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Stalked and fleshy life forms photographed on Banc Gail (southwestern lagoon, New Caledonia), a site heavily impacted by hypersedimentation

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ABSTRACT

Previous research has shown that a 100-km² area in the central part of the southwestern lagoon of New Caledonia ('Banc Gail') consists of a field of mud-mounds built on oyster reefs. Erosion caused by land clearing and mining is assumed to have dramatically increased hypersedimentation in a recent past, which in turn is thought to have caused the extinction or near-extinction of Banc Gail's oyster populations. SCUBA-diving exploration of Banc Gail revealed a peculiar ecosystem now dominated by stalked or fleshy, mucus-producing corals.

Keywords

Hypersedimentation – mud mound – oyster reef – dead community

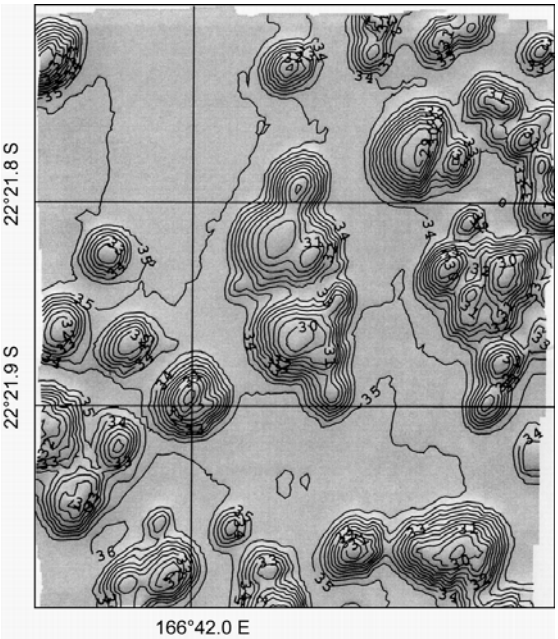

Figure 1. Bathymetric map of a part of Banc Gail, taken during cruise 2005-NC-PL of RV Alis. Isobaths drawn every 0.5 m (redrawn from [2]).

1. INTRODUCTION

Circulation modelling of the southwestern lagoon of New Caledonia has shown a permanent gyre in its central, deeper part [1]. The gyre revolves around a shoal ('Banc Gail') that extends over a surface of approximately 100 km². Gyres retain buoyant particles and allow the sedimentation of the denser particles. Bathymetric maps of Banc Gail produced from multiple-beam sonar images have revealed a tormented landscape that consists of a field of about one thousand evenly spaced mounds 40-120 m wide and 1-6 m high above the flat bottom at -35 m ([2]; Figure 1). Drilling the summit of two mounds has uncovered reefs of sub-fossil oyster shells, *Hyotissa hyotis* (Gryphaeidae), filled with mud [2, 3].

2. OBSERVATIONS AND DISCUSSION

Banc Gail is presently a site of hyper-sedimentation as shown by the muddy bottom and the abundance of silt particles in the water column. Massive land clearing and mining within the last century [4] is likely to have led to a significant increase in the input of sediment into the lagoon. It is here hypothesized that the mounds initially grew by the accumulation of live oysters, and that the latter were recently driven extinct or near-extinct by hypersedimentation.

A proportion of the animals presently encountered on the summits of the mud mounds of Banc Gail ([2, 3]; present note) possess stalks or have long, inflatable bodies (Figure 2 a-d) that presumably allow them to permanently stay clear above the accumulating mud. Abundant mucus production is probably essential to the survival of those animals since mucus agglomerates silt particles and facilitates their ejection (Figure 2c, d). This also facilitates and enhances their sedimentation.

ACKNOWLEDGMENTS

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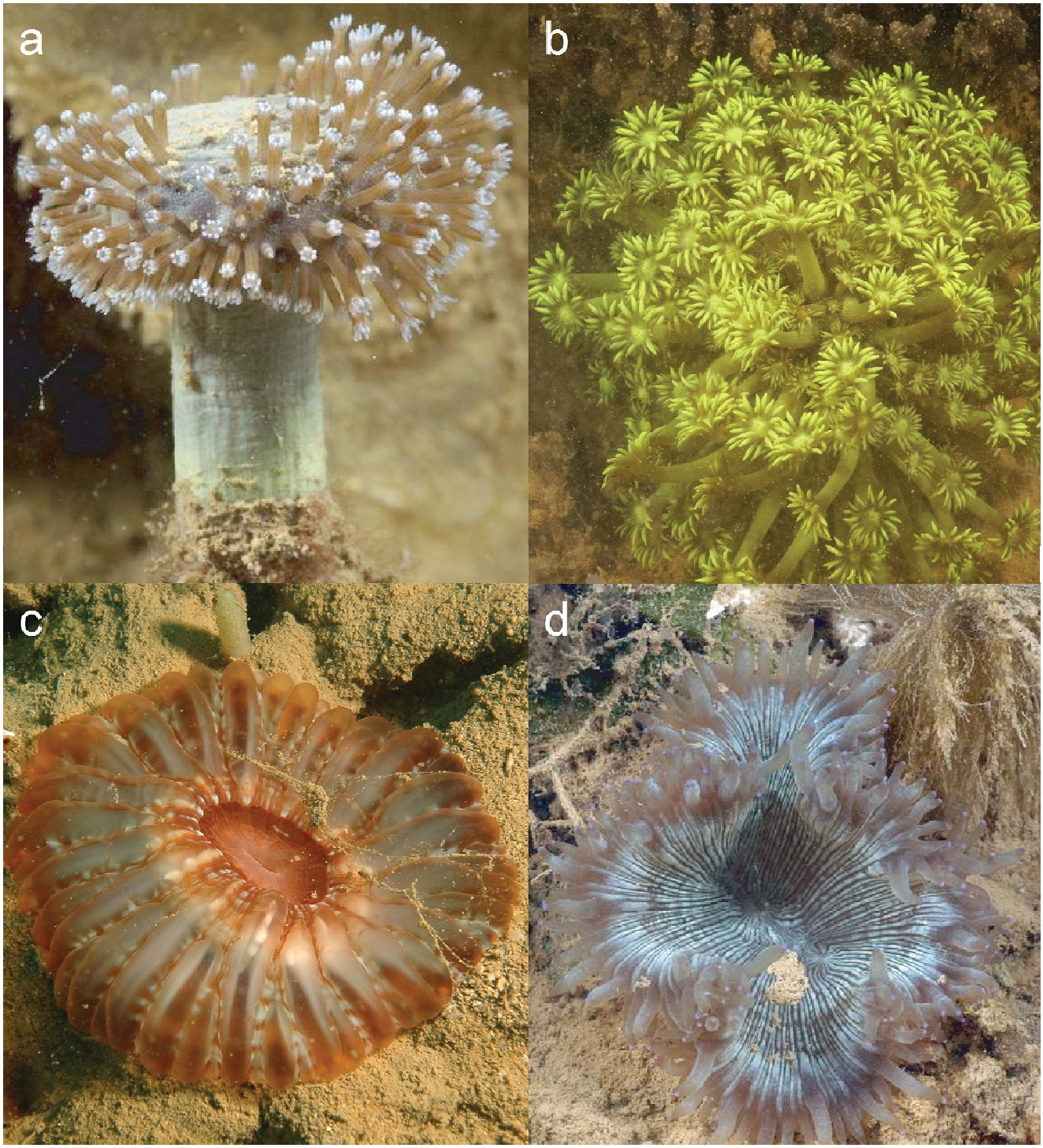

Figure 2. Stalked and fleshy corals occurring on the summits of Banc Gail mud mounds (selection of photographs from a series taken by E.F., 2005-2008): (a) Undetermined alcyonarian of family Xenidae; (b) *Goniopora* sp. (Poritidae); (c) Inflated *Cynarina lacrymalis* (Mussidae) shedding mucus and silt; (d) *Catalaphyllia jardinei* (Caryophyllidae) ejecting agglomerated silt particles.

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