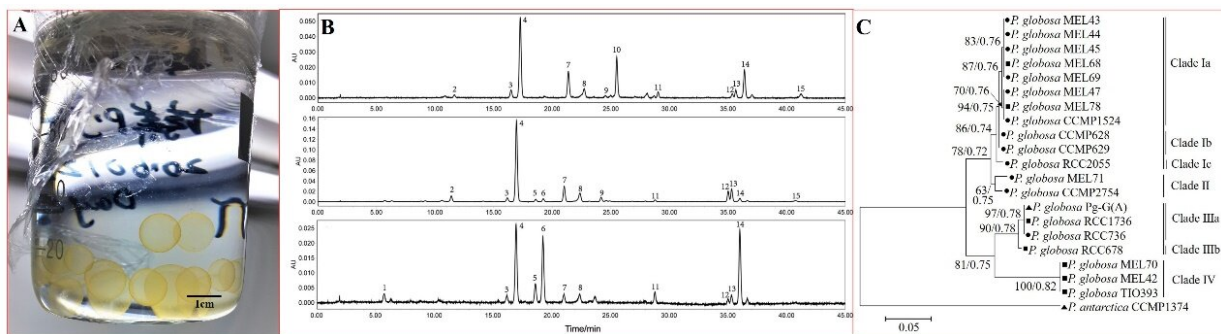


Unique 'giant-colony' ecotype leads to intense blooms of *Phaeocystis globosa* in South China Sea

April 6 2022, by Li Yuan



Giant colonies of *P. globosa* collected from the SCS (A), pigment chromatograms of representative *P. globosa* isolates (B), and phylogenetic tree of different geographic isolates of *P. globosa* (C). Credit: IOCAS

Haptophyte *Phaeocystis globosa* is an important causative agent of harmful algal blooms. Outbreaks of *P. globosa* blooms usually occur in the eutrophic coastal waters in the form of colonies and influence marine ecosystems and mariculture industry.

The South China Sea (SCS) is a typical region with a large number of *P. globosa* blooms that are characterized by the formation of "giant colony," the unique diagnostic pigment, and the strong hemolytic toxicity.

Recently, a research team led by Prof. Yu Rencheng from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS) provided new insights into the intense blooms of *P. globosa* in the SCS, and identified the causative species of the blooms as a unique "giant-colony" ecotype.

The study was published in *Harmful Algae* on March 23.

The researchers used a high-resolution chloroplast [molecular marker](#) to analyze the genetic diversity of more than 19 strains of *P. globosa* collected from different regions of the Pacific and Atlantic Oceans. They determined colony sizes and pigment profiles of these *P. globosa* isolates.

These *P. globosa* strains could be divided into four genetic clades based on their [sequences](#), or two groups based on colony size and the diagnostic pigments (19'-hexanoyloxyfucoxanthin, hex-fuco, and 19'-butanoyloxyfucoxanthin, but-fuco).

Three strains from the SCS, all belong to the same genetic clade, showed unique biological features in forming "giant colony" and possessing but-fuco as their diagnostic pigment. Based on these findings, the researchers suggested that these SCS strains should be a unique "giant-colony" ecotype of *P. globosa*.

They analyzed more than 1,000 sequences of the chloroplast molecular marker obtained from *P. globosa* colony and phytoplankton in the SCS during the period 2016-2021. Phylogenetic analysis indicated that more than 95% of the sequences from *P. globosa* colonies in the SCS were comprised of the "giant-colony" ecotype, whereas the genetic diversity of solitary cells was much higher. Therefore, the intense blooms of *P. globosa* in the SCS were mainly caused by this "giant-colony" ecotype of *P. globosa*.

P. globosa exhibits varying morphological and physiological features and high [genetic diversity](#), yet the relationship among these has never been elucidated. "Our work provides a valuable molecular marker to examine the intraspecific diversity of *P. globosa*, which will help to understand the morphological, physiological and genetic differentiation of *P. globosa*," said Dr. Zhang Qingchun, first author of the study.

"The studies on this unique 'giant-colony' ecotype of *P. globosa* will help to reveal the mechanisms of *P. globosa* blooms in the coastal waters of China, and to develop the monitoring and early-warning system," said Prof. Yu.

More information: Qing-Chun Zhang et al, Intense blooms of *Phaeocystis globosa* in the South China Sea are caused by a unique "giant-colony" ecotype, *Harmful Algae* (2022). [DOI: 10.1016/j.hal.2022.102227](#)

Provided by Chinese Academy of Sciences

Citation: Unique 'giant-colony' ecotype leads to intense blooms of *Phaeocystis globosa* in South China Sea (2022, April 6) retrieved 21 June 2024 from <https://phys.org/news/2022-04-unique-giant-colony-ecotype-intense-blooms.html>

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