Human-generated noise can contribute to deplete Seagrass Posidonia populations

June 15 2021

Credit: Universitat Politècnica de Catalunya · BarcelonaTech (UPC)

When exposed to human-made noise, seagrass posidonia reveals permanent severe lesions in their sensory organs that sense gravity, which threatens their survival. This is the main conclusion of a recent

study of the Laboratory of Applied Bioacoustics (LAB) of Universitat Politècnica de Catalunya BarcelonaTech (UPC) titled "Seagrass Posidonia is impaired by human-generated noise," which is published in *Nature Communications Biology*.

These new findings demonstrate that plants have the physiological ability to perceive sounds, and just as importantly, reveal that commonly encountered sources of noise in the ocean can contribute to deplete their populations.

The last 100 years have seen the introduction of many sources of artificial noise in the sea environment, which have shown to negatively affect marine organisms. Many aspects of how noise and other forms of energy may critically impact the natural balance of the oceans are still unstudied. A lot of attention has been devoted to determining the sensitivity to noise of fish and marine mammals, especially cetaceans and pinnipeds, because they are known to possess hearing organs. Recent studies conducted at the Laboratory of Applied Bioacoustics (LAB) of the Universitat Politècnica de Catalunya, Barcelona Tech (UPC) have also shown that cephalopods, anemones and jellyfish, while lacking similar auditory receptors, are also affected by artificial sounds. Indeed, marine invertebrates have sensory organs whose main functions allow these species to maintain equilibrium and sense gravity in the water column. But not a single study has yet addressed the sensitivity to noise of sessile marine organisms like plants or coral reefs, whose immobility makes them highly susceptible to chronic effects since they also have sensory organs specialized in gravity perception, which are essential to find their natural substrate.

Posidonia is already fragilised by mechanical human threats because of the massive use of leisure boats' anchors that literally uproot these unique seagrasses.

Seagrasses are considered as an equivalent of primary forests in their ecological functions. They are higher plants adapted to marine environments, developing vital ecosystems consisting of complex networks that are thousands of years old, anchored in soft bottom areas. They have significant effects on both biodiversity and ecosystem functions, minimizing hydrodynamic forces, influencing hosted species (invertebrates and fishes) and promoting microbiome and bacteria growth. Seagrasses present starch grains in its roots that function as invertebrate statocysts, which are sensory organs responsible of sensing gravity and processing sound vibration. In addition, its rhizomes, which act as storage organs, provide a considerable amount of starch grains, a guarantee of energy provision to the plants.

This study, lead by Marta Solé, a senior researcher at the LAB-UPC, reports morphological and ultrastructural changes in seagrass after exposure to sounds in a controlled environment. These changes are new to aquatic plants pathology. Low-frequency sounds produced alterations in posidonia oceanica root and rhizome statocysts, and the nutritional processes of the plant were affected by a decrease in the number of rhizome starch grains. In addition, a degradation in the specific fungal symbionts of posidonia roots was observed. Fungus improves the nutrient status of the plant (e.g. mineral nutrition, water absorption) in exchange for carbon provided by posidonia, which is necessary for fungal growth and reproduction.

This sensitivity to artificial sounds revealed how sound can potentially affect the health status of posidonia. Moreover, these findings address the question of how much the increase of ocean noise pollution may contribute in the future to the depletion of seagrass populations and to biodiversity loss.

More information: Marta Solé et al, Seagrass Posidonia is impaired by human-generated noise, *Communications Biology* (2021). DOI:

10.1038/s42003-021-02165-3

Provided by Universitat Politècnica de Catalunya BarcelonaTech (UPC)

Citation: Human-generated noise can contribute to deplete Seagrass Posidonia populations (2021, June 15) retrieved 22 September 2024 from https://phys.org/news/2021-06-human-generated-noise-contribute-deplete-seagrass.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.