

TWO NEW SPECIES IN THE *CHAETOCEROS SOCIALIS* COMPLEX (BACILLARIOPHYTA):
C. SPOROTRUNCATUS AND *C. DICHATOENSIS*, AND CHARACTERIZATION OF ITS
RELATIVES, *C. RADICANS* AND *C. CINCTUS*¹

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The diatom genus *Chaetoceros* is one of the most abundant and diverse phytoplankton in marine and brackish waters worldwide. Within this genus, *Chaetoceros socialis* has been cited as one of the most common species. However, recent studies from different geographic areas have shown the presence of pseudo-cryptic diversity within the *C. socialis* complex. Members of this complex are characterized by curved chains (primary colonies) aggregating into globular clusters, where one of the four setae of each cell curves toward the center of the cluster and the other three orient outwards. New light and electron microscopy observations as well as molecular data on marine planktonic diatoms from the coastal waters off Chile revealed the presence of two new species, *Chaetoceros sporotruncatus* sp. nov. and *C. dichatoensis* sp. nov. belonging to the *C. socialis* complex. The two new species are similar to other members of the complex (i.e., *C. socialis* and *C. gelidus*) in the primary and secondary structure of the colony, the orientation pattern of the setae, and the valve ultrastructure. The only morphological characters that can be used to differentiate the species of this complex are aspects related to resting spore morphology. The two newly described species are closely related to each other and form a sister clade to *C. gelidus* in molecular phylogenies. We also provide a phylogenetic status along with the morphological characterization of *C. radicans* and *C. cintus*, which are genetically related to the *C. socialis* complex.

Key index words: *Chaetoceros*; *Chaetoceros dichatoensis* sp. nov.; *Chaetoceros sporotruncatus* sp. nov.; diatoms; phylogeny; spores; taxonomy

Abbreviations: BI, Bayesian inference; BPP, Bayesian posterior probability; GTR, general time reversible; LTER-MC, Long Term Ecological Research station MareChiara; ML, maximum likelihood; TBR, tree-bisection reconnection

The diatom genus *Chaetoceros* is one of the most abundant marine phytoplankton in coastal and oceanic waters worldwide (Malviya et al. 2016). The genus is highly diverse with about 200 species reported (Guiry and Guiry 2016). One of the most common species is *Chaetoceros socialis* Lauder (e.g., Leblanc et al. 2012, Harrison et al. 2015), a supposedly ubiquitous and cosmopolitan species, documented from polar to tropical waters (Hasle and Syvertsen 1997). This species is characterized by colonies with a secondary spherical structure formed by intermingled curved chains. Cells possess three curved, short setae and one long, straight seta; the chain curvature is due to the convergence of the long setae toward the center of the spherical colony.

Recent studies on strains collected in different geographic areas have shown the presence of genetically distinct entities within the morphologically similar species *C. socialis*. Strains isolated from the North Atlantic/Arctic (northern strains) and the Tyrrhenian Sea (southern strains) showed clear differences in spore morphology, physiological traits (growth rate, photosynthetic yield, metabolomics profiles) and genetic profile (28S rRNA; Degerlund et al. 2012, Huseby et al. 2012). In their detailed morphological and molecular analysis of the *C. socialis* species complex, Chamnansin et al. (2013) summarized the intricate taxonomic history of this species. The authors amended the description of *C. socialis* based on epitype material collected from warm waters off Japan, whereas the species recorded in colder waters was described as *Chaetoceros gelidus*.

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