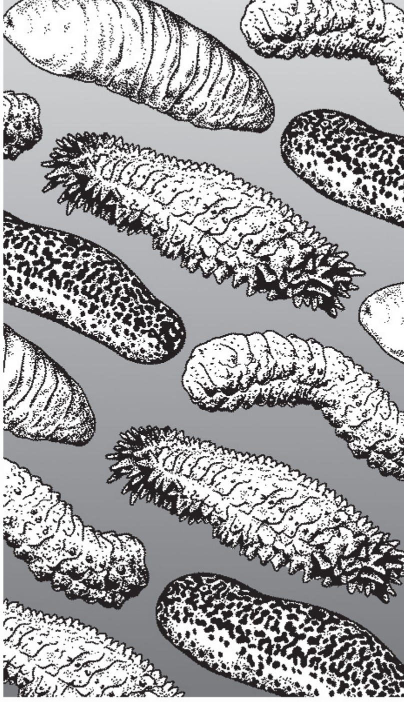

ISSN 1025-4943

Pacific Community
Communauté du Pacifique

Issue 41 – March 2021

BECHE-DE-MER information bulletin

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Produced with financial assistance from the government of Australia, the European Union, France and the New Zealand Aid Programme.

Editorial

This 41th issue of the SPC *Beche-de-Mer Information Bulletin* includes 16 original articles and scientific observations from a wide variety of regions around the world. We first want to express our congratulations to Dr Marie Bonneel, Dr Cathy Hair and Dr Hocine Benzait who recently received their PhDs. Dr Bonneel received her PhD from the University of Mons in Belgium, and her dissertation is titled "Sea cucumbers as a source of proteins with biomimetic interest: Adhesive and connective tissue – stiffening proteins from *Holothuria forskali*". Dr Hair received her PhD from James Cook University in Australia, and the title of her dissertation is "Development of community-based mariculture of sandfish, *Holothuria scabra*, in New Ireland Province, Papua New Guinea". Dr Benzait received his PhD from the Université de Mostaganem in Algeria, and his dissertation is titled "Ecologie, dynamique de la population et reproduction d'*Echinaster sepositus*, *Ophioderma longicauda* et de *Parastichopus regalis* au niveau de la côte de Mostaganem".

The first article by Simone et al. (p. 3) recalls that at the last meeting of the Conference of the Parties to CITES in August 2019, three species of teatfish were included in CITES Appendix II. This inclusion has opened the door for potential new species listings.

The next four articles are original research contributions. Two articles are from Murphy et al. One (p. 5) provides updated conversion ratios for beche-de-mer species in Torres Strait, Australia. These values are useful for stock assessments, management and monitoring of the beche-de-mer fishery in Australia. In their second article (p. 8), the authors show the results of a field survey of eastern Torres Strait where they used a remotely operated vehicle to survey sea cucumbers. Ram et al. (p. 12) investigates the effect of salting time on the collagen content of the body wall of *Holothuria scabra*. They observed that after 72 hours of salting, collagen fibers are almost totally destroyed and disappear from the body wall of sandfish. The analysis of *Parastichopus regalis*'s digestive content, by Elakkermi et al. (p. 15), reveals that it includes mostly fine sedimentary particles and that a very small part is composed of foraminiferans, annelids, fragments of mollusc shells, sponge spicules, echinoderm ossicles, diatoms and cyanobacteria.

The next three articles concern field observations. Tanita et al. (p. 19) observed several juvenile teatfish showing intermediate ventral colour morphs and provide illustrations of these variations. Schagerström and Sundell (p. 22) and

Green sea turtle, *Chelonia mydas*, feeding on *Synapta maculata* (Holothuroidea: Synaptidae) on a seagrass bed (*Syringodium isoetifolium*) at Reunion Island, western Indian Ocean

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Abstract

Young green turtles, *Chelonia mydas*, frequent the *Syringodium isoetifolium* seagrass beds on Reunion's inner reef flats of fringing reefs, where they come to feed. Photographs of a green turtle looking for and eating the snake sea cucumber. *Synapta maculata*, were taken for the first time at Reunion Island. *S. maculata* is a sea cucumber species that was frequently observed on the inner reef flats and on the back-reef depression, but these abundances seem to be decreasing in recent years. Studies of *S. maculata* populations are needed to monitor changes in densities of this species, which has an important ecosystem role, as well as other observations to determine whether this case of green sea turtle predation is an isolated one or whether *S. maculata* may occasionally be part of the diet of young *C. mydas* in Reunion.

Introduction

Green sea turtles, *Chelonia mydas*, are regularly observed on the west coast of Reunion Island where they feed mainly on the red algae *Carpopeltis* sp. and *Amansia* sp. at depths of 10 to 30 m (Ciccione 2001). To a lesser extent, young individuals are observed on *Syringodium isoetifolium* seagrass beds in the inner flats where they feed (Ballorain 2010; Cuvillier 2016).

Synapta maculata is a species that is typically observed on certain areas of the back-reef depression or on inner reef flats of Reunion Island's fringing reef, particularly on sandy areas or in seagrass beds (Conand and Mangion 2002; Flammang and Conand 2004; Conand and Frouin 2007; Conand et al. 2010; Conand et al. 2016; Bourjon 2017). *Synapta maculata* feeds in particular on organic matter trapped by the epiphytic community that develop on the leaves of *Syringodium isoetifolium* (Hendriks et al. 2008). Sea cucumbers are essential organisms for the functioning of reef ecosystems and are one of the most important groups in the recycling of organic matter and bioturbation of coral reef sediments (Purcell et al. 2016).

Remains of holothurians (Holothuroidea) have previously been found in the stomach contents of some sea turtle species, such as the loggerhead turtle *Caretta caretta* (Thompson 1980; Casale et al. 2008) and cases of holothurian predation by this turtle species have been photographed on a reef in Belize (Rogers et al. 2020). To our knowledge, there has not yet been any published direct evidence showing *Chelonia mydas* feeding on a holothurian on the reef of Reunion Island.

An observation had already been made in 2010 of a *C. mydas* individual feeding on *S. maculata* on the inner reef flats south of La Saline Les Bains at Reunion Island, without, unfortunately, photographic evidence (Stéphane Ciccione, pers. comm.). Similar observations have been made in Polynesia but are not published and concern other holothurian species (A. Carpentier, Te mana o te moana, pers. comm.).

This article presents pictures of *Chelonia mydas* feeding on *Synapta maculata* in *Syringodium isoetifolium* seagrass beds and in coral heads.

Methodology

The observation was made while snorkelling on 6 January 2019 at 17:15 on a seagrass bed located on an inner reef flat of the fringing reef of La Saline Les Bains at Reunion Island (S21°05'02.5 and E55°14'17.9). This particular *Syringodium isoetifolium* seagrass bed is located at a depth of 1.0 to 1.5 m, and had an average surface area of 1100 m² in 2015 (Cuvillier 2016). The observation lasted 10 minutes and the photos presented were taken from several videos.

This observation was made inside the area of the Reunion Island Marine Nature Reserve in a level 2b protection zone.[4]

Results

The green sea turtle was observed eating two specimens of *Synapta maculata* during the time of the observation. The turtle first searched for this prey by swimming over the seagrass

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or coral blocks. It then pulled the holothurian out of the seagrass and coral blocks, and used its beak and fins to cut it up and eat it (Fig. 1). The observation also shows that the turtle does not seem to eat the holothurians in their entirety; some pieces were left over, but this may be due to the proximity of the divers. Furthermore, it is interesting to note that the turtle looked for and specifically chose to eat *S. maculata*, and not another species of holothurian such as *Holothuria leucospilota*, which was observed on the videos but which does not seem to be of interest to the turtle, although it is abundant in this area of the inner reef flat.

Discussion

The observation of a green sea turtle, *C. mydas*, looking for and eating *S. maculata* had never been documented at Reunion Island. Green sea turtles feed mainly on red algae on outer reef slopes (Ballorain 2010). However, young *C. mydas* visit the *Syringodium isoetifolium* seagrass beds where they are protected by the marine nature reserve[5] (Jean et al. 2010b).

The young turtle observed in these photos has been observed (Jean et al. 2010a) on this seagrass bed of the La Saline flat since September 2018, and was also seen (only once) on another seagrass bed of a reef flat 800 m to the north. All of these observations (n =14) were made while the sea turtle was feeding on *S. isoetifolium* beds, except for the one mentioned here, where it was feeding on *Synapta maculata*.

Other research suggests that immature green turtles are not strictly herbivores and adapt to local food resources (Gonzales et al. 2012).

Densities of *S. maculata* in 2014 on this seagrass bed where the observation was made were 0.3 ind. m-^{2} ± 0.05, other Holothuroidea species are frequently observed there such as *Holothuria leucospilota* and *S. chloronotus* (Cuvillier 2016). Several scientists report that densities of *S. maculata* appear to be decreasing in recent years in the seagrass beds and the reef depression (pers. obs.), but there are no robust data to confirm this hypothesis. Recent observations indicate that *S. maculata* can also be found under coral blocks during the day and come out at night to feed. Studies of *S. maculata* populations in the back-reef depression and the inner reef flat of the fringing reef of Reunion Island are needed to monitor changes in densities of this species with an important ecosystem role (Purcell et al. 2016). Further observations and/or the studies of stomach contents of *C. mydas* are necessary to enable us to say whether this observation is an isolated case or whether *S. maculata* may occasionally be part of the diet of young *C. mydas* at Reunion. In this case, it might be interesting to assess the impact on *Synapta maculata* populations.

Figure 1. An individual of *Chelonia mydas* observed eating *Synapta maculata* on *Syringodium isoetifolium* seagrass beds on a coral reef at Reunion Island

[5] See https://torsooi.com/about

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