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## 沖縄島産サンゴ被覆性海綿 *Terpios hoshinota* に関する研究

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Abstract

Studies on the coral-killing sponge *Terpios hoshinota* in Okinawa Island, Japan

沖縄島産サンゴ被覆性海綿 *Terpios hoshinota* に関する研究

Coral reefs are facing serious threats in decades due to climate change or competition with other organisms. The coral-killing sponge *Terpios hoshinota* Rützler & Muzik 1993 can cover huge areas of corals. Studies on the biology and ecology of this cyanobacteriosponge is scarce. The aim of this research addresses the gaps in understanding the biology and ecology of *T. hoshinota* in Okinawa Island, Japan.

Although the morphological components of the sponge such as cyanobacteria, spicules and particles are crucial, accurate quantitative measurements have not been estimated. In Chapter 2, the density of symbiotic cyanobacteria was carried out with grinding method showing higher density than previous report. Similarly, densities of spicules and particles were estimated by bleaching method. Spicule length of Sesoko sponge was shorter (193  $\mu\text{m}$ ) compared to other sites in previous studies. This sponge selects specific size particles (22.3  $\mu\text{m}$  in diameter) from surrounding water. Moreover, spicules size and composition of particles were analyzed and discussed in relation to composition of sediments around the sponge (Chapter 3). The rate of acid-insoluble matter in sediments was higher in northern site of Okinawa Island, suggesting the plasticity of morphological components and surrounding environmental factors.

Despite of its importance, the in site progression of *T. hoshinota* remained unclear. Therefore, the monthly progression rates of *T. hoshinota* were measured over a year (Chapter 4), the results showing higher progression in summer (July, August, and October) with a mean value of 66 mm month<sup>-1</sup>, except in September, when strong typhoons come close to Okinawa and the progression rate decreased temporarily. For sponge reproduction, the development of gametogenesis and embryogenesis through histological examination were determined together with the experiment of field larval settlement (Chapter 5). The results showed that the higher number of larval settlements might depend on the topography of location and be affected by the event such as typhoon. In Chapter 6, monthly observations on the maturity stages categorized as the position of sponge larvae were carried out (May 2021 – May 2022), showing different patterns in different sites. Environmental differences such as temperature fluctuation due to reef structures were suggested.

Sponge-associated snail was identified as *Joculator* sp. (family Cerithiopsidae) (Chapter 7).

The present study elucidated the fundamental survival strategy of *T. hoshinota* in relation to environment in subtropical coral reefs in Okinawa Island, Japan.

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