Abstract

In thecate dinoflagellates, the thecal plate pattern has been considered to be important criteria in their classifications. Due to this fact the shape of the theca and the arrangement of the theca were studied. In the pictures, the distinctions between the plates in the cells were so vague that I drew a diagram to illustrate the plate pattern. To identify the genus Protoperidinium, the shape of the first apical plate and the second anterior intercalary plate were used. Depending on the shape of first apical plate, will be designated as meta(4), meta(5), para(4), para(5) or para(6). The shape of first apical plate is considered an important factor. From this point of view, the genus Protoperidinium as a group of planktonic protist in the coastal environment was classified.

1. Introduction

Traditionally, one of the bases of classification has been a split the division into naked (unarmoured) and thecate (armoured). The majority of other thecate dinoflagellates have a relatively small number of plates(<30), which may be quite thick and frequently are elaborately patterned. For the genera in this armored category, the taxonomic separation was based on a combination of the shape of the cell and the number and arrangement of the two main large thecal plates.

Paulsen(1908) divided the genus Peridinium into the subgenus groups, Protoperidinium and Euperidinium. That was important in that it divided the right-handed forms from the left-handed forms, but it was not accepted as a satisfactory classification. Afterwards more satisfactory classification was brought forward by Joergensen(1911), who divided Peridinium in two ways. The first, according to the arrangement and form of the first apical plate; and second, according to the arrangement of dorsal epithecal plate. Afterwards the genus Peridinium was classified, which was important for the classification.

In recent years, genotypic analysis of fresh water Peridinium species was performed by Ki et al.(2005a) and morphological researchs were done unchanged(Ki et al., 2005b). Molecular biological
studies of *Peridinium* have done by some researchers (Daugbjerg et al., 2000; Inagaki et al., 2000; Saldarriaga et al., 2001).

Although recently more scientists observe that the arrangement of these plates are not always constant, still one arrangement is almost always typical for every species.

2. Plate Pattern of Genus *Protoperidinium*

2.1. The first apical plate and meta group

When the genus *Peridinium* and *Protoperidinium* were observed, it could be seen that each species had the same plate pattern. For example, when *Protoperidinium conicum* was observed, the shape of the first apical plate and the secondary anterior intercalary plate were the same each time, even though they were of different varieties or forms of the same species due to the shape of cell. So I think it could be included for the explanation for the plates.

For example, in the meta groups of the *Protoperidinium divergence* or *Protoperidinium crassipes*, the shape of the first apical plate is meta but the actual shape of the first apical plate is 4 sided, even though they meet 5 plates (2', 1'', 7'', 4'''). Thus, I would like to designate the plate pattern of this species as meta(4) meaning it has a 4 sided first apical plate with meta meaning they meet 5 plates (Fig. 2). 

![Diagram showing arrangement of the first apical plate (meta group).](image)

2.2. Plate pattern of para group

In the same way it is possible to designate the group of paraperidinium. Another species is the *Protoperidinium pellucidum* var. *stellatum* BALECH. This species has the hexa as first apical plate, but they only have a four-sided plate, so it could designate the plate as hexa(4). Hexa means that the first apical plate meets 6 plates, (4) shows that the shape of the first apical plate is four sided (Fig. 3 and Fig. 4).

![Plate pattern of *P. crassipes*](image)  
![Plate pattern of *P. divergence*](image)

![Diagram showing arrangement of the first apical plate belonging to para and the shape of the first apical plate.](image)

References  
[1] Daugbjerg, N., G. Hansen, J. Larsen and O. Moestrup, Phylogeny of some of the major genera of dinoflagellate based on ultrastructure and partial LSU rDNA sequence data, including the erection of three genera of...


