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Diversity of sponges (Porifera) from cryptic habitats on the Belize barrier reef near Carrie Bow Cay

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Abstract

The Caribbean barrier reef near Carrie Bow Cay, Belize, has been a focus of Smithsonian Institution (Washington) reef and mangrove investigations since the early 1970s. Systematics and biology of sponges (Porifera) were addressed by several researchers but none of the studies dealt with cryptic habitats, such as the shaded undersides of coral rubble, reef crevices, and caves, although a high species diversity was recognized and samples were taken for future reference and study. This paper is the result of processing samples taken between 1972 and 2012. In all, 122 species were identified, 14 of them new (including one new genus). The new species are *Tetralophophora* (new genus) *mesoamericana, Geodia cribrata, Placospongia caribica, Prosuberites carriebowensis, Timea diplasterina, Timea oxyasterina, Rhaphidhistia belizensis, Wigginsia curlewensis, Phorbas aurantiacus, Myrmekioderma laminatum, Niphates arenata, Siphonodictyon occultum, Xestospongia purpurea,* and *Aplysina sciophila.* We determined that about 75 of the 122 cryptic sponge species studied (61%) are exclusive members of the sciophilic community, 47 (39 %) occur in both, light-exposed and shaded or dark habitats. Since we estimate the previously known sponge population of Carrie Bow reefs and mangroves at about 200 species, the cryptic fauna makes up 38 % of total diversity.

Key words: Taxonomy, morphology, distribution, Caribbean, submarine caves, coral rubble, mangrove, new species, associations

Introduction

The principal objective of this contribution is a sponge diversity assessment in cryptic habitats of the Atlantic barrier reef ecosystem near Carrie Bow Cay, Belize. This islet has been the site of the Smithsonian Marine Field Station for more than four decades, which has supported numerous systematic, ecological, life-history, and geological studies (Rützler, 2009). Sponges (Porifera) received a lot of attention from international collaborators, owing to their high diversity, biomass, and ecological importance in most reef, seagrass, and mangrove communities (Diaz & Rützler, 2001; Rützler, 2012).

We were intrigued by the sponge fauna in cryptic spaces early on—from lower surfaces and interstices of coral rubble to marine caves—because we could tell that many sponge species were different from those on the open, fully light-exposed surfaces of reefs, on lagoon bottoms covered by turtle grass, and on mangrove prop roots. Because sampling in cryptic spaces is difficult and time consuming and often resulted only in small specimen fragments, we were hesitant to describe our findings until more material was available. Only in recent years could we refocus our attention on cryptic environments as we had become well acquainted with most open-space species.

Reefs are rather porous, with cavities ranging in size from micrometers (pores in limestone skeletons of calcareous algae, foraminiferans and invertebrates) to meters (reef-framework caves), even kilometers in case of

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