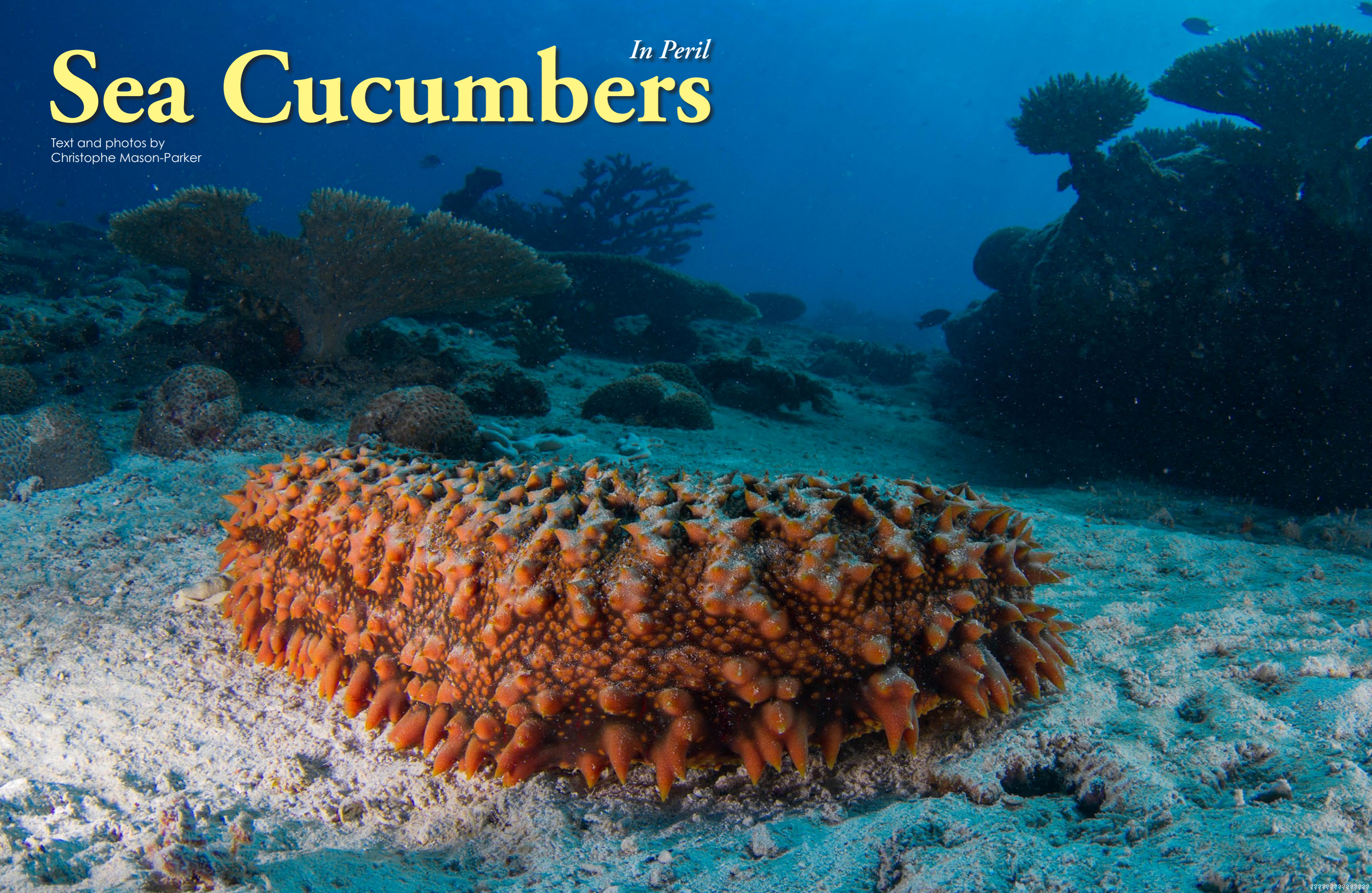


Sea Cucumbers *In Peril*

Text and photos by
Christophe Mason-Parker



In the late afternoon, sea cucumbers display spawning behaviour.

PREVIOUS PAGE; An adult prickly redfish on the reef

Sea Cucumbers are a group of marine species belonging to the Class *Holothuroidea*. They are characterised by fleshy, elongated bodies, covered in numerous projections known as papillae. When disturbed, many species eject an effluvium of sticky, white threads designed to distract predators, and if removed from the marine environment, they quickly become foul smelling—not your ideal culinary ingredient, one might think. Yet the market for sea cucumber is booming, so much so that several species have seen significant population crashes.

As with many marine species, it is the Asian market that is driving the trade, with Hong Kong and China the main hubs. Sea cucumbers have traditionally been harvested throughout their

range and have long been considered a delicacy in numerous countries. However, in recent years the rise of an affluent middle class in China has led to a surge in demand, in part due to the animals' popularity as a food source, but also as a result

of its association with male virility in Chinese folk medicine. As local populations of target animals have collapsed, fisheries have switched to exploit further species, leaving large areas of seabed depleted with little possibility of replenishment.

Processed food

Both fresh and dried varieties are used in cooking, but the animals require a great deal of preparation before they are ready for consumption. As with shark fin, the final product has minimal taste and the process

often requires the animal to be cooked in broths to add flavour. A wide variety of sea cucumber species are harvested globally, with a high proportion of these destined to be dried for export as a culinary ingredient. The product is known as *bêche-de-mer* in

While underwater macro photographers will no doubt testify to the numerous photographic opportunities that an abundance of symbiotic creatures provide, invertebrates will always lose out to charismatic megafauna as far as the general public is concerned, and sea cucumbers are never going to be high on anyone's list of conservation priorities. This does not mean that they are any less deserved of our or the media's attention.





French, hoi sam in Chinese and trepang in Indonesian.

Meeting demand

As populations collapse in Asia, middlemen have begun targeting locations further afield. In south-east Asia where sea cucumber harvesting is most intensive, fishers often glean cucumbers from shallow reef flats. However, overexploitation has had significant impacts on local populations and many shallow water species have suffered localised extinctions.

While in some parts of the world sea cucumber harvesting is carried out with traditional scuba gear, there remains a number of countries where fishers use a method known as 'hookah'. The system involves divers breathing compressed air, delivered to them



through extensive tubes connected to the surface.

The 'hookah' system allows divers to access depths of up to 100m for over 30 minutes at a time. This method of fishing is not

without risk and accidents are all too common. Equipment failure is a constant threat and the divers

a malfunction of the compressor. Decompression sickness is a genuine hazard as divers remain at depth for too long, and often fishing expeditions are miles away from adequate medical assistance.

The demand for sea cucumber shows no sign of abating, while stocks of most species continue to decline. In an attempt to tackle the issue, attention has now turned to sea cucumber aquaculture. While there has been moderate

Dried sea cucumbers for sale in an Asian market store; A customer browses the shelves of a dried seafood shop in Hong Kong's Sheung Wan district (far left)

must be wary of kinks or holes in the tubes delivering their air, or worse,



Dried sea cucumbers on sale with other marine products

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A juvenile prickly redfish with elongated papillae (left); An emperor shrimp on the surface of a Stichopus sea cucumber (right); Commensal crabs are often found living in association with several sea cucumber species (below)

lae on the dorsal surface, which are far more pronounced than in adults of the species.

Pearsonothuria graeffei, known as the flowerfish, or blackspotted sea cucumber, is cream coloured with numerous dark blotches and small black spots, and the animal's mouth is circled by two dozen black tentacles. Juveniles of the species bare no resemblance to the adults and are instead blue with black lines and yellow papillae. The colouration is believed to be a defensive strategy with the young sea cucumber imitating the appearance of a toxic nudibranch.



Sea Cucumber

success with a handful of species, there remain a number of impediments to achieving large scale production in sea cucumber aquaculture.

For many locations throughout southeast Asia, if there is to be any prospect of replenishing sea cucumber populations, and maintaining sustainable fisheries, then extensive management plans need to be adopted.

Biology

For divers, sea cucumbers are often ignored. To underwater photographers, they are perhaps not the most photogenic of subjects, yet they are fascinating creatures that deserve our attention.

Symbiotic relationships. Several species of sea cucumber live in a symbiotic relationship with other marine organisms. The commensal crab *Lissocarcinus orbicularis*

often found associated with the sea cucumbers *Holothuria atra* and *Actinopyga obesa*, while the emperor shrimp (*Perclimenes imperator*) is another well-known symbiont, and is frequently found living with several sea cucumber species. Meanwhile, the Carapidae family, more commonly known as pearl fish, are famously renowned for inhabiting the sea cucumber's anal opening where they feed upon the animal's gonads.

Juvenile forms. Juvenile sea cucumbers are particularly interesting not least because they are rarely encountered. Certain species, however, have striking juvenile forms that differ greatly from the adult animal. The prickly redfish (*Thelenota ananas*) is a commercially important species, which is harvested for bêche-de-mer throughout its range. Juveniles exhibit elongated papil-



Reproduction. Sea cucumbers display little sexual dimorphism, though the sexes tend to be independent. Reproductive behaviour can often be observed in the late afternoon when both male and females are positioned upright on the substrate. The animals proceed to sway back and forth as gametes are released into the water column as part of the spawning process.

Reef cleaners. Holothurians are detritivores, and play a crucial role in nutrient recycling, feeding



The flowerfish has two dozen oral feeding tentacles (left);
The juvenile flowerfish resembles a toxic nudibranch (below)



Sea Cucumber

many localities they have all but disappeared. While we remain insouciant, the trade will no doubt continue at unsustainable levels, and it is likely that we will fail to understand the true value of these remarkable creatures before it is too late. ■

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on organic matter on the seabed. Many species ingest sand from the substrate, removing edible particles before ejecting the sand, while others utilise oral tentacles to remove plankton from the water column.

In the tropics they regulate coral reef health by removing organic matter from the ecosystem. The process of harvesting large numbers of sea cucumber from shallow waters could potentially have lasting consequences on the entire marine food web.

In recent years it has even been suggested that sea cucumbers play a role in mitigating the impacts of ocean acidification on coral reefs through the production of cal-

cium carbonate. The marine environment is a complex, interconnected system that is currently facing unprecedented anthropogenic pressures, coral reefs in particular are on the front line, and it is possible that sea cucumbers and other marine invertebrates may be critical in helping to build reef resilience.

Unsung heros

Despite their varied forms and interesting behaviour, for the majority of recreational divers the sea cucumbers are an undervalued group of marine animals. While underwater macro photographers will no doubt testify to the numerous photographic opportunities

that an abundance of symbiotic creatures provide, invertebrates will always lose out to charismatic megafauna as far as the general public is concerned, and sea cucumbers are never going to be high on anyone's list of conservation priorities. This does not mean that they are any less deserved of our or the media's attention.

As divers we have a unique opportunity to champion the cause of the sea cucumber and highlight their importance as integral parts of a healthy marine ecosystem. For the commercially sought after species, the pressure being placed upon them by overharvesting is causing a decline in numbers throughout their range and in



Sea cucumbers are important for healthy reefs, but overharvesting is causing a decline in their numbers