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# First record of the coral-killing sponge *Terpios hoshinota* in the Maldives and Indian Ocean

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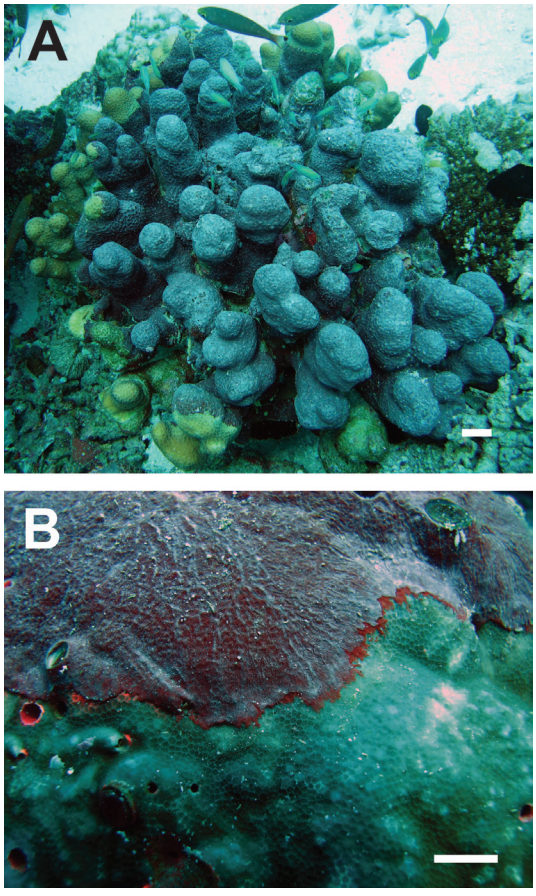


The cyanobacteriosponge species *Terpios hoshinota* Rützler and Muzik, 1993 (class Demospongiae: family Suberitidae) is noted for its ability to overgrow living corals, and occasionally undergoes large outbreaks capable of killing the majority of hard corals on afflicted reefs (Bryan 1973). Originally described off Guam, this sponge has been reported from the subtropical northwestern Pacific Ocean (Liao et al. 2007, Reimer et al. 2010), the Great Barrier Reef (Fujii et al. 2011), and off Indonesia (de Voogd et al. 2013); it is theorized to be spreading its range in western Pacific waters (Liao et al. 2007).

During recent biodiversity surveys at the Faafu Atoll, Maldives, thin, black, encrusting sponges were observed overgrowing live *Porites*, *Acropora*, *Cyphastrea*, *Montipora,* and *Pavona* coral colonies at 13 different locations at depths from 7 to 24 m. Panel A shows an image of *T. hoshinota* (dark gray center portion) overgrowing *Pavona* coral (yellow-brown peripheral portion). Panel B is a close-up showing the expanding edge of *T. hoshinota* (top) overgrowing *Porites* coral (bottom) (scale bars for both A, B approximately 2 cm). Analyses of specimens' spicules and mitochondrial DNA sequences of cytochrome oxidase subunit 1 (COI) confirmed the identity of these sponges as *T. hoshinota*. Spicules matched those reported for *T. hoshinota* and obtained COI sequences (length = 626 base pairs) that were either identical (4/5 examined specimens) or with 1 synonymous base pair difference (1 specimen) from previously reported sequences from Taiwanese specimens (GenBank Accession Number KJ008098).

This is the first record of *T. hoshinota* from the Maldives and by extension from the Indian Ocean. Although monitoring is needed to ascertain the full extent of *T. hoshinota's* presence in the Maldives, this report demonstrates that this species is much more widely spread than previously thought. Either *T. hoshinota* is expanding its range rapidly or the extent of the original range of this species has been underestimated. Population level analyses are needed to answer whether this species is undergoing rapid distribution expansion.

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## Literature Cited

Bryan P. 1973. Growth rate, toxicity, and distribution of the encrusting sponge, *Terpios* sp. (Hadromerida: Suberitidae) in Guam, Mariana Islands. Micronesica. 9:237–242.

de Voogd NJ, Cleary DFR, Dekker F. 2013. The coral-killing sponge *Terpios hoshinota* invade Indonesia. Coral Reefs. 32:755. http://dx.doi.org/10.1007/s00338-013-1030-4

Fujii T, Keshavmurthy S, Zhou W, Hirose E, Chen CA, Reimer JD. 2011. Coral-killing cyanobacteriosponge (*Terpios hoshinota*) on the Great Barrier Reef. Coral Reefs. 30:483. http://dx.doi.org/10.1007/s00338-011-0734-6

Liao M, Tang S, Hsu C, Wen K, Chen W, Wang J, Meng P, Twan W, Lu C, Dai C, Soong K, Chen C. 2007. The "black disease" of reef-building corals at Green Island, Taiwan—outbreak of a cyanobacteriosponge, *Terpios hoshinota* (Suberitidae: Hadromerida). Zool Stud. 46:520.

Reimer JD, Nozawa Y, Hirose E. 2010. Domination and disappearance of the black sponge: a quarter century after the initial *Terpios* outbreak in southern Japan. Zool Stud. 50:394.

Rützler K, Muzik K. 1993. *Terpios hoshinota*, a new cyanobacteriosponge threatening Pacific reefs. Sci Mar. 57:395–403.

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