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The planktonic diatom genus *Chaetoceros* Ehrenberg (Bacillariophyta) from the Adriatic Sea

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Abstract

The morphology of the genus *Chaetoceros*, one of the most abundant and diverse planktonic diatom groups, was investigated using material collected in the eastern Adriatic Sea from 2006 to 2012. Twenty-seven morphologically distinct species have been identified from both field samples and cultivated strains. Two species, *C. bacteriastroides* and *C. pseudodichaeta*, are reported for the first time for the area. Morphometric data, general morphology and ultrastructural characters are presented for each species, based on light and electron microscopy observations, with a special emphasis on species-specific distinctive features. Valve ultrastructure appeared to be characteristic for single species or group of closely related species, especially inside the subgenus *Hyalochaete*. A collection of appropriate micrographs will facilitate future identification of *Chaetoceros* species and morphological comparison with material from other geographic areas.

Introduction

Chaetoceros Ehrenberg (1844: 198) is the most abundant and diverse genus among planktonic diatoms across the world oceans (Malviya *et al.* 2016). The members of the genus are primarily marine with only a few species found to inhabit inland waters (Rushforth & Johansen 1986). The genus *Chaetoceros* is placed together with the genus *Bacteriastrum* Shadbolt (1854: 13) within the family Chaetocerotaceae Ralfs in Pritchard (1861: 758, 860) and is characterized by the presence of setae, long and hollow silicate spine-like projections protruding from the valve surface. As a main morphological distinction, *Chaetoceros* shows bilateral symmetry having elliptical valves adorned with usually two setae, whereas *Bacteriastrum* has radial symmetry with numerous (6–20) setae regularly arranged around the circular valve margin (Round *et al.* 1990).

The genus *Chaetoceros* was erected by Ehrenberg who described two species, *Chaetoceros dichaeta* Ehrenberg (1844: 200) and *C. tetrachaeta* Ehrenberg (1844: 200), from material obtained from the Southern Ocean (64ºS, 160ºW). *C. tetrachaeta* has never been reported after Ehrenberg's first record, although several authors such as Boyer (1926) listed this species as type of the genus. On the other hand, VanLandingham (1968) regarded *C. tetrachaeta* as a taxonomic name not recommended to be used. The remaining species, *C. dichaeta*, which is one of the dominant planktonic diatoms in southern cold waters (Assmy *et al.* 2008), is therefore recognized as the type species of the genus (Hernández-Becerril 2002). Since the genus description, the number of species and infraspecific taxa has increased to 400 (Hasle & Syvertsen 1997). However, due to the numerous inadequate type descriptions, together with large number of existing synonyms, the number of currently accepted taxa is around 200 (Guiry & Guiry 2016).

The first classification system within the genus *Chaetoceros* was proposed by Gran (1897) who defined two subgenera: *Phaeoceros*, including robust forms that have thick plastid-containing setae, and *Hyalochaete*, comprising less silicified forms which have thin setae lacking plastids. The epithet *Phaeoceros* was later replaced by Hendey (1964) with *Chaetoceros* because the subgenus that includes the type species (*C. dichaeta*) has to keep the epithet of the genus (McNeill *et al.* 2012, Art. 22.1). Hernández-Becerril (1993) proposed a third monotypic subgenus, *Bacteriastroidea*, to accommodate the species *Chaetoceros bacteriastroides* (Karsten 1907: 390). Moreover, Hernández-Becerril (1996) expanded the list of features characteristic for the two main subgenera and pointed out that *Chaetoceros* species have rimoportulae on every valve of the chain whereas *Hyalochaete* species possess rimoportulae only on terminal valves.

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