelli A., Conand C., Purcell S., Uthicke S., Hamel J.-F. and Mercier A. 2004. Advances in sea cucumber aquaculture and management. FAO Fisheries Technical Paper no. 463. Rome, Italy: Food and Agriculture Organization. 425 pp.  
<http://www.fao.org/docrep/007/y5501e/y5501e00.htm>
  - Toral-Granda V., Lovatelli A. and Vasconcellos M. 2008. Sea cucumbers. A global review of fisheries and trade. FAO Fisheries and Aquaculture Technical Paper no. 516. Rome, Italy: Food and Agriculture Organization. 317 p.  
<http://www.fao.org/docrep/011/i0375e/i0375e00.htm>
  - Food and Agriculture Organization. 2010. Putting into practice an ecosystem approach to managing sea cucumber fisheries. Rome, Italy: Food and Agriculture Organization. 81 p.  
<http://www.fao.org/docrep/013/i1780e/i1780e00.htm>
  - Purcell S.W., Samyn Y. and Conand C. 2012. Commercially important sea cucumbers of the world. FAO Species Catalogue for Fishery Purposes no. 6. Rome, Italy: Food and Agriculture Organization. 150 p. + colour plates.  
<http://www.fao.org/docrep/017/i1918e/i1918e.pdf>
  - Food and Agriculture Organization. 2012. Report on the FAO workshop on sea cucumber fisheries: An ecosystem approach to management in the Pacific (SCEAM Pacific), Nadi, Fiji, 15–18 November 2011. FAO Fisheries and Aquaculture Report no. 1003. Rome, Italy: Food and Agriculture Organization. 44 p.  
<http://www.fao.org/docrep/015/i2658e/i2658e00.htm>
  - Purcell S.W. Managing sea cucumber fisheries with an ecosystem approach. 2012. Edited/compiled by Lovatelli A., Vasconcellos M. and Yimin Y. FAO Fisheries and Aquaculture Technical Paper no. 520. Rome, Italy: Food and Agriculture Organization. 157 p.  
English: <http://www.fao.org/docrep/012/i1384e/i1384e00.htm>  
Spanish: <http://www.fao.org/docrep/013/i1384s/i1384s00.htm>
3. The Animals Committee encourages sea cucumber range States to:
  - promote the conservation and management of sea cucumbers that occur on their territories, taking advantage of the information in the publications above and other documents available from FAO, as well as in the reports of the CITES-related workshops on Sea Cucumbers in 2003 and 2004 (see documents AC22 Inf. 1 and CoP14 Doc. 62), and other publications.

## Some conferences to come

### *North American Echinoderm Conference, 1–6 June 2014*

The conference will take place at the University of West Florida, Pensacola, FL, USA. The website is: <http://uwf.edu/naec2014>

The conference is being dedicated to the career of David Pawson. As part of the dedication, we have several student “scholarships” to help offset the cost of attending the meeting.

While the meeting is being held in North America, anyone interested in the meeting is invited to attend regardless of where you are from. Please help spread the word.

**3<sup>rd</sup> Annual World Congress of Aquaculture and Fisheries — 2014 (WCAF-2014)**

The meeting will be held from 16–18 October in Dalian International Conference Center, Dalian, China.

For more info please visit: <http://www.bitcongress.com/wcaf2014/default.asp>

**Next European Echinoderms Conference**

The next European Echinoderms Conference will take place in Portsmouth, England between 20 and 24 July 2014. We look forward to welcoming you there so please pass this message on to anyone who might be interested.

A website will be developed shortly giving details of the meeting and how to register, but for early planning registration covering all costs except the conference dinner and post-conference excursions will be around £ 110 (€ 130) and accommodation will be available in the university halls of residence bed and breakfast £ 44 (€ 51.3) per night.

Dr Andrew B. Smith FRS FRSE: [a.smith@nhm.ac.uk](mailto:a.smith@nhm.ac.uk)

**Books in press****I. Sea cucumbers in the western Indian Ocean: Improving management of an important but poorly understood resource**

*N. Muthiga and C. Conand*

2014 – *WIOMSA Book Series No. 14. viii + 74 (in press)*

Across the western Indian Ocean, the harvesting of sea cucumbers is predominantly carried out by artisanal fishers. Although sea cucumbers have been traded for centuries in the region, little is known about stocks, fishing practices and the socioeconomic factors driving this fishery. This, coupled with declining stocks led to the initiation of a three-year, multi-country regional research project funded by the Marine Science for Management programme of the Western Indian Ocean Marine Science Association. The project aimed to document and evaluate the knowledge available on sea cucumbers in the region and conduct studies to fill key information gaps in five countries Kenya, Madagascar, Reunion (France), Seychelles and Tanzania. This volume provides a summary of key research findings of the project and recommendations for the effective management of the sea cucumber fishery in the western Indian Ocean. Information is summarised in chapters discussing ecological assessments and species inventories; studies on the reproductive biology of the key commercial species; studies to assess the effectiveness of marine protected areas in the management of sea cucumbers; and studies on the socioeconomics and management of the fishery. The volume is targeted at institutions that have a stake in maintaining the long-term productivity and sustainability of fisheries and natural resources, fisheries and conservation managers, local communities that depend on these resources and donors especially those who have an interest in coastal community resource management and alternative livelihoods. The main findings of the project were that the sea cucumber fisheries in most of the studied countries continued to decline due to overexploitation and persistent and systemic governance challenges. The key recommendations detailed in this report include improving management capacity and planning, addressing the ecological and socioeconomic knowledge gaps, exploring alternative livelihoods and diversification, and improving stakeholder engagement and regional coordination. Copies of this volume can be obtained from the Executive Secretary WIOMSA ([secretary@wiomsa.org](mailto:secretary@wiomsa.org)).

**II. FAO Publications**

The two publications below are available online and hard copies are available by contacting Alessandro Lovatelli. Simply contact him and provide your contact details and mailing address and indicate what you are doing in the field of sea cucumbers. Link: <http://www.fao.org/docrep/011/i0375e/i0375e00.htm>

**Sea cucumbers. A global review of fisheries and trade.**

*Toral-Granda V., Lovatelli A. and Vasconcellos M.*

*FAO Fisheries and Aquaculture Technical Paper. No. 516. Rome, Italy: Food and Agriculture Organization. 317 p. 2008.*

This paper reviews the worldwide population status, fishery and trade of sea cucumbers through the collection and analysis of available information from five regions, covering known sea cucumber fishing grounds: temperate areas of the Northern Hemisphere; Latin America and the Caribbean; Africa and the Indian Ocean; Asia; and the western central Pacific. In each region a case study of a “hotspot” country or

fishery is presented to highlight critical problems and opportunities for the sustainable management of sea cucumber fisheries. The hotspots are Papua New Guinea, Philippines, Seychelles, Galapagos Islands and the fishery for *Cucumaria frondosa* in Newfoundland, Canada. Together they provide a comprehensive and up-to-date evaluation of the global status of sea cucumber populations, fisheries, trade and management, constituting an important information source for researchers, managers, policy-makers, and regional and international organisations interested in sea cucumber conservation and exploitation.

### Commercially important sea cucumbers of the world.

*Purcell S.W., Samyn Y. and Conand C.*

*FAO Species Catalogue for Fishery Purposes no. 6. Rome, Italy: Food and Agriculture Organization. 150 p. + 30 colour plates. 2012.*

Sea cucumbers are harvested and traded in more than 70 countries worldwide. They are exploited in industrialised, semi-industrialised and artisanal fisheries in polar regions, temperate zones and throughout the tropics. In some fisheries, more than 20 species are exploited by fishers. The processed animals are exported mostly to Asian markets and need to be distinguished to species level by customs and trade officers. This book is intended as an identification tool for fishery managers, scientists, trade officers and industry workers to distinguish various species exploited and traded worldwide. This book provides identification information on 58 species of sea cucumbers that are commonly exploited around the world. There are many other species that are exploited either in a small number of localities or in relatively small quantities, which are not presented. Species in some regions with active fisheries are also not represented due to limited available information (e.g. Mediterranean species). The accounts are based on more than 170 reports and research articles, and by comments and reviews by taxonomists and field workers. Two-page identification sheets provide sufficient information to allow readers to distinguish each species from other similar species, both in the live and processed (dried) forms. Where available, the following information for each species has been included: nomenclature together with FAO names and known common names used in different countries and regions; scientific illustrations of the body and ossicles; descriptions of ossicles present in different body parts; a colour photograph of live and dried specimens; basic information on size, habitat, biology, fisheries, human consumption, market value and trade; geographic distribution maps. The volume is fully indexed and contains an introduction, a glossary, and a dedicated bibliography. Readers are encouraged to base their identifications on a combination of morphological features, samples of ossicles from different body parts and information on what habitat and locality the species was found.

### III. A manual on hatchery of sea cucumber *Holothuria atra* in the sultanate of Oman

The manual is available for download at:

[http://www.google.co.uk/url?sa=t&rct=j&q=&resrc=s&source=web&cd=1&ved=0CDAQFjAA&url=http%3A%2F%2Fwww.sarnissa.org%2Fdl679&ei=4q3HUoLSOq-U0QXUuYGIDQ&usg=AFQjCNGS2t22HZ3XGzrZR-rALnzWcMcm\\_g&sig2=EiKRE08\\_ncc\\_2kKBOZ000g&bvm=bv.58187178,d.bGQ](http://www.google.co.uk/url?sa=t&rct=j&q=&resrc=s&source=web&cd=1&ved=0CDAQFjAA&url=http%3A%2F%2Fwww.sarnissa.org%2Fdl679&ei=4q3HUoLSOq-U0QXUuYGIDQ&usg=AFQjCNGS2t22HZ3XGzrZR-rALnzWcMcm_g&sig2=EiKRE08_ncc_2kKBOZ000g&bvm=bv.58187178,d.bGQ)

### Oral presentations and posters from the Eighth WIOMSA Scientific Symposium held in Maputo, Mozambique (28 October–2 November 2013) communicated by C. Conand.

#### Oral presentations

Analysis of the incomes generated by community-based sea cucumbers farmers within an NGO–private sector partnership in the Velondriake Locally Managed Area (LMMA) in southwestern Madagascar, case of the village of Tampolove.

*Razafimana H., Lanting M., Rougier A. and Harris A.*

Lost values of insufficiently managed sea cucumber fishery resources.

*Eggertsen M., Eriksson H. and de la Torre-Castro M.*

Science to policy and the road ahead for western Indian Ocean sea cucumber fisheries management and research.

*Eriksson H., Purcell S., Conand C., Muthiga N. and Lovatelli A.*

Effect of the size release of sea cucumber juveniles on their survival and growth during the three first months of rearing in pens (case of Tampolove site).

*Lavitra T., Tsiresy G., Rasolofonirina R., Rougier A. and Eeckhaut I.*

Poverty eradication through community-led, integrated multi-trophic aquaculture of sea cucumber *Holothuria scabra* and red seaweed *Kappaphycus striatum* in Tanzania.

*Mgaya Y., Beltran-Gutierrez M., Ferse S.C.A., Kunzmann A., Msuya F.E., Slater M.J. and Stead S.M.*

The hidden part of the iceberg: Fifteen years of malgacho-belgian researches to sustain the development of sea cucumber farming.

Eeckhaut I., Jangoux M., Rabenevanana M.W., Rasolofonirina R. and Lavitra T.

### Poster presentations

Management strategies in sea cucumber fisheries in Tanzania.

Mmbaga T. K.

Abundance and distribution of *Thallamita crenata* crabs (redoubtable predator of sea cucumber *Holothuria scabra*) in Sarodrano and Tapolove (two main sea cucumber farming villages in SouthWestern coast of Madagascar) and identification of the best trap system and bait to catch them.

Lavitra T., Tsiresy G., Rasolofonirina R., Rougier A. and Eeckhaut I.

AMPA/HOLOTHURIE: A new project funded by the Malagasy Government to promote sea cucumber farming in Madagascar.

Lavitra T., Tsiresy G., Rasolofonirina R., Rougier A. and Eeckhaut I.

The use of food compound to rear juveniles of sea cucumber *Holothuria scabra* in the external pond.

Lavitra T., Tsiresy G., Rasolofonirina R., Rougier A. and Eeckhaut I.

The holothurian (Echinodermata) biodiversity of the Scattered Islands (France, Mozambique channel): Glorioso Islands.

Mulochau T., Conand C. and Chabanet P.

Production *Holothuria scabra* seeds for farming: Experience from Tanzania.

Mmbaga T.K. and Mgaya Y.D.

Abundance and composition of sea cucumbers in Bongoyo Island, Dar es Salaam.

Kaiza V.E.

Sea cucumbers recruitment: A poorly understood stage in life history.

Conand C. and Bourjon P.

Sea cucumbers in the shallow lagoons of Mauritius: Abundance, diversity and size distribution.

Lampe K. and Moothien Pillay R.

Rehabilitation of natural stocks of the holothuroid *Holothuria fuscogilva* (Cherbonnier, 1980) at the Gulf of Aqaba, Red Sea.

Hasan M.H.

### From Mercedes Gonzalez-Wanguemert: Masters theses conducted under her supervision

Fernanda Rodrigues. 2013. Role of coastal lagoon on genetic diversity: Are they hotspots of biodiversity? Msc thesis (EMBC: International Master of Science in Marine Biodiversity and Conservation). CCMAR, Universidade do Algarve (Portugal). Supervisor: Dr Mercedes Gonzalez-Wanguemert. 40 p.

Andjin Siegenthaler. 2013. Spatial distribution patterns and population structure of *Holothuria mammata* and *Holothuria arguinensis* in the Ria Formosa (Portugal). Master's thesis (EMBC: International Master of Science in Marine Biodiversity and Conservation). CCMAR, Universidade do Algarve (Portugal). Supervisor: Dr Mercedes Gonzalez-Wanguemert. 55 p.

### Recent publications

Caulier G., Flammang P., Gerbaux P. and Eeckhaut I. 2013. When a repellent becomes an attractant: Harmful saponins are kairomones attracting the symbiotic Harlequin crab. *Scientific Reports* 3, article number: 2639 [DOI:10.1038/srep02639]

Caulier G., Flammang P., Rakotorisoa P., Gerbaux P., Demeyer M. and Eeckhaut I. 2013. Preservation of the bioactive saponins of *Holothuria scabra* through the processing of *trévang*. *Cahiers de Biologie Marine* 54:685–690.

Dolmatov I.Y., Khang N.A. and Kamenev Y.O. 2012. Asexual reproduction, evisceration, and regeneration in holothurians (Holothuroidea) from Nha Trang Bay of the South China Sea. *Russian Journal of Marine Biology* 38(3):243–252.

- Eckelbarger K.J. and Riser N.W. 2013. Derived sperm morphology in the interstitial sea cucumber *Rhabdomolgus ruber*, with observations on oogenesis and spawning behavior. *Invertebrate Biology* 132(3):270–281.
- Eriksson H. and Byrne M. 2013. The sea cucumber fishery in Australia's Great Barrier Reef Marine Park follows global patterns of serial exploitation. *Fish and Fisheries* [DOI: 10.1111/faf.12059]
- Hannah L., Duprey N., Blackburn J., Hand C.M. and Pearce C.M. 2012. Growth rate of the California sea cucumber *Parastichopus californicus*: Measurement accuracy and relationships between size and weight metrics. *North American Journal of Fisheries Management* 32(1):167–176.
- Jupiter S.D., Saladrau W. and Vave R. 2013. Assessment of sea cucumber fisheries through targeted surveys of Lau Province, Fiji. Wildlife Conservation Society/University of the South Pacific/Fiji Department of Fisheries/Khaled bin Sultan Living Oceans Foundation, Suva, Fiji. 22 p.
- Lane D.J.W. and Limbong D. 2013. Catastrophic depletion of reef-associated sea cucumbers: Resource management/reef resilience issues for an Indonesian marine park and the wider Indo-Pacific. *Aquatic Conservation: Marine and Freshwater Ecosystems* [DOI: 10.1002/aqc.2421]
- Mezali K., Soualili D.L., Neghli L. and Conand C. 2014. Reproductive cycle of the sea cucumber *Holothuria (Platyperona) sanctori* (Holothuroidea: Echinodermata) in the southwestern Mediterranean Sea: Interpopulation variability. *Invertebrate Reproduction and Development* [<http://dx.doi.org/10.1080/07924259.2014.883337>]
- Min Qu B., Luan Z., Li X. and Yang Y. 2013. Electrohydrodynamic drying of sea cucumber (*Stichopus japonicus*). *LWT – Food Science and Technology* 54:570–576.
- Mohammadzadeh F., Ehsanpor M., Afkhami M., Mokhlesi A., Khazaali A. and Montazeri S. 2013. Evaluation of antibacterial, antifungal and cytotoxic effects of *Holothuria scabra* from the North Coast of the Persian Gulf. *Journal de Mycologie Médicale* [<http://dx.doi.org/10.1016/j.mycmed.2013.08.002>]
- Navarro P.G., García-Sanz S., Barrio J.M. and Tuya F. 2013. Feeding and movement patterns of the sea cucumber *Holothuria sanctori*. *Marine Biology*. Online First. June 2013 [DOI 10.1007/s00227-013-2286-5] [<http://link.springer.com/article/10.1007%2Fs00227-013-2286-5>]
- Nelson E.J., MacDonald B.A. and Robinson S.M.C. 2012. A review of the northern sea cucumber *Cucumaria frondosa* (Gunnerus, 1767) as a potential aquaculture species. *Reviews in Fisheries Science* 20(4):212–219.
- Pakoa K., Saladrau W., Lalavanua W., Valotu D., Tuinasavusavu I., Sharp M. and Bertram I. 2013. The status of sea cucumber resources and fisheries management in Fiji. Noumea, New Caledonia: Secretariat of the Pacific Community. 49 p. [[http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Pakoa\\_13\\_Fiji\\_Sea\\_Cucumbers.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Pakoa_13_Fiji_Sea_Cucumbers.pdf)]
- Pakoa K.M., Ngaluafe P.V., Lotoahea T., Matoto S.V. and Bertram I. 2013. The status of Tonga's sea cucumber fishery, including an update on Vava'u and Tongatapu. Noumea, New Caledonia: Secretariat of the Pacific Community. 46 p. [[http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Pakoa\\_13\\_Tonga\\_Sea\\_Cucumbers.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Pakoa_13_Tonga_Sea_Cucumbers.pdf)]
- Pasilio T., Pereira F., Rikim K., Pakoa K. and Bertram I. 2013. The status of reef invertebrate resources and recommendations for management at Tokelau. Noumea, New Caledonia: Secretariat of the Pacific Community. 32 p. [[http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Pasilio\\_13\\_Tokelau\\_Invertebrate\\_Resources.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Pasilio_13_Tokelau_Invertebrate_Resources.pdf)]
- Plotieau T., Baele J.-M., Vaucher R., Hasler C.-A., Koudad D. and Eeckhaut I. 2013. Analysis of the impact of *Holothuria scabra* intensive farming on sediment. *Cahiers de Biologie Marine* 54:703–711.
- Plotieau T., Lavitra T., Gillan D. and Eeckhaut I. 2013. Bacterial diversity in the digestive tube of *Holothuria scabra* (Holothuroidea; Echinodermata). *Marine Biology* 160(12):3087–3101.
- Price A.R.G., Evans L.E., Rowlands N. and Hawkins J.P. 2013. Negligible recovery in Chagos holothurians (sea cucumbers). *Aquatic Conservation: Marine and Freshwater Ecosystems* 23(6):811–819.
- Purcell S.W., Lovatelli A. and Pakoa K. 2013. Constraints and solutions for managing Pacific Island sea cucumber fisheries with an ecosystem approach. *Marine Policy* [<http://dx.doi.org/10.1016/j.marpol.2013.11.005i>]
- Purcell S.W., Mercier A., Conand C., Hamel J.-F., Lovatelli A., Toral-Granda V. and Uthicke S. 2013. Sea cucumber fisheries: Global analysis of stocks, management measures and drivers of overfishing. *Fish and Fisheries* 14:34–59.

Raumea K., George N., Pakoa K., Bertram I. and Sharp M. 2013. The status of sea cucumber resources at Aitutaki, Mangaia, Palmerston and Rarotonga, Cook Islands: June 2013. Noumea, New Caledonia: Secretariat of the Pacific Community. 32 p. [[http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Raumea\\_13\\_Cooks\\_Sea\\_Cucumbers.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Raumea_13_Cooks_Sea_Cucumbers.pdf)]

Sapatu M.F. and Pakoa K. 2013. The status of sea cucumber resources and recommendations for management in Samoa. Noumea, New Caledonia: Secretariat of the Pacific Community. 23 p. [[http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Sapatu\\_13\\_Samoa\\_Sea\\_Cucumbers.pdf](http://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Sapatu_13_Samoa_Sea_Cucumbers.pdf)]

Schneider K., Silverman J., Kravitz B., Rivlin T., Schneider-Mor A., Barbosa S., Byrne M. and Caldeira K. 2013. Inorganic carbon turnover caused by digestion of carbonate sands and metabolic activity of holothurians, Estuarine, Coastal and Shelf Science [<http://dx.doi.org/10.1016/j.ecss.2013.08.029>]

Vincent I.V. and Morrison-Saunders A. 2013. Applying sustainability assessment thinking to a community-governed development: A sea cucumber. *Impact Assessment and Project Appraisal* 31(3):208-213. [DOI:10.1080/14615517.2013.773720]

Yuan X., Yang H., Meng L., Wang L. and Li Y. 2013. Impacts of temperature on the scavenging efficiency by the deposit-feeding holothurian *Apostichopus japonicus* on a simulated organic pollutant in the bivalve-macroalgal polyculture from the perspective of nutrient budgets. *Aquaculture* 406–407:97–104.

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Secretariat of the Pacific Community, Fisheries Information Unit, BP D5, 98848 Noumea Cedex, New Caledonia  
Telephone: +687 262000; Fax: +687 263818; [cfpinfo@spc.int](mailto:cfpinfo@spc.int); <http://www.spc.int/coastfish>