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Opinion Article

Role of Conservation of *Bigelowiella natans* in Marine Biodiversity

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DESCRIPTION

The world's oceans are teeming with life, and a significant portion of this life is invisible to the naked eye. Phytoplanktons, the microscopic plants that drift with the currents, play a vital role in the marine ecosystem. Among these remarkable microorganisms, *Bigelowiella natans* stands out as a fascinating temperate marine phytoplankton species. *Bigelowiella natans*, commonly known as *B. natans*, is a species of unicellular phytoplankton belonging to the Chlorarachniophytes group. Its unique characteristics set it apart from other phytoplankton and make it an intriguing subject of study. Perhaps the most remarkable feature of *B. natans* is its complex cell structure. Unlike many other phytoplankton species, *B. natans* is not a simple unicellular organism. Instead, it possesses a eukaryotic structure with multiple compartments. Within the cell, a secondary plastid called a "chloroplast" is found, which the site for photosynthesis is. This complex cell structure is a result of endosymbiosis, a process where one organism lives inside another. In the case of *B. natans*, it contains a green algal endosymbiont, allowing it to photosynthesize and thrive in a variety of environmental conditions. *B. natans* is relatively small, typically measuring between 5 to 30 micrometers in diameter. This tiny size allows it to remain suspended in the water column, where it can efficiently harness sunlight for photosynthesis. *Bigelowiella natans* is primarily found in temperate marine environments. It's commonly observed in coastal regions and can adapt to a wide range of water temperatures. This adaptability to different temperature conditions is one of the reasons why *B. natans* is an essential component of temperate marine ecosystems. As photosynthetic organisms, *B. natans* forms the base of the marine food web. Through photosynthesis, they convert carbon dioxide and sunlight into organic matter, providing a source of energy for other marine organisms. This makes *B. natans* an essential link in the transfer of energy from the sun to the rest of the marine ecosystem. Phytoplankton, including *B. natans*, are responsible for a significant portion of global carbon fixation. They absorb carbon dioxide from the atmosphere and convert it into organic compounds. This process, known as the biological pump, helps mitigate the impacts of climate change by sequestering carbon in the ocean. During photosynthesis, *B. natans* releases oxygen into the water, contributing to oxygen production in marine environments. This oxygen is crucial for the survival of many marine organisms, including fish and other phytoplankton species. *B. natans* also plays a role in nutrient cycling. As they photosynthesize and grow, they take up essential nutrients from the water, such as nitrates and phosphates. When they are consumed or die, these nutrients are released back into the water, making them available for other marine organisms. *B. natans* serves as a primary food source for various marine organisms, including zooplankton and small fish. These grazers consume *B. natans*, transferring the energy they have acquired through photosynthesis up the food chain. This consumption forms a critical part of the marine food web. Increasing levels of carbon dioxide in the atmosphere are leading to ocean acidification. This change in the chemistry of seawater can impact *B.natans* and other phytoplankton, potentially reducing their ability to form calcium carbonate shells, which are essential for some species. Rising ocean temperatures due to climate change can affect the distribution of *B. natans*. While they are adapted to a range of temperatures, extreme fluctuations or prolonged warm periods can disrupt their growth and distribution. Excess nutrient runoff from human activities, such as agriculture and industrial processes, can lead to nutrient imbalances in coastal waters. This can result in harmful algal blooms, which may outcompete *B. natans* and disrupt the marine ecosystem. *Bigelowiella natans* is a remarkable example of the hidden wonders of the marine world. As a temperate marine phytoplankton species, it plays an important role in the health of coastal ecosystems and the global carbon cycle. Its complex cell structure and adaptability to various environmental conditions make it a fascinating subject of study for scientists seeking to understand the intricacies of marine life.

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