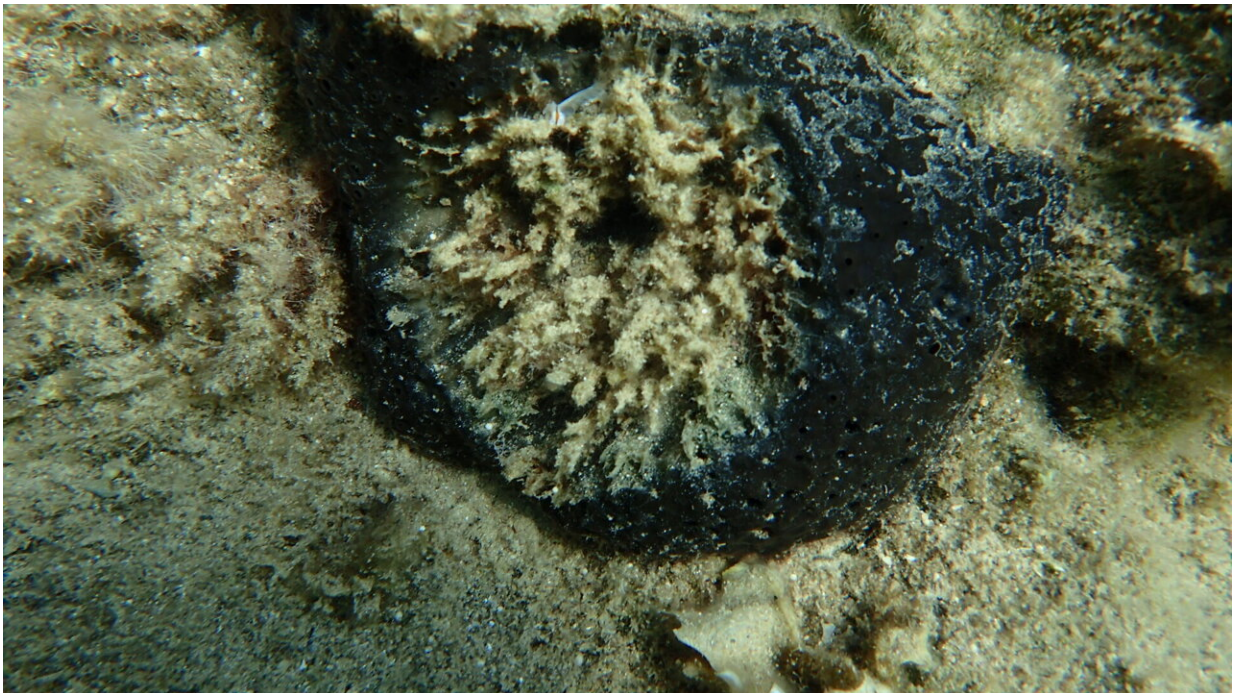


# Scientists raise alarm as bacteria are linked to mass death of sea sponges weakened by warming Mediterranean

December 1 2023

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Dead dark stinging sponge (*Sarcotragus foetidus*). Credit: Fikret Öndes

*Vibrio* bacteria, named for their vibrating swimming motion, span approximately 150 known species. Most *Vibrio* live in brackish or salt water, either swimming free or living as pathogens or symbionts in fish, crustaceans, mollusks, and corals. Because *Vibrio* thrives at relatively

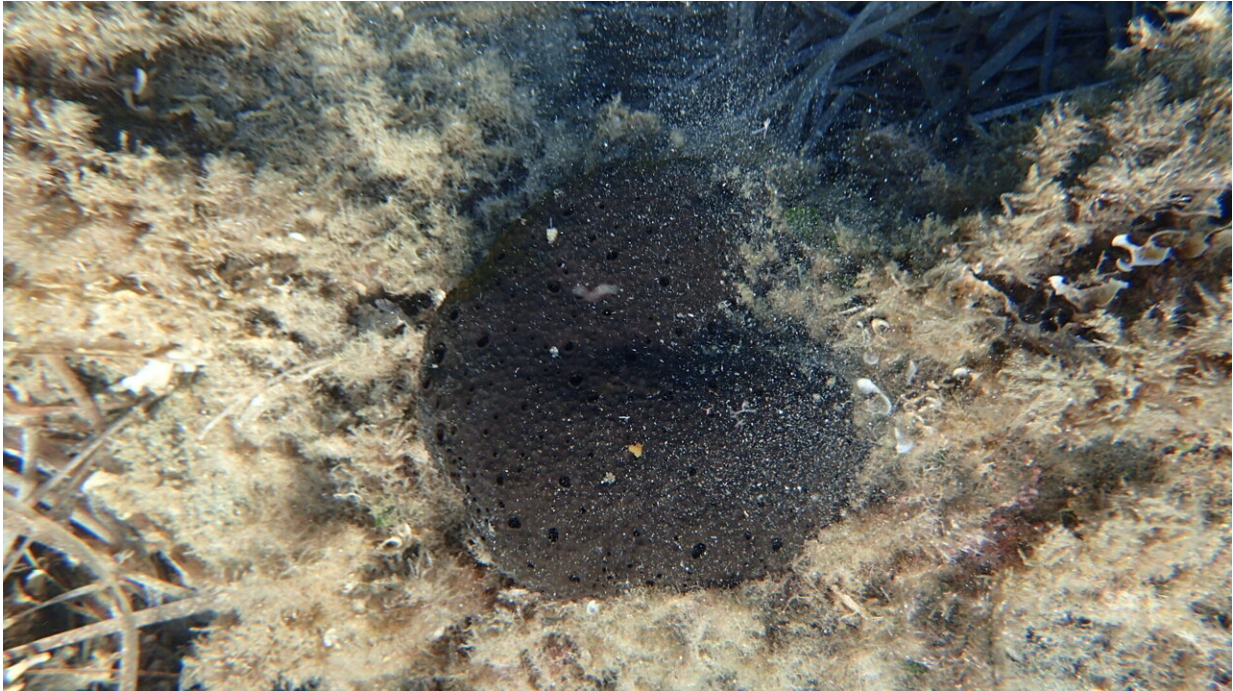
high temperatures, outbreaks in marine animals are expected to become ever more frequent under global warming. For example, over the past few decades, *Vibrio* have been implicated in the 'bleaching' of subtropical and tropical corals around the world.

Now, researchers from Spain and Turkey have shown that *Vibrio* bacteria also play a role in outbreaks of mortality of an unrelated sessile marine organism, the dark stinging sponge (*Sarcotragus foetidus*). The results are published in [\*Frontiers in Microbiology\*](#).

"Here we show that pathogenic *Vibrio* bacteria were abundant in diseased individuals of the dark stinging sponge, during a deadly outbreak first observed in late 2021 in the Aegean Sea," said Dr. Manuel Maldonado, a senior scientist at the Spanish National Research Council (CEAB-CSIC) and a co-author of the study.

The dark stinging sponge, first recorded by Aristotle in his books, is widespread in the Mediterranean and North Atlantic, typically living at shallow depths. In the summer of 2021 at Izmir, Turkey, co-author Dr. Fikret Öndes—an associate professor at Izmir Katip Celebi University—first learned of a [mysterious disease](#) that affected dark stinging sponges locally.

"When I dived and observed the study area and its surroundings, I encountered not only visibly unhealthy sponges but also dead ones," said Öndes. He immediately alerted his colleagues, with whom he undertook to study the novel disease.



Live dark stinging sponge (*Sarcotragus foetidus*). Credit: Fikret Öndes

### **Link to warm temperatures**

During subsequent dives between August and December, the researchers studied 117 dark stinging sponges off Seferihisar on the Turkish Aegean coast. Each individual was photographed and measured, with [tissue samples](#) taken for DNA analysis. The majority (64%) of the sponges seemed healthy, but 27% were visibly affected by partial necrosis, while 9% appeared dying or dead.

From ribosomal RNAs exclusively present in diseased, dying, and dead sponges, the authors detected a total of three *Vibrio* species: *V. fortis*, *V. owensii*, and *V. gigantis*. These species were previously known to occur in the tissues of corals and diseased crustaceans and shrimp, respectively.



"None of the three pathogenic *Vibrio* species occurred in all the diseased sponges studied. This may mean that vibriosis is a secondary infection that worsens the course of disease but isn't the primary etiological agent. Further research based on the metagenomics of diseased individuals, sampled at several disease stages, is required to resolve this," said Maldonado.

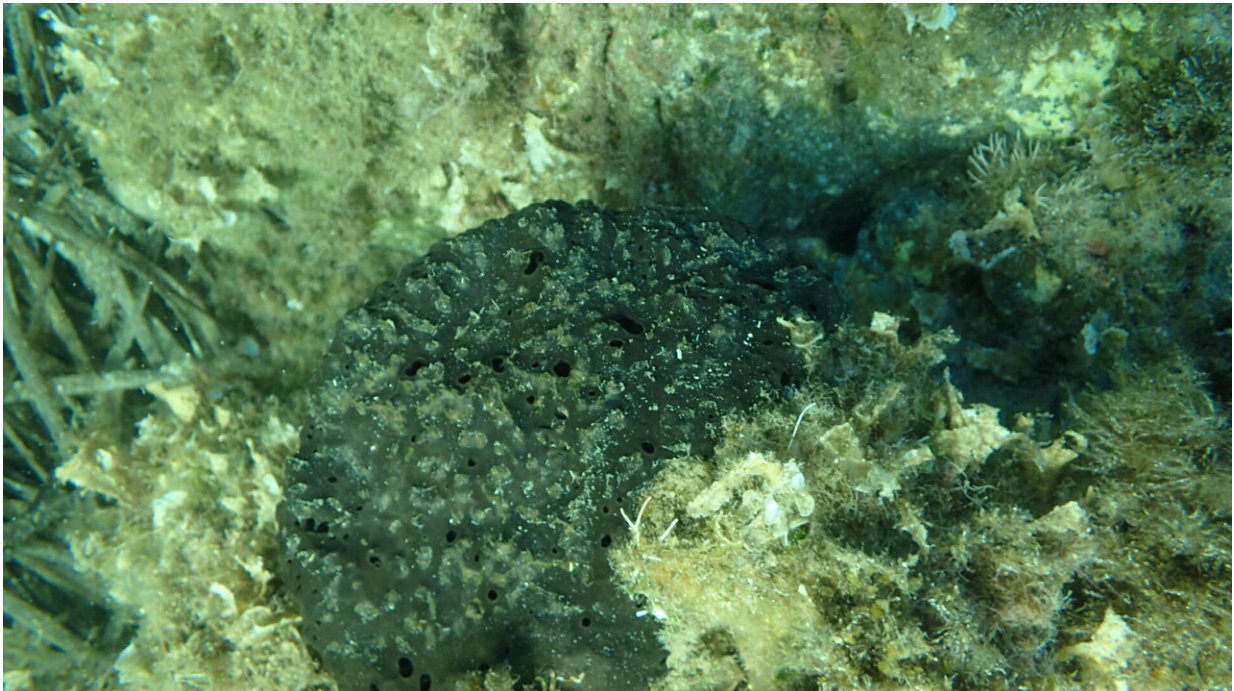


Live dark stinging sponge (*Sarcotragus foetidus*). Credit: Fikret Öndes





Dark stinging sponge (*Sarcotragus foetidus*) affected with the novel disease.  
Credit: Fikret Öndes

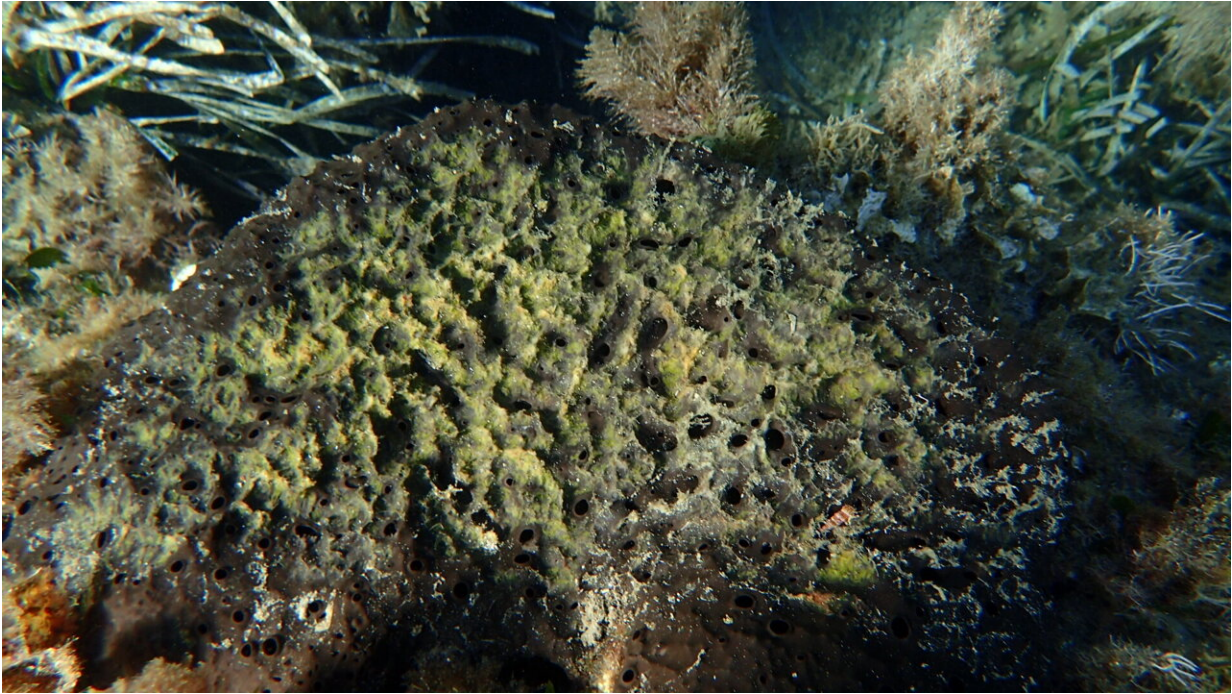




Dark stinging sponge (*Sarcotragus foetidus*) affected with the novel disease.  
Credit: Fikret Öndes



Dark stinging sponge (*Sarcotragus foetidus*) affected with the novel disease.  
Credit: Fikret Öndes



Dark stinging sponge (*Sarcotragus foetidus*) affected with the novel disease.  
Credit: Fikret Öndes

## Consequences for marine ecosystems

That heat-loving *Vibrio* bacteria play a role in the disease, either as the primary or secondary agent, is borne out by the observation that the disease wasn't observed later than October. The authors also speculate that the same pathogens may have caused the reported simultaneous mass mortality of shallow-water stony corals in the northern Aegean. Further studies are needed to confirm this.

"Climate change is currently affecting [marine ecosystems](#), including [water temperature](#), and these changes appear to impact disease dynamics in sponges and their pathogens," said first author Dr. Ezgi Dinçtürk from the Department of Aquaculture of Izmir Katip Celebi University.

"Healthy sponges enhance light penetration by clean bacterio- and microphytoplankton from water, take up and release inorganic nutrients, and serve as micro-refuges for a large variety of organisms. Disease outbreaks like this could thus have major consequences for marine ecosystems."

**More information:** Mass mortality of the keratose sponge *Sarcotragus foetidus* in the Aegean Sea (Eastern Mediterranean) correlates with proliferation of *Vibrio* bacteria in the tissues, *Frontiers in Microbiology* (2023). DOI: [10.3389/fmicb.2023.1272733](https://doi.org/10.3389/fmicb.2023.1272733).  
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