Lush underwater forests in mesophotic reefs of the Gulf of Guinea

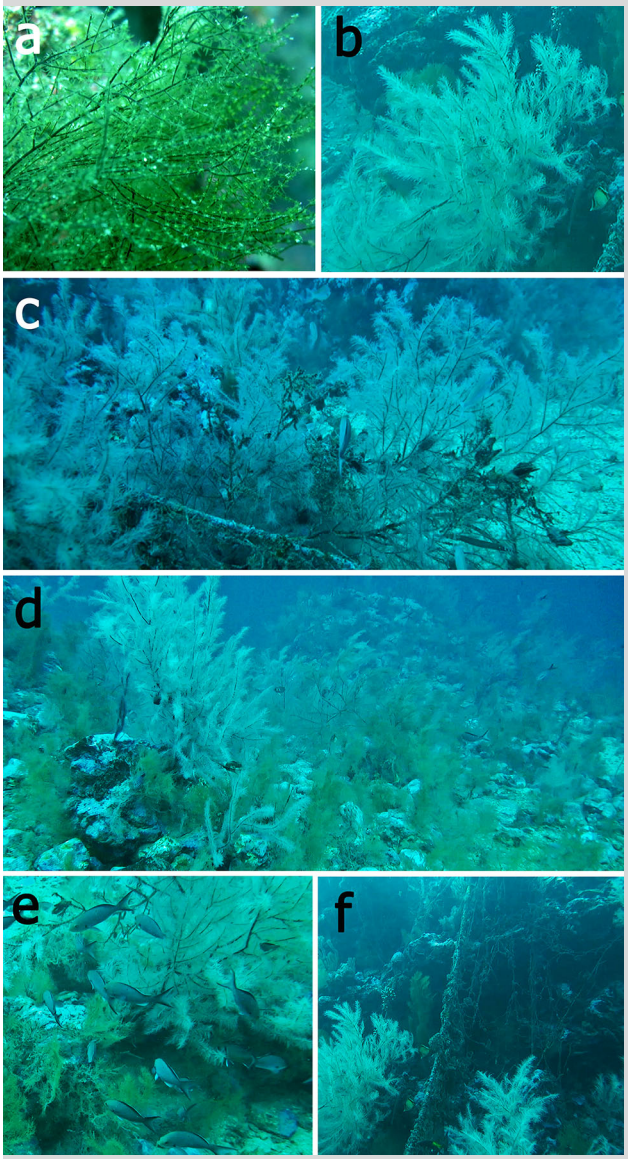

Fig. 1 Mesophotic reef dominated by black corals in São Tomé Island: **a** *Antipathes gracilis*, **b** a white species, possibly *Tanacetipathes spinescens*; **c**, **d** seascape of the reef showing high canopies, **e** *Paranthias furcifer* among the corals, and **f** detail of abandoned fishing net

The Gulf of Guinea, in West Africa, harbors some of the least known tropical reefs in the world. Shallow reefs in this region are mainly rocky and have limited scleractinian growth (Laborel 1974). Circulation patterns restrict warm waters to the surface layer and cooler waters to below 20–30 m depth (Laborel 1974). Reefs lying below these depths, in cool water, have not yet been described. Here, we report a mesophotic reef ecosystem dominated by black corals between 30 and 50 m depth off Lagoa Azul, northwest São Tomé Island (0°24′33″N, 6°36′30″E). At 28–30 m depth, temperature declined abruptly, from 29 °C to 22 °C, and the reef shifted from rocky/biogenic patches (scleractinians *Montastrea cavernosa, Siderastrea* sp., and coralline algae) among sand to high-canopy black corals on rocky substrate. The black corals were mainly the greenish *Antipathes gracilis* (Fig. 1a) and a white-colored species, possibly *Tanacetipathes spinescens* (Fig. 1b; Wirtz and d'Acoz 2008), and also included the whip coral *Stichopathes lutkeni*. Colonies were largely ramified and formed canopies reaching 1–2 m height (Fig. 1c). The dense distribution of colonies between 35 and 50 m depth resembled a large underwater forest, intensified by the green coloration of *A. gracilis* (Fig. 1d). Canopies gave shelter to schools of fish, especially *Paranthias furcifer, Cleptiscus africanus,* and *Lutjanus fulgens* (Fig. 1e). In situ observation of canoes fishing and abandoned gear (Fig. 1f), as well as fishermen interviews, revealed that this area is heavily fished with occasional blasting. This reef may also be affected by the development of a deepwater port ~7 km from the area. The fragile structure of black corals in this hitherto undescribed and potentially unique ecosystem should be considered in the management and conservation of São Tomé's reefs.

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