



The Critical Role of Biological Sample Curation in Advancing Research on *Eutreptiella* (Euglenophyceae/Euglenozoa)

Oral

Taxonomy and Phylogeny

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The genus *Eutreptiella* is widely distributed in marine and brackish environments and plays a key role in microbial food webs. Despite its ecological importance, its taxonomy remains problematic due to frequent misidentifications. Many sequences in GenBank are incorrectly assigned, as species are often identified based solely on molecular data without proper morphological validation. This leads to errors in phylogenetic analyses and misinterpretations of biodiversity and species distribution, ultimately affecting ecological studies. Additionally, the genus *Eutreptiella* is known to form harmful algal blooms (HABs), which further underscores the need for accurate species identification. Our results confirm these inconsistencies. Morphological analyses of studied strains reveal differences in cell size, flagellar structure, periplast morphology, and intracellular features compared to previously described species. Phylogenetic trees based on SSU and LSU rDNA sequences show that several strains do not cluster with their supposed species, indicating misclassification. These errors

likely stem from the fact that many identifications are made by non-taxonomists, leading to the propagation of inaccurate data in ecological and evolutionary studies worldwide. Misclassifications in public databases not only distort phylogenetic relationships but also affect ecological studies by misrepresenting species diversity and distribution. Our findings highlight the urgent need for a rigorous taxonomic reassessment of the genus *Eutreptiella*, integrating morphological and molecular approaches to ensure accurate classification and restructure the genus. In conclusion, correcting misidentifications will improve our understanding of *Eutreptiella* biodiversity, aid in the reorganization and restructuring of the genus, and provide a clearer framework for studying its role in HABs and ecosystem dynamics.

Palabras Clave

(1) Euglenoids, (2) Marine, (3) Herbarium.

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