

# GENERAL COMMUNICATIONS

## *Kerabu beronok (Acaudina salad)* – Signature appetiser in Langkawi Island, Malaysia

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### 1 Introduction

A salad (*kerabu*) dish prepared by mixing julienned vegetables and tropical fruits and tossed with pieces of raw sea cucumber (*beronok*), is popularly eaten in the Langkawi Island in Peninsular Malaysia.

The *beronok* sea cucumber belongs to molpadida, family Caudinidae). The main genera are presented in WORMS (Paulay 2015). *Acaudina molpadidoides* is a common species in the muddy shores in the west coast of Peninsular Malaysia. It is common in the region (O'Loughlin and Ong 2015; Ong and Wong 2015).

In the Langkawi Island, close to the Langkawi International Airport in the bay located between Pantai Kok and Pantai Cenaang (Fig. 1, Site a) is an area where *beronok* are frequently gleaned from the shallow waters (Figs 2 and 3). During low tide, members of households, including women and young children are often seen wading in the waters feeling the *beronok* with their feet. Only freshly caught *beronok* are used in the preparation of this delicious salad dish, which is often eaten as an appetiser.



**Figure 1.** Sampling site locations in Langkawi. Site a, is opposite to Langkawi airport. Site b, is south of Pulau Tuba.

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**Figure 2.** A fresh specimen of *Acaudina molpadioides* collected in Langkawi. (Image: Chantal Conand)



**Figure 3.** Collecting *beronok* in Malaysia: A child after collection (left) and a catch from skin diving collection (right). (Images: Chantal Conand)

## 2. Preparation of the dish

**The ingredients are:** *Beronok*, fresh from the sea, are cleaned with the insides removed, and then cut into bite-size pieces; young leafy shoots of cashew nuts shredded; long beans shredded; green papaya shredded; young green mango shredded; one-half grated coconut fried in a frying pan without oil until fragrant; one-half cup of fried rice powder; one lemon; salt and sugar to taste; ingredients for making sambal (a spicy paste of one-half grated coconut, two red onions, five bird chili, five dried chili, thumb-size piece of *belacan*, which is a fermented shrimp paste)

**Method:** Pound or blend the ingredients for making *sambal* until a paste is formed, then fry the sambal with heated oil until dry and fragrant; mix all the ingredients (except *beronok*) together and stir well; add *beronok* and mix again; Squeeze lime over salad; add salt and sugar to taste and toss the salad.

During a trip to Pulau Tuba (Langkawi islands) in December 2014, *beronok* was observed in high densities in the south of the island (Fig. 1, Site b). At low tides, women and children were observed collecting *beronok* by searching the mud flats. Only pink, smooth and almost translucent sea cucumber individuals were collected, while those with a thick body wall were not (Fig. 5A), the latter being too tough to eat raw and the *kerabu* dish was only prepared with the young *beronok* individuals. The individuals were then brought to the jetty to be processed by the women. Each sea cucumber individual was cut at both ends to drain the coelomic fluid and the digestive tract, then cut lengthwise and the inside scrapped with a knife blade (Fig. 5B and 5C). They were then cut into slice, rinsed and placed aside for *kerabu* preparation (Fig. 5D). The local villagers were preparing the *kerabu* dish to be served at a wedding that afternoon.



**Figure 4.** Preparation of the dish, in a street... and tasting. (Images: Chantal Conand)



**Figure 5.** Processing *beronok* by local villagers on Pulau Tuba. A: Typical *beronok* used for *kerabu* dish; B and C: Gutting and cleaning of *beronok*; D: *Kerabu* dish. (Images: Devarajen Vaitilingon)

### 3. Live holding of *beronok* in tanks

Another trip to Pulau Tuba was organised (August 2015) to collect around 50 *beronok* individuals and brought to the facilities at Fisheries Research Institute (FRI) in Pulau Sayak, Kedah (Fig. 6). The aim was to keep the animals live in the holding tanks and try to induce spawning. The 50 individuals were collected at Site b (Fig. 1), packed in plastic bags with minimal water and filled with oxygen. The bags were then placed in a Styrofoam box with two ice packs. The animals were then transported for about 3 hours before being recovered in tank with flow through seawater at the marine station. Although all the animals recovered well in the tanks during the next 12 hours (Fig. 6B), one day later most of the individuals were eviscerated and



**Figure 6.** *Acaudina molpadioides*. Live holding of *beronok* in tanks. A: *Beronok* collected at Pulau Tuba; B: Recovery in tanks at FRI after transport; C and D: 24 to 36 hours after recovery, almost all individuals were eviscerated and dead. (Images: Devarajen Vaitilingon)

died within the following 12 hours (Fig. 6C and 6D). The lack of mud in the tank could be the reason for total loss of the batch. The same observation was later reported from another independent trial at FRI (Ilias, personal communication).

#### 4. Discussion

Malaysians value sea cucumbers for their medicinal benefits and also as culinary delicacies. Processed sea cucumber species such as *Stichopus* sp. (locally known as “*gamat*”) are traditionally used in wound healing, treatment of stomach ulcers and as a painkiller. Other species such as sandfish (*Holothuria scabra*) are highly sought after and used in traditional Chinese cuisine. Likewise, *beronok* is also consumed by local villagers around Langkawi islands for their general health benefits. The health benefits from sea cucumber is known to be due to the presence in their body wall of bioactive compounds such as triterpene glycosides, chondroitin sulphates, sterols and many others (Boardbar et al. 2011). Past studies on *Acaudina* sp. has shown that they are rich in vitamins and minerals (Chen 2003), and a more recent study highlighted the bioactivity of polysaccharide fucoidan from *beronok* and its role in preventing chemotherapeutic mucositis in mice (Zuo et al. 2015).

The uniqueness of *beronok* is that it is one of the rare species of sea cucumber that can be eaten raw when young. This characteristic is of great interest to Japanese and Korean chefs since many seafoods in those two countries are eaten raw. A first survey among Japanese and Koreans chefs from restaurants in Penang has revealed great interests from those culinary experts.

The habitat where *beronok* occurs is quite peculiar in the fact that the mud flats can be anoxic or level of dissolve oxygen very low. Although no proper DO level was measured in situ, however, the black colour of the mud and hydrogen sulfite smell indicate an anoxic condition. The same black mud is found in the intestinal tract of the animal. Further studies should focus on the preferred habitat of *beronok*. If a low DO level is revealed to be their preferred habitat, then this could explain why all of the animals die in our holding tanks.

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## Beche-de-mer sold in San Francisco shops

San Francisco has a large Chinese community that is able to find a variety of beche-de-mer species and quality shops in Chinatown. The photos below were taken by Jacques Conand in August 2015.



Beche-de-mer on offer in a shop of Chinatown, San Francisco. (Images: Jacques Conand)

## Bibliography on holothurians: Access to modern tools to follow new publications

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It is now easy to make a "Google Alert" with the word "holothurian" and then to receive the references weekly, or at any another frequency. From my experience, it gives access to numerous papers, covering many different fields; a PDF can be uploaded in many cases, and / or the author's email can facilitate obtaining the paper, which is generally still in press.

The Table below shows the results I obtained for 2015, from March to November. More than 400 had the word holothurian in the title or in references.

They have been dispatched between five categories. Despite some possible overlap, it appears that publications in category 3, biochemistry and microbiology, fields not covered traditionally by the SPC *Beche-de-mer Information Bulletin*, display the highest number of references.

**Table 1.** Number of new publications found with a Google Alert search using the key word 'holothurian' (March–November 2015).

Month	Category				
	general, ecology, biology	biochemistry, microbiology	genetics	aquaculture	fishery, socioeconomics
March (partial)	6	9	3	3	0
April	6	9	4	4	0
May	16	26	8	6	4
June	12	17	3	8	5
July	13	30	3	5	10
August	20	13	4	4	9
September	13	15	5	7	12
October	15	30	4	3	2
November	9	20	4	7	7
<b>total</b>	<b>110</b>	<b>169</b>	<b>38</b>	<b>47</b>	<b>49</b>
%	27%	41%	9%	11%	12%

I believe that the difficulty is now to identify what is really relevant for us, people from different disciplines involved in commercial sea cucumbers.

For the SPC *Beche-de-mer Information Bulletin*, it is not necessary to present a list of new of articles published in journals, but it should keep publishing a list of theses and dissertations, and reports that may not necessarily be recorded by Google, as was done in this present issue.

It is also very important to make our publications available to our community.

## Hawaii's proactive action with the sea cucumber fishery

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Tropical sea cucumber fisheries are known for unsustainable harvest leading to eventual collapse due to limited management capacity and vulnerable nature of the animal (Toral-Granda et al. 2008; Purcell et al. 2013). However, Hawaii recently became a rare case where managers halted the operation to prevent stock depletion after intense fishing activities were reported.

Sea cucumbers (locally known as "loli") have long been used for traditional practices in Hawaii, but with the exception of the harvest of two aquarium species (*Holothuria hilla* and *H. edulis*), large-scale commercial exploitation had never been reported. In 2014, however, sea cucumber fishermen from Tonga collaborating with Hawaii based fishermen contacted the Hawaii State, Department of Land and Natural Resources

(DLNR), Division of Aquatic Resources (DAR) to inquire about current regulation and to obtain a license for starting a sea cucumber fishery aimed at exporting *H. atra* and *Actinopyga varians* to China for medicinal and consumption use. Although these species are categorized as low- and medium-value species for the beche-de-mer trade (Purcell et al. 2012), people increased its value by processing it on island and marketing it as medicine ingredients.

The fishery started in March 2015, and rapidly developed during the following first three months of operation. Seeing the intense fishing pressure and disappearance of sea cucumbers, local communities began to express concerns for their resource and environment. The public concern peaked when a picture of zodiac filled with sea cucumbers was posted on a popular social media and later aired on TV. In response to this public outcry, DLNR acted swiftly and put into effect an emergency four-month ban on the fishery. The DLNR then sought out scientific advice to help develop a permanent sustainable management plan for the fishery. Currently, permanent rules have been developed and are under review. If approved, these rules would include a state-wide ban on the commercial consumption fishery until proper management capacity is installed; species limits, seasonal limits, and daily catch limits for the aquarium fishery; and daily bag limits for personal non-commercial harvest.

It gives us hope to see such precautionary action initiated by local communities and management agency responding with swift action.

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## Short report on the recent *Apostichopus japonicus* poaching incidents in Aomori, Japan

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*Note: This article is a translated compilation of three newspaper articles and one blog post regarding recent poaching incidents that occurred in Aomori, Japan.*

Aomori, Japan is one of the top fishing grounds for *A. japonicus* in Japan (Motokawa et al. 2003). Their landing has been sold both within country and for export to China. The species is known to be one of the most expensive species of beche-de-mer and high-quality specimens have been sold for more than USD 2,000 per kg in Japan.

Driven by high prices, repeated poaching has been observed in Mutsu Bay, Aomori. After the arrests of poachers in October 2015, the fishery guild has requested: 1) increased punishment for poaching by the central government; and 2) the creation of a vigil network and stronger enforcements to prefectural government to prevent future violations.

So far, there have been three arrest cases of poachers for Aomori. The first case was reported in 2007, where 12 people were arrested for poaching. The second case was in 2014 where 11 poachers were arrested by Aomori coast guards. It took the coast guards more than two years of undercover operations to obtain evidence for poaching a total of 700 kg *A. japonicus*. The third case was in 2015 when eight poachers were arrested by the prefectural police for poaching 960 kg of *A. japonicus* (worth USD 28,800). The poaching group was based in the neighbouring prefecture. Further investigations suggest that the group have been poaching since last year, and the total poached revenue is estimated to be more than USD 2 million. The poached sea cucumbers were then transported to Hokkaido and exported to China. The poachers usually divided their respective roles – boat drivers, divers, watchmen and truck drivers – to hide their operations.

Furthermore, all poachers arrested were members of Japanese mafias. It is speculated that these poaching revenues are becoming a funding source for other mafia activities.

The Kamata village fishing guild was impacted the most by these poaching incidents because it had the right to fish *A. japonicus* in Mutsu Bay where the poaching took place. The guild had just started harvesting sustainably after their juvenile restocking programme that took 10 years and cost USD 660,000. Sea cucumber annual sales could increase to USD 30 million dollars and is a very important income substitute when the scallop fishery does not fare well in Aomori. Members of the guild have been guarding their resources in collaboration with fishery managers, but they feel limited in results. Some worry that the current punishment for poaching is not enough to stop poachers. These concerns have led to the recent request for stricter and stronger enforcement to both prefecture and central government.

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## Request for information on illegal sea cucumber fisheries

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The concern with IUU (illegal, unreported and unregulated) fisheries has been raised with guidelines produced by FAO (1992) for decision-makers and policy-makers associated with fisheries managers to fight irresponsible fishing, which undermines the efforts to establish sustainable fisheries. Meetings, committees and regulations have followed.

Sea cucumber fisheries management has been progressing during the last decade, with efforts from international, regional and national agencies, as reported in many previous contributions of the SPC *Beche-de-mer Information Bulletin*. Despite the development of management tools, such as marine protected areas, rotational harvesting, IUCN Red listing, CITES, and national legal decisions on fisheries and export, illegal captures or exports remain an important issue. High prices, declining resources and stricter management (with fishing bans set up in an increasing number of countries) are incentives for increased illegal fishing or export activities, and these have become an urgent issue to address. A synthesis has recently been presented at the WIOMSA Symposium (see 2015 Meetings, p. 94, this issue) and a publication is being prepared.

It will probably be very useful, as was done previously in the *Beche-de-mer Bulletin* for several aspects of the biology of holothurians (e.g. spawning or juvenile observations) to set up a section in the Bulletin related to 'Information on illegal captures', with newspapers reports, links to websites, and published or anecdotal reports. Reports from those who have experience in fighting illegal activities related to sea cucumber fishing or trade would be very useful.

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Original text: English

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