

First occurrence of the species *Holothuria coronopertusa* in Mayotte, in the Indian Ocean

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Introduction

Holothuria (Stichothuria) coronopertusa (Cherbonnier, 1980) has been described from collections made by divers from ORSTOM⁴ in Noumea, New Caledonia. This species was described in a publication on holothurians from New Caledonia (Cherbonnier 1980), a description later included in the guide to sea stars, urchins and other echinoderms of New Caledonia (Guille et al. 1986). The species is long and cylindrical and has a thin tegument. Its description is detailed and mostly based on the spicules. The subgenus *Stichothuria* had been created for this species, as the spicules are quite different from the other 17 subgenera under the genus *Holothuria*. *Stichothuria* shares with eight other subgenera, the presence of a collar of papillae at the base of the tentacles. To our knowledge, this species has never been observed in the Indian Ocean.

A programme currently underway, named MesoMay, aims to carry out a first non-exhaustive faunal inventory of certain sites located in mesophotic zones on the slopes of some Mayotte reefs between 50-m and 150-m depth (Mulochau et al. 2019). This programme is based on participatory science, and two associations of divers with gas mixtures and recyclers are involved (Service Plongée Scientifique and Deep Blue Exploration). Individuals of *Holothuria coronopertusa* have been observed during several scuba dives at different sites in Mayotte.

Methods

Dives with gas mixtures and rebreathers were necessary to inventory mesophotic fauna on the outer slopes of Mayotte's reefs. At each site, divers photographed and sampled (for 30 minutes) some organisms to determine their species. For holothurians, if the species is difficult to identify from photos, a specimen can be collected and its tegument sampled on site, to prepare spicules (Fig. 1). The specimen is then released back into the water.

From the sample collected, spicules were prepared, following the method described by Samyn et al. (2006).

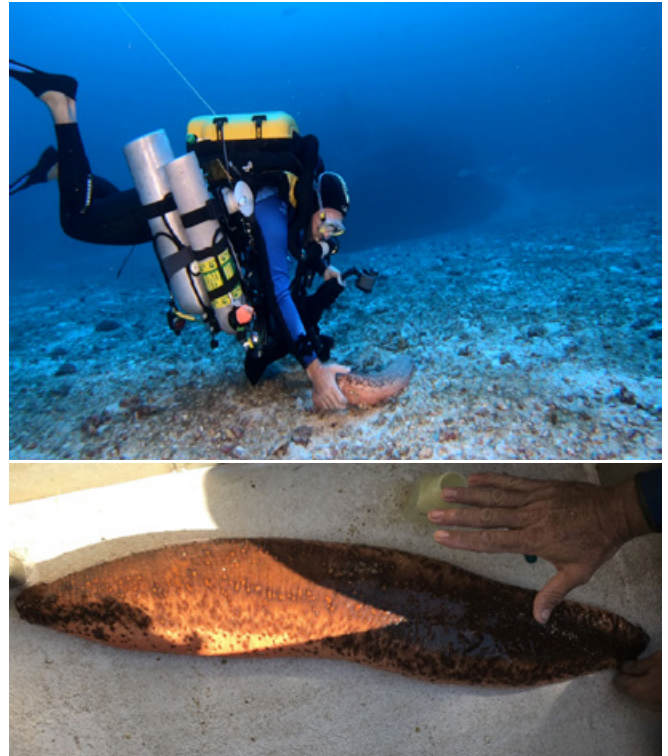


Figure 1. Sampling an individual of *Holothuria coronopertusa* in Mayotte in November 2018 – on the Iris Bank at a depth of 78 m – to collect surface integument to prepare spicules. (Images: Association Service de Plongée Scientifique)

Results

The external morphology of the *Holothuria coronopertusa* specimen that was collected – at a depth of 78 m on Iris Bank north of Mayotte – was typical, in that it had no Cuvierian tubules (Fig. 1). It was photographed and integument samples were taken. It was then released on site.

Three other specimens of *Holothuria coronopertusa* were observed and photographed at an average depth of 80 m (Table 1).

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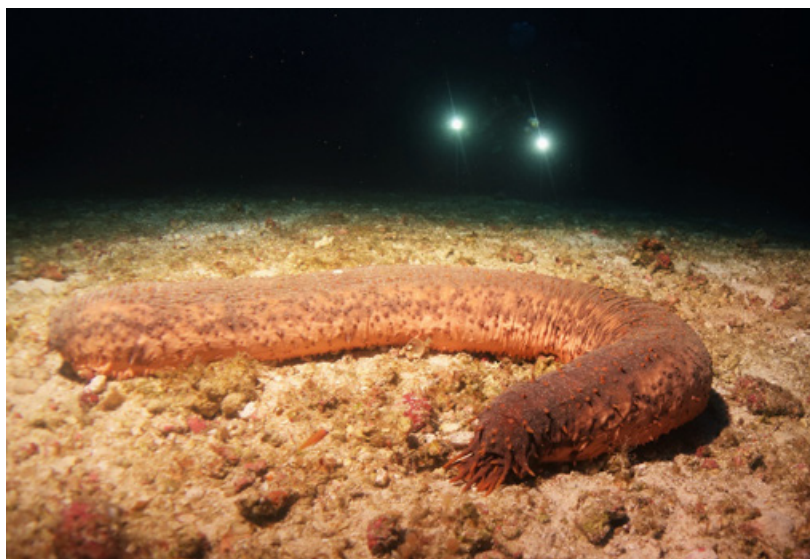
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⁴ ORSTROM stands for Office de la recherche scientifique et technique outre-mer. The organisation is now called Institut de Recherche pour le Développement

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Table 1. Observations of *Holothuria coronopertusa* in Mayotte.

Location	Depth	Date	Latitude	Longitude
Bouéni	70–90 m	24 November 2018	12.931583°S	44.964250°E
Iris Bank west	78.6 m	26 November 2018	12.626944°S	44.927789°E
Iris Bank west	70–90 m	17 January 2019	12.626944°S	44.927789°E

**Figure 2.** *Holothuria coronopertusa* observed on the Iris Bank north of Mayotte at a depth of 80 m (length ~80 cm). (Images: Association Service de Plongée Scientifique)**Figure 3.** *Holothuria coronopertusa* observed at a depth of 80 m at Bouéni in southwestern Mayotte. (Images: Association Deep Blue Exploration)

A carapid fish was observed protruding from the cloaca of an individual of *H. coronopertusa*. The species could be *Carapus* aff. *boraborensis* (Fig. 4), although a sample is still necessary to confirm this species.

**Figure 4.** Observation of a carapid (*Carapus* aff. *boraborensis*) protruding from the cloaca of a *Holothuria coronopertusa*. (Image: Association Service de Plongée Scientifique)

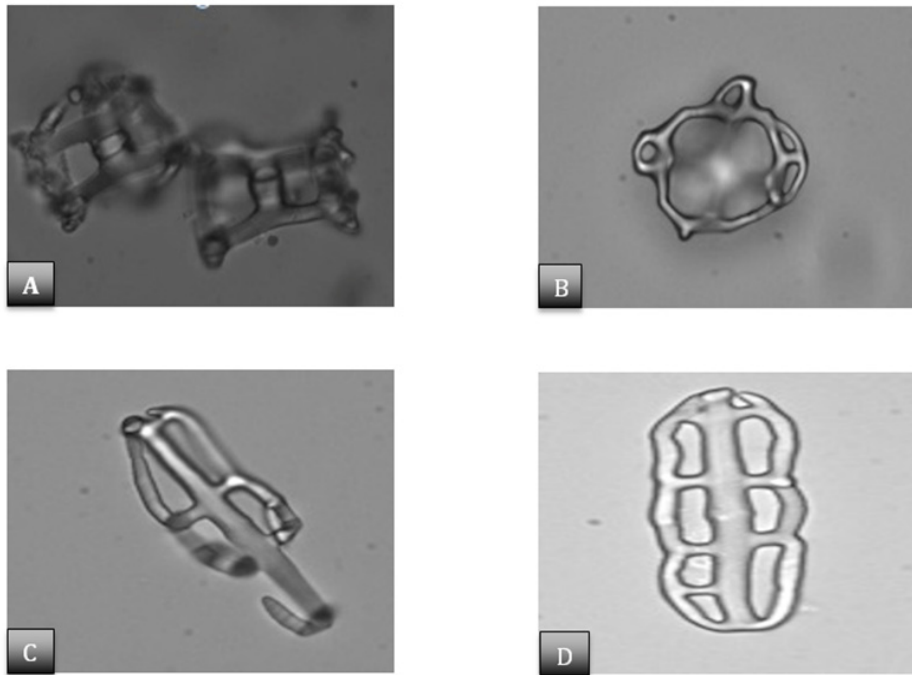


Figure 5. Spicules from the tegument of *Holothuria coronopertusa*. A: Tables in lateral view; B: Table; C: Pseudo-button; D: Button.

Spicules from the integument are shown in Figure 5. They correspond to the original description by Cherbonnier (1980). The tables are similar on both the dorsal and ventral sides, a characteristic of this species. Numerous spicules are either C- or O-shaped.

Discussion and conclusion

The exploration of mesophotic coral reef ecosystems in the Indo-Pacific region is relatively recent. No faunal inventory in the mesophotic zone of Mayotte had been done before. To our knowledge, *Holothuria coronopertusa* – a species never before observed in Mayotte, and recorded at two sites about 40 km away from each other (Banc de l'Iris and Bouéni Pass) – has never been observed in the Indian Ocean. This species has not yet been observed at other sites. The depth of observation is around 80 m. This species has been sampled in New Caledonia and the western Pacific at depths of 100 m (Michonneau et al. 2013). A better knowledge of the biodiversity of the mesophotic coral ecosystems of the southwest Indian Ocean and Pacific could explain the distributions and connectivity of the species.

Acknowledgements

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References

- Cherbonnier G. 1980. Holothuries de Nouvelle-Calédonie. Paris : Bulletin du Muséum d'histoire naturelle, 4^e ser., 2:615–667.
- Guille A., Laboute P. and Menou J.-L. (eds). 1986. Guide des étoiles de mer, oursins et autres échinodermes du lagon de Nouvelle-Calédonie. Paris : Editions de l'ORSTOM. 238 p.
- Michonneau F., Borrero-Perez G.H., Honey M., Kamarudin K.R., Kerr A.M., Kim S., Meñez M.A., Miller A., Ochoa J.A., Olavides R.D., Paulay G., Samyn Y., Setyastuti A., Solis-Marin F., Starmer J. and Vandenspiegel D. 2013. The littoral sea cucumbers (Echinodermata: Holothuroidea) of Guam re-assessed – a diversity curve that still does not asymptote. *Cahiers de Biologie Marine* 54:531–540.
- Mulochau T., Durville P., Barathieu G., Budet D., Delamarre C., Konieczny O., Quaglietti S., Anker A., Bidgrain P., Bigot L., Bo M., Bonnet N., Bourmaud C., Conand C., De Voogd N., Ducarme F., Faure G., Fricke R., Huet R., Mah C., Maurel L., Messing C., Philippot V., Poupin J., Sartoretto S., Schleyer M., Stöhr S., Trentin F. and Wickel J. 2019. Inventaire faunistique non exhaustif de quelques sites situés en zone récifale mésophotique à Mayotte - BIORECIF – GALAXEA – rapport DEAL Mayotte. 30 p. plus annexes.
- Samyn Y., Vandenspiegel D. and Massin C. 2006 Taxonomie des holothuries des Comores. *Abc Taxa*, 1, 130 p.