



## Morphology and taxonomy of *Psammodiscus* Round & Mann (Bacillariophyceae: Rhaphoneidales) with a description of the new species *Psammodiscus calceatus*

TSUYOSHI WATANABE<sup>1\*</sup>, TAMOTSU NAGUMO<sup>2</sup>, ZHONGMIN SUN<sup>3</sup>, KAZUKIYO HASEGAWA<sup>3</sup>, TOMOFUMI MIYAGAWA<sup>3</sup>, MISATO KUMADA<sup>3</sup> & JIRO TANAKA<sup>3</sup>

<sup>1</sup> Tohoku National Fisheries Research Institute, Fisheries Research Agency, 3-7-25 Shinhamacho, Shiogama-shi Miyagi 985-0001 Japan (Email: [tsuyoshiw@affrc.go.jp](mailto:tsuyoshiw@affrc.go.jp))

<sup>2</sup> Department of Biology, The Nippon Dental University, Chiyoda-ku, Tokyo 102-8159 Japan

<sup>3</sup> Department of Marine Science, Tokyo University of Marine Science and Technology, Minato-ku, Tokyo 108-8477 Japan

### Abstract

Part of the definition of *Psammodiscus* is that there is always a small pore and sometimes a rimoportula present on the valve centre. A new species *Psammodiscus calceatus* Tsuy. Watanabe, Nagumo & J. Tanaka is described, which lacks a central small pore. And the valves of *P. nitidus* were found that have two marginal rimoportulae. Living cell of *P. nitidus* attached on sand grain solitary and it has many discoid plastids. The structures of rotae with fin-like projections in *Psammodiscus* differ from those of Rhaphoneidaceae genera. The epicingulum of *Psammodiscus* consists of three or four open bands with the valvocopula and second band opening at 180° to one another alternately at one apex.

**Key words:** cingulum, morphology, *Psammodiscus*, *Psammodiscus calceatus* sp. nov., Rhaphoneidales

### Introduction

Round established the order Rhaphoneidales to include two families, Rhaphoneidaceae Forti and Psammodiscaceae Round & D.G. Mann (Round *et al.* 1990: 662). The family Rhaphoneidaceae includes 13 genera: *Adoneis* G.W. Andrews & P. Rivera (1987: 2); *Delphineis* G.W. Andrews (1977: 249); *Neodetonia* S. Blanco (= *Detonia* Frenguelli (1949: 119); *Dickensoniaforma* R.P. Scherer (1997: 85); *Diplomenora* K.L. Blazé (1984: 218); *Drewsandria* P.A. Sims & R. Ross (1996: 302); *Incisoria* Hajós in M. Hajós & H. Stradner (1975: 937); *Lancineis* G.W. Andrews (1990: 128); *Meloneis* Louvrou, Danielidis & Economou-Amilli (2012: e32198, 2); *Neodelphineis* Takano (1982: 45); *Perissonoë* G.W. Andrews & Stoelzel (1984: 226); *Rhaphoneis* Ehrenberg (1844: 74); *Sceptroneis* Ehrenberg (1844: 264). The family Psammodiscaceae consists of only one monotypic genus *Psammodiscus* Round & Mann (1980: 371), with *P. nitidus* (Gregory) Round & Mann (1980: 371) as its generitype. *P. nitidus* was originally described under the name of *Coscinodiscus nitidus* Gregory (1857: 499) as a radial centric diatom because of its circular valve and radiating striae. However, *C. nitidus* is epipsammic and has areolae occluded by rotae without slits and small sessile rimoportulae, which resembles of *Rhaphoneis* and related genera. Thus, *C. nitidus* was judged not to be a species of *Coscinodiscus* but related to *Rhaphoneis* and placed in the monotypic genus (Round & Mann 1980). Part of the definition of *Psammodiscus* is that there are always a small pore and sometime a rimoportula present on the valve centre. And it was known that *P. nitidus* has the rota with several spokes and the cingulum consisting open bands (Round & Mann 1980).

Cells of *Psammodiscus* were collected from marine coast in Japan and observed using light (LM) and scanning electron microscopy (SEM). The object of this study is to clarify the morphology of species in the genus *Psammodiscus*, as our examination of specimens from *Psammodiscus* revealed differences with previous studies and some new structures leading to the description of the new species, *Psammodiscus calceatus* sp. nov., which lacks central small pore.