

COMMUNICATIONS

2017 conferences

Costa Rica (see *SPC Beche-de-Mer Bulletin* 37)

Communication from Juan José Alvarado

Access to the new supplement from *Revista de Biología Tropical*, Proceedings of the 3 Latin-American Echinoderm Conference, San Jose, Costa Rica, 2016, is available at: <http://rediberoamericanaequinodermos.com/2017/10/29/estudios-latinoamericanos-en-equinodermos-iv/>

8th North American Echinoderm Conference Worcester, Massachusetts, USA.
9–13 July 2017

Presentations on holothurians

- Population density and spatial arrangement of two holothurian species in a coral reef system: is clumping behavior an anti-predatory strategy?
Sanvicente Añorve L., Solís-Marín F.A., Solís-Weiss V. and Lemus Santana E.
- Echinoderm diversity in Chamela Bay, Jalisco, Mexico (North East Pacific).
Solís-Marín F.A., González Moguel P., Savarino Drago A., Pardo Granillo, I, Laguarda-Figueras A. and Durán González A.
- The potential for isolation and characterization of collagen from the body wall of sea cucumbers in Mexico.
Salgado-Ortiz N., Arreguín Espinosa de los Monteros R., Conejeros-Vargas C.A., Simental Crespo D., Solís-Marín F.A. and Caballero-Ochoa A.A.
- Baja California Peninsula echinoderm biodiversity and distribution.
Caballero-Ochoa A.A., Conejeros-Vargas C.A., Solís-Marín F.A., Laguarda-Figueras A. and Rivas Lechuga G.
- Understanding the color variability and confusion of the valuable sea cucumber *Isostichopus badionotus* (Echinodermata: Holothuroidea) based on mitochondrial DNA, morphology and habitat preferences
Borrero-Pérez G.H., Solís-Marín F.A. and Lessios H.
- Cloning starfish larvae and the discovery of the adult in the life cycle by virtue of collaboration in the echinoderm community.
Janies D., Solís-Marín F.A., Hernández Y.Q. and Codd J.
- Effect of burrowing sea cucumbers, *Holothuria arenicola*, on seagrass beds in Abaco, Bahamas
Boyd L., Stoner E., Murata P., Archer S., Comer Santos K., Heithaus M. and Whitman E.

Highlights from the World Aquaculture 2017 Conference

Communication from B. Gianasi, C. Hair and G. Robinson

On 28 June 2017, sea cucumber experts from around the world met up in Cape Town, South Africa at the World Aquaculture 2017 conference to discuss the latest developments in hatchery technology, grow-out systems, stock enhancement, processing and markets. The sea cucumber session, chaired by Dr Georgina Robinson and Cathy Hair, was one of the largest sessions at the conference with a total of 14 oral presentations and four poster presentations (listed below). The session was well attended and attracted a great audience throughout the day. The talks covered a variety of topics, which included the optimisation of diets for larvae, juveniles and adults of *Holothuria arguinensis* and *H. scabra*, determination of growth and survival in floating hapa nets and different sea ranching sites, as well as the effect of stocking density and the stress physiology of *H. scabra*. A presentation about morphometrics and behaviour changes of early juveniles of the cold-water sea cucumber *Cucumaria frondosa* was also given. Geographic information system (GIS) was

proposed as an effective low-cost technique to assess potential areas suitable for culturing *H. scabra* in Papua New Guinea. Two presentations highlighted the challenges of polyculture between *H. scabra* and Pacific white shrimp, and *Apostichopus japonicus* and tunicates. Finally, there was a presentation on the potential to harness the interaction of *H. scabra* and sediment bacterial communities in sediment-based aquaculture bioremediations systems to treat effluent from land-based aquaculture.

At the end of the session, a discussion forum was held with participation from the session presenters and the audience in order to identify potential bottlenecks for the sea cucumber production and to brainstorm future research directions. The availability of broodstock for spawning, survival of juveniles in grow-out systems and diet composition were the main areas of the discussion. Following the discussion forum, the sea cucumber meeting was successfully closed with a poster session highlighting information about: 1) the environmental control of gametogenesis and egg quality in the cold-water sea cucumber *Cucumaria frondosa*; 2) the nutritional value of *Holothuria scabra* in Fiji Islands; 3) the role of microbiome in regulating growth of *H. scabra*; and 4) the performance of floating hapa bag nets for rearing juvenile sandfish, *H. scabra*, in central Philippines.

Oral presentations

- Establishing the baseline of sea cucumber aquaculture in Europe
Domínguez-Godino, J.A. and González-Wangüemert, M.
- Detecting thermal shock and acclimation in the sea cucumber *Holothuria scabra*, using a multiple bio-marker approach
Kuehnhold H., Slater M.J., Kamyab E., Novais, S.C., Lemos M.F., Indriana L. and Kunzmann A.
- A new approach to feeding larvae and early juveniles of sandfish *Holothuria scabra* supporting simplified hatchery culture methods
Duy Nguyen Dinh Quang and Southgate P.C.
- Morphometric and behavioural changes in the early life stages of the sea cucumber *Cucumaria frondosa*
Gianasi B.L., Hamel J-F. and Mercier A.
- The microbiome is the nexus between sediment bioremediation and deposit feeder growth
Robinson G., Reid W.D.K., Nelson A., Jones C.L.W., Rushton S.P.R., Stead S.M. and Caldwell G.S.
- Understanding bio-physical variability in sea cucumber ranching sites in the Philippines
Altamirano J., Juinio-Meñez M.A., Uy W., dela Cruz M., Rodriguez B.D.R., Hair C. and Mills D.
- Using GIS classification methods to predict suitable habitat for sea ranching of cultured sandfish *Holothuria scabra* in Papua New Guinea
Hair C., Wood P. and Southgate P.C.
- Farming model changes and their rationale after experimental trials and 7 years project history farming *Holothuria scabra* in sea pens in south-west Madagascar
Klückow T.M. Gough C. and Humber F.
- Effect of biomass density, handling stress, and non-fallowing of sediment on the growth and survival of *Holothuria scabra*
Klückow T.M.
- Growth of sandfish *Holothuria scabra* juveniles during an ENSO
Gamboa R. Bulseco R. Concepcion L. Aurelio R. and Abreo N.A.
- Polyculture of sandfish *Holothuria scabra* and Pacific white shrimp *Litopenaeus vannamei* – A viable approach for a sustainable future?
Spreitzenbarth S. and Slater M.
- A study of the polyculture of the sea squirt *Halocynthia roretzi* and sea cucumber *Apostichopus japonicus* under a hanging culture system
Young Dae Kim, Mi Seon Park, Yun Kyung Shin, Myoung Ae Park and Yong Hyun Do
- Microbial–Deposit feeder aquaculture bioremediation systems
Robinson G.
- Short term approach to epidemiology of skin disease in the new target species for aquaculture in Europe *Holothuria arguinensis*
Cánovas F.G., Domínguez-Godino J. and Mercedes González-Wangüemert M.

Poster presentations

- Environmental control of gamete production, spawning, and egg quality in the sea cucumber *Cucumaria frondosa*
Gianasi B.L., Hamel J-F. and Mercier A.
- Nutritional value of the sea cucumber *Holothuria scabra* from the Fiji Islands
Ram R., Chand R.V. and Southgate P.C.
- Rearing performance of floating hapa bag nets for juvenile sandfish *Holothuria scabra* in central Philippines
Noran R.D., Altamirano J.P. and Recente C.P.
- The microbiome is the nexus between sediment bioremediation and deposit feeder growth
Robinson G., Reid W.D.K., Nelson A., Jones C.L.W., Rushton S.P., Stead S.M. and Caldwell G.S.



Participants to the World Aquaculture 2017 Conference.

Indo-Pacific Fish Conference

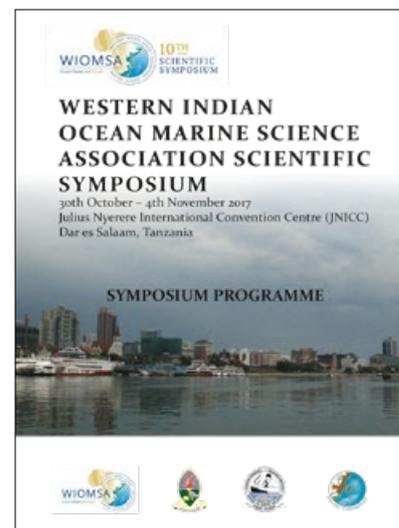
Information available at: <https://ipfc10.sciencesconf.org>

WIOMSA 10th International Scientific Symposium

Dar es Salaam, Tanzania (30 October–4 November 2017)

Oral presentations on holothurians (Session XXII: Sea cucumber: Ecology and management options)

- Estimating sea cucumber resource abundance in the Seychelles using spatially-explicit fishery-dependant data
Leopold M., Govinden R. Caquelard J. and Bach P.
- Effect of biomass density, handling stress, and non-fallowing of sediment on the growth and survival of *Holothuria scabra*
Klückow T.M. and Donah A.
- Clonal structure through space and time in Reunion Island: high stability in the holothurian *Stichopus chloronotus* (Echinodermata)
Pirog G., Bédier, B., Georget F. and Magalon H.



- The effect of exploitation on reproductive potential of *Holothuria scabra* in Tanzanian coastal waters
Mmbaga T.K., Mgaya Y.D. and Ndaro S.G.M.

Posters

- Marine biodiversity of Reunion Island: Echinoderms
Conand C., Ribes-Beaudemoulin S., Trentin F., Mulochau T. and Boissin E.

XIth International Larval Biology Symposium

Honolulu, Hawaii (10–13 August 2017)

With, among others, Dustin Marshall, Peter Marko, Mary Sewell, Maria Byrne, Brian Nedved, Megan Hintz, Donald Kobayashi and Jeff Shima.



Participants to the XIth International Larval Biology Symposium.

Up-coming conferences

16th International Echinoderm Conference, Nagoya, Japan

Information available at: <http://www.num.nagoya-u.ac.jp/iec16/>

It is our great pleasure to announce that the 16th International Echinoderm Conference will be held in Nagoya, Japan from 28 May to 1 June 2018. This is the second IEC in Japan since the 7th conference was held in Atami in 1990. We have already received many inquiries and comments about this conference, for which we are very thankful.

Nagoya is a big city located between two large cities, Tokyo and Osaka, and is located in the central part of Japan. The Chubu Centrair International Airport (code NGO) is a convenient distance from Nagoya, and takes less than one hour by train to the city centre. There are direct flights from many Asian cities, Europe and USA. Nagoya is also connected to Tokyo, Osaka and other cities by Shinkansen (bullet trains, JR system). Therefore, if you plan to extend your stay in Japan and would like to visit other cities such as Tokyo or Kyoto etc., you can use other airports in Japan.

3rd Aquaculture Conference: Recent Advances in Aquaculture Research

Date and location: 25–28 September 2018 at the Hyatt Regency Qingdao, China

The conference will bring together top senior scientists in all of aquaculture's disciplinary, interdisciplinary and transdisciplinary research areas.

Download the preliminary programme available at: <https://www.elsevier.com/events/conferences/aquaculture/programme>

International Conference Co-Chairs

Barry Costa-Pierce, *University of New England, US*

Wenbing Zhang, *Ocean University of China, China*

4th World Conference on Marine Biodiversity

13–16 May 2018, Montréal, Québec, Canada

4th WCMB Congress Secretariat – JPdL International

1555 Peel Street, Suite 500 Montréal, QC H3A 3L8 Canada

Tel: +1 514 287-9898 (ext. 334); Fax: +1 514 287-1248; wcmb2018secretariat@jpdL.com

Abstract submission is now open for the 4th world conference on marine biodiversity in Montreal in May 2018. Available at: <http://wcmb2018.org/call-for-abstracts.html>

You can register for the WCMB newsletter at: <https://visitor.eliteemail.net/WCMB/signup>

Registration is also open at: <http://wcmb2018.org/registration.html>

ICRS14

The Society is pleased to announce that the next Global International Coral Reef Symposium will be held in Bremen, Germany, in the first or second week of July, 2020.

After the great success of ICRS13 in Honolulu, Hawaii, it is anticipated that very large numbers of members and others will be eager to attend.

But if you cannot wait until then, note that a number of ISRS regional meetings are expected to take place in 2018. For details see the ISRS website at: www.coralreefs.org.

Call for collaboration from Kim Friedman (FAO Senior Fishery Resources Officer)

Development of new digital technologies for fish identification and request for species imagery (sharks and rays, tuna, billfish, **sea cucumbers**, ornamental fish of the aquarium trade)

Dear sea cucumber colleagues,

FAO's Fisheries and Aquaculture Department services the needs of fisheries as a global information provider of species identification materials. This service gives knowledge to fishers and assists countries in documenting catches and landings of commercially exploited aquatic resources, as well as information on other species of interest to fisheries.

In order to assess the potential for moving FAO's (and willing collaborators) species identification and dissemination processes from traditional methods to one that exploits modern machine learning digital techniques, FAO is seeking to establish a collaborative workgroup ('FishFinder 2.0 Development Platform'), where interested individuals and groups (fisheries, taxonomy and IT experts) can work together on the development of more automated species identification systems.

FAO has taken some first steps in this approach, and has been running a study to identify opportunities that such digitised systems could bring by collecting ideas and requirements from staff members at FAO (including a questionnaire sent to Regional Fisheries Bodies), IT services and the systematics/taxonomic ichthyological community at large. FAO is also detailing knowledge on the current status of machine learning and other related IT technologies that could help us progress the above objectives – the capabilities of which would form part of any future digitised system.

The aim is for FAO is to help coordinate this work – with the suggestion of an inaugural meeting in 2018 to bring interested parties together – to assess the current opportunities and define a path forward. In preparing for such an approach, FAO has also set aside some funds for developing a test mobile application that is provisionally named 'FishID' (a prototype app for development over the short term), which should help inform collaborators of the opportunities, challenges and knowledge gaps in using digital technologies for species identification.

This memo is a chance to inform everyone of the direction that FAO is taking, but also to reach out and see if anyone can assist with the short-term development of the app. For help with this latter task we are looking for fish images. We need images so that we can to run tests and are reaching out to ask if you or someone you know has access to 200+ images of a fish species, so that we can use those images to train machine learning algorithms in terms of recognising fish species from images. The results of this test will then be jointly reviewed in 2018.

At present, the specifications for the images that we are asking for are as follows:

- Fish species most targeted are: sharks and rays, tuna, billfish, **sea cucumbers**, ornamental fish of the aquarium trade.
- Each image must have a reliable species ID.
- Repeats of the same fish are possible if images are taken from different angles, although images of different fish of the same species that are taken from across its range are naturally preferable if we are to test the system.
- Image format: preferably jpg images (since the compression is much higher, so the size is much smaller) that are in excess of 50 KB (normally the size ranges from 300 KB to 1.5 MB). We will crop and resize the pictures, so they are suitable for training.
- The fish in the image is in focus and not obstructed by other articles or within/on top of other fishes.
- The image of the fish should preferably be in a natural type position (not crumpled or bent, or cut and frozen, underwater, in poor visibility conditions, etc.).

- Please alert FAO to any picture ‘sets’ that you have and are willing to share for such training purposes. FAO has set aside funds to cover the extra costs that might be associated with collating such image sets, which can be discussed on a case-by-case basis. To be able to proceed with short-term development of a test app, FAO will need to be given permission from you, the owner of the images for their use. FAO is not asking to hold copyright over individual images; however, FAO would need to hold copyright over the ‘repository collection’ for the purpose of testing machine learning systems. The image ‘repository collection’ may be shared freely under a Creative Commons license in the future, which permits sharing, provided FAO is acknowledged as the source and copyright holder of the collection, and that the owner of the individual image is also properly acknowledged.

So to summarise, the short term plans that FAO has are as follows:

- To collect images of fish from experts (we aim at some 200+ or up to 500 images per species) for the running of a number of tests as part of a test app.
- Images would be stored in a temporarily ‘closed’ repository (only accessible to selected data-manager and computing algorithms – individual images will not be published).
- The test app would go into production as soon as the images are collated, using image ‘sets’ that are provided to run many tests.
- FAO would then like to bring like-minded experts together for a meeting in 2018 (if we can acquire sufficient funds), to exchange what we know and have learnt, and try to articulate a development pathway for any future work.

Looking further into the future, FAO would continue to work jointly with the collaborators of the Fish-Finder 2.0 Development Platform, to:

- develop easy to use but more sophisticated digital systems to facilitate species recognition from digital imagery, and well resolved Artificial Intelligence tools that could either: i) suggest a species name; ii) request a further more defined image; and iii) deliver a truncated dichotomous tree to facilitate species identification, once an image is uploaded into such a system.
- start to link these types of apps and tools into practical work flows (e.g. ‘smart’ forms, recreational and non-commercial/artisanal reporting), but importantly, always focusing on assisting countries to document catches and landings of exploited aquatic resources, as well as other species of interest to fisheries.
- develop related tools, such as ones that recognise and identify fish diseases.

Thanks in advance for getting in touch to highlight your interest in offering image ‘sets’ or for suggesting other potential source(s) of imagery or assistance (email Kim.Friedman@fao.org or Anton.Ellenbroek@fao.org). If you are able but do not have sufficient images of a particular species then even sharing what you do have through Dropbox would be much appreciated, and I will try and build the sets of 200 for two to five common species for the test.

Kim Friedman

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Viale delle Terme di Caracalla, 00153 Rome, Italy*

Tel: +39 06 570 56510 / Skype: [kim.j.friedman](https://www.skype.com/people/kim.j.friedman) / Kim.Friedman@fao.org



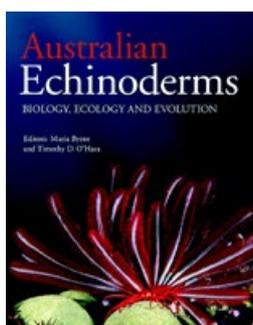
**Food and Agriculture Organization
of the United Nations**

Books and other information

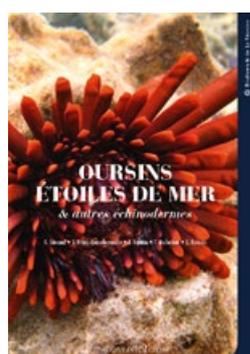
(communicated by Chantal Conand)

New books

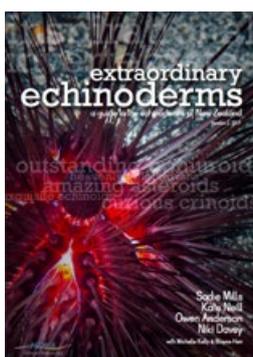
Information on new books with a chapter on holothurians



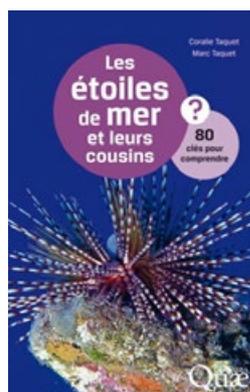
Australian echinoderms
Maria Byrne and Timothy D. O'Hara (eds)
More information at:
<http://www.publish.csiro.au/book/6484/>



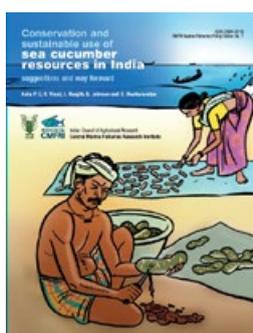
Oursins, étoiles de mer et autres échinodermes [in French only]
C. Conand, S. Ribes-Beaudemoulin, F. Trentin, T. Mulochau and E. Boissin
More information at:
<http://www.editions-ducyclone.fr/product/oursins-etoiles-de-mer-autres-echinodermes/>



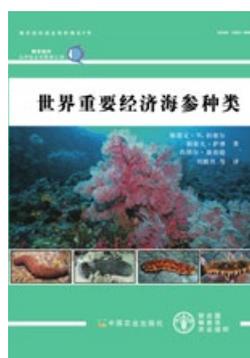
Extraordinary echinoderms: A guide to the echinoderms of New Zealand
S. Mills, K. Neill, O. Anderson and N. Davey
Available from: https://www.niwa.co.nz/static/web/MarineIdentificationGuidesandFactSheets/Extraordinary_Echinoderms_Vers2.0_2017.pdf



Les étoiles de mer et leurs cousins: 80 clés pour comprendre [in French only]
M. Taquet and C. Taquet
More info at: <http://www.quae.com/fr/r4868-les-etoiles-de-mer-et-leurs-cousins.html>



Conservation and sustainable use of sea cucumber resources in India
P.S. Asha, K. Vinod, L. ranjith, B. Johnson and E. Vivekanandan
Available from: <http://eprints.cmfri.org.in/11957/1/Sea%20cucumber.pdf>



Publication of a Chinese version of the FAO book **Commercially important sea cucumbers of the world**
S.W. Purcell, Y. Samyn and C. Conand
English version available from: <http://www.fao.org/docrep/017/i1918e/i1918e.pdf>

Information from Madagascar posted by Ben Parker

Mama Bevata: Tampolove's new security watchtower: Sea cucumber farmers in Tampolove are now protected by a state of the art watchtower designed to deter potential thieves from making off with valuable stock.

Available from: <https://blog.blueventures.org/mama-bevata-tampoloves-new-security-watchtower/>

Sea cucumber pictures

Sulawesi, Indonesia



Sea cucumbers (Stichopodids) drying at Bunaken in Indonesia (Photo: Narp, 2017).

Melbourne, Australia



Frozen sea cucumbers at the Victoria market (Photo: G. Conand).

Publications related to holothurians published in 2017

Chantal Conand

A 'Google Alert' using the word 'holothurian' has been set up for the period from January to 15 December 2017. The same method had been used to produce the article 'Bibliography on holothurians: Access to modern tools to follow new publications'¹, which was published in the *SPC Beche-de-mer Information Bulletin* #36. Table 1 presents a summary of the findings and uses the same five categories (themes) that were used in 2015.

Table 1. Number of documents related to 'holothurians' published in the period 1 January to 15 December 2017.

Month	General, ecology, biology	Biochemistry, microbiology	Genetics	Aquaculture	Fishery, socio-economics	Total per month
January	12	11	4	7	9	43
February	14	17	4	4	3	42
March	12	14	3	6	7	42
April	10	21	1	6	10	48
May	11	17	2	5	13	48
June	10	14	7	2	8	41
July	8	18	4	2	10	42
August	14	11	3	5	4	37
September	15	21	5	5	6	52
October	13	15	4	7	6	45
November	5	15	8	5	8	41
December (partial)	4	6	1	1	3	15
Total	128	180	46	55	87	496
Ratio (%)	26%	36%	9%	11%	18%	100%

The total number of references – nearly 500 – shows the interest for the subject among scientists. It is not significantly different from the 2015 count (413 references listed for the period March to December 2015).

The ratios of documents for the five categories remain quite similar to that of 2015, and once again the highest ratio was found for the biochemistry and microbiology category, followed by the general, biology and ecology category.

¹ <http://www.spc.int/DigitalLibrary/Doc/FAME/InfoBull/BDM/36/BDM36.pdf>

PhD thesis

Study of the reproductive biology and chemical communication of sea cucumbers (*Holothuria arguinensis* and *H. mammata*)

Nathalie Marquet (*defended on the 24 November 2017 at the University of Algarve, Portugal*)

Supervisors: Prof Adelino V.M. Canário, Dr Peter C. Hubbard and Dr Mercedes González-Wangüemert

Abstract

New sea cucumber fisheries are emerging in the Mediterranean Sea and Atlantic Ocean in response to a strong demand from the Chinese market. However, little is known about the biology of the new target species, which is hindering decisions on their management. The main objective of the present thesis was to study the reproductive biology and the role played by chemical communication and chemosensory systems in *Holothuria arguinensis* and *Holothuria mammata*. The different populations that were sampled in a narrow range along the Iberian Peninsula varied in size/weight, gonadal production, and maturity profile within each species, which suggests the influence of singular features of each location. However, they all had the same general reproductive pattern – summer–autumn spawning. These results, which are essential for managing populations, are also useful for determining when to develop bioassays to test whether and how these species communicate during reproduction. Male sea cucumbers, but not females, release chemicals that attract and induce spawning in both sexes. A preliminary analysis of the male spawning water suggests a pheromone with multiple components, among them possibly phosphatidylcholine derivatives. Histology, histochemistry and immunohistochemistry of the potential chemosensory structures involved in the detection of these cues – tentacles, papillae and tube feet – show no obvious differences between them. However, the disc was the most specialized area, with a specific nerve arrangement that was rich in nitric oxide synthase and contained numerous cells, some of which are likely to be sensory neurons. The analysis of tissue transcriptomes revealed the presence of at least 591 G-protein coupled receptors, and, among them, at least seven putative odorant receptors that were distributed mainly in the tentacles, oral cavity, calcareous ring and, papillae and tegument. Overall, this thesis gives valuable insights into managing sea cucumbers from the region and to better understand how sea cucumbers communicate during reproduction.

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Original text: English

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