



Title	Taxonomy, morphology and molecular phylogeny of several marine benthic dinoflagellates from the coastal areas of Okinawa Prefecture, Japan(Abstract_論文要旨)
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Abstract

Title : Taxonomy, morphology and molecular phylogeny of several marine-benthic dinoflagellates from the coastal areas of Okinawa Prefecture, Japan

Currently, less than 10% of described marine dinoflagellates are benthic species. In contrast to their planktonic counterpart, marine-benthic dinoflagellates possess unique morphologies specifically adapted to their environment (e.g. unusual shape, distinct thecal plate arrangements, the presence of stalk for holding-fast onto the substrate, etc). However, the classification of dinoflagellates is far from being resolved because the discovery of new species and genera contributed in the rearrangements of their taxonomic organization. Consequently, their clear identity, relationship, biodiversity, evolution, distribution and potential utilization remain poorly understood. This study, therefore, was aimed to unveil the morphology, genetic diversity, molecular phylogeny and distribution of several marine-benthic dinoflagellate strains isolated from the coastal areas in Okinawa Prefecture, Japan. The results of this investigation are presented in five (Chapter 2-6) of the total seven chapters of this thesis.

First, the genetic diversity of heterotrophic marine dinoflagellates isolated from Okinawa Island, Ishigaki Island and Iriomote Island were investigated based on the nuclear-encoded SSU, ITS region and LSU rDNA D1-D3. The results suggested that all strains formed a monophyletic group with *Crypthecodinium cohnii* (Seligo) Javornicky, but separated into two genetically distinct clades. Morphologically, the presence of two types of cingulum encirclement in *C. cohnii* was reported for the first time from Okinawa (Chapter 2).

The next three chapters focused on the unarmored and phototrophic genus *Moestrupia* (Larsen and Patterson) Hansen and Daugbjerg. First, on the basis of morphology and molecular phylogenetic analysis, the genetic diversity of *M. oblonga* strains from Okinawa Island and one strain reported from Tenerife, Canary Island, Spain was investigated. The results suggested the presence of at least three pseudo-cryptic species of *M. oblonga* (namely Clade A, B and C) from Okinawa Island related to the strain from Tenerife (Chapter 3). Additionally, the haplontic life cycle and intracellular lipid bodies in *M. oblonga* were observed and its potential utilization was briefly discussed (Chapter 4). Subsequently, a new species of *Moestrupia*: *M. enormis* sp. nov. was proposed on the basis of light microscopy and molecular phylogenetic analyses. This species was clearly distinct from strains or clades of *M. oblonga* regarding its unusual large cell size, shape as well as its rDNA sequences (Chapter 5).

In Chapter 6, a new species and new genus of armored marine-benthic dinoflagellate: *Bovistadinium arenicolum* gen. et sp. nov., was proposed based on the morphology and molecular phylogenetic analyses of strains isolated from the seagrass-bed in Ishigaki Island (Chapter 6). They were conspecific with strains isolated from Indonesia and the Philippines. The key characters of this new species/genus are: (1) plate tabulation formula: Po, x, 4', 2a, 6", 6c, 4s, 5", 2""; (2) a type B eyespot (*sensu* Moestrup and Daugbjerg 2007); and (3) the presence of girdle-lamella-like thylakoids in the chloroplast lobe.

The significant and novel findings of these investigations are summarized and discussed in the last chapter of this thesis (Chapter 7). The results of this study have added essential knowledge on the taxonomy, morphology, molecular phylogeny, diversity, and to some extent, the life cycles and distribution of marine-benthic dinoflagellates presently described under the genus *Crypthecodinium*, *Moestrupia* and *Bovistadinium* gen. nov. from Okinawa Prefecture, Japan.

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