



Research note

Thomsodinium intermedium (Dinophyceae), a freshwater planktonic species in Mexico

Thomsodinium intermedium (Dinophyceae), una especie planctónica de agua dulce en México

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Abstract. Morphological description of *Thomsodinium intermedium* found in a karstic sinkhole Dzityá, in Yucatán is provided. This is the only locality in Mexico where the species has been recorded. Taxonomic circumscription of the species has changed considerably since its original description. An emended diagnosis for the species is provided, as well as for the genus. Worldwide distribution of *Thomsodinium intermedium* is provided.

Key words: dinoflagellate, emended diagnosis, karstic sinkhole, thecae.

Resumen. Se proporciona la descripción morfológica de *Thomsodinium intermedium* encontrado en el cenote Dzityá en Yucatán, único registro en México. La circunscripción de la especie ha cambiado considerablemente desde su descripción original, por lo que se propone una diagnosis enmendada para la especie y para el género. Se muestra la distribución mundial de *Thomsodinium intermedium*.

Palabras clave: dinoflagelado, enmienda, cenote, teca.

Cenote Dzityá (or Chen-Ha) is a small karstic sinkhole (10.89 x 7.40 m, 4.60 m mean depth) located close to Mérida City, Yucatán Mexico (21.06° N, 89.69° W). In 2 samples of phytoplankton collected in April and May 1999 from this sinkhole, the occurrence of a dinoflagellate was observed. This microalga was studied by light (Leica dmi1) and electron microscopes (SEM-JEOL-5600). The morphology indicates that the species belongs to the genus *Thomsodinium* Bourrelly. Description of the species follows:

Thomsodinium intermedium (Thompson) Bourrelly 1970: the cells are 20-32 µm in width and 22-33 µm in length with a ratio width/height of 0.7-0.95, so the cells are ovate or spherical. The cells are dorsoventrally slightly compressed. Many small chloroplasts and a small eyespot are present. Tabulation is Po, x, 4', 3a, 6'', 6c, 4s, 5''', 2'''' (Figs. 1, 2). The second intercalary plate and the third apical plate can be in "remotum" or "contactum" position. The sulcal posterior plate is large extending to the antapex looking like a plate of hypotheca. The third and fourth

postcigular plates are large and the antapical plates are dissimilar in size and shape.

Diagnostic characters of the species have changed in the interpretation of the type of hypothecal and sulcal plates (Table 1). Nowadays, the intercalary plate at hypotheca described by Thompson (1950) is known to be a large posterior sulcal plate (Sp) (Carty 1989). Since the original description is not correct anymore, an emended diagnosis of the species (and therefore the monotypic genus) is necessary to attain an adequate taxonomic circumscription of the species:

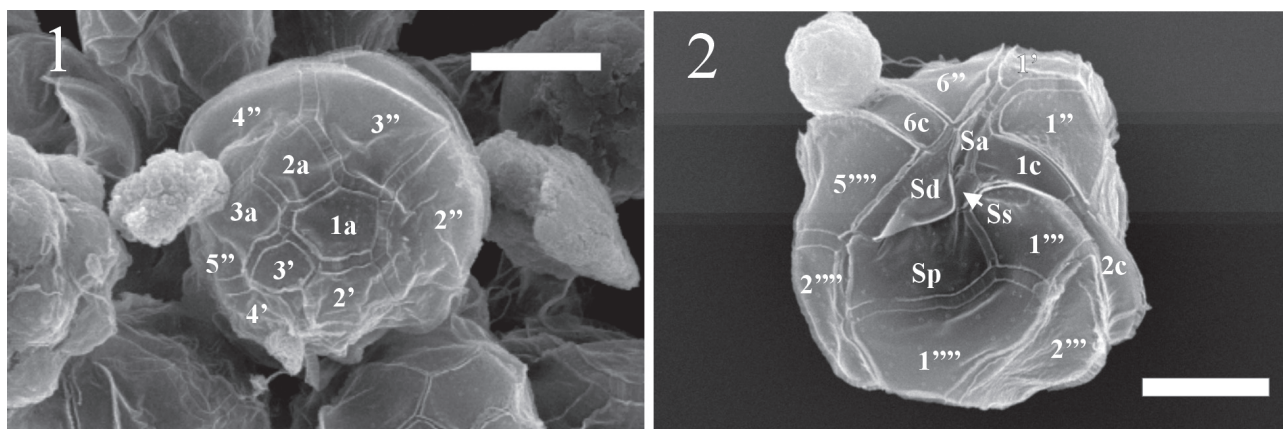
Thomsodinium Bourrelly emend. Aké-Castillo, herein.

Cells with tabulation Po, 4', 3a, 6'', 6c, 4s, 5''', 2'''''. Arrangement of the 2a and 3' plates in remotum, contactum or conjunction position.

Type species: *Thomsodinium intermedium* (Thompson) Bourrelly emend. Aké-Castillo, herein.

Thomsodinium intermedium (Thompson) Bourrelly emend. Aké-Castillo, herein.

Basionym: *Peridinium intermedium* Thompson 1950 Lloydia 13:277-299 p. 298 figs 80-88 (non *Peridinium intermedium* Playfair 1919).



Figures 1-2. *Thomsodinium intermedium* (scanning electron microscope). 1, Plate arrangement in remotum position; 2, sulcal plates: anterior plate (Sa), small left plate (Ss), right plate (Sd), large anterior plate (Sp). Scale bars 10 µm.



Figure 3. Worldwide distribution of *Thomsodinium intermedium*. Records in chronological order: 1) Thompson, 1950; 2) Popovský, 1970; 3) Couté and Iltis, 1984; 4) Carty, 1989; 5) Ngô and Pfister, 1990; 6) Carty, 1993; 7) Carty and Wujek, 2003; 8) Johansen et al., 2007; 9) Cardoso and Torgan, 2007; 10) Krakhmalny, 2011; 11) this work.

Synonyms (taxonomic): *Peridinium pseudointermedium* Couté and Iltis 1984, *Thomsodinium pseudointermedium* (Couté and Iltis) Krakhmalny 2011.

Ovate to spherical cells with 20-42 µm wide and 22-47 µm in length. Tabulation Po, x, 4', 3a, 6'', 6c, 4s, 5''', 2'''' with a distinctive large posterior sulcal plate.

Lectotype: Figs. 80-88 in Thompson 1950 (designated by Bourrelly 1970).

Type locality: Chanute, Kansas, USA.

Distribution: freshwater environments in USA, Mexico, Belize, Brazil, Ivory Coast and Ukraine (Fig. 3).

The occurrence of this dinoflagellate in Mexico is known until now only from cenote Dzityá since 1988. It is the dominant species (Sánchez-Molina et al., 1994) and causes blooms with cell densities between 254 860 and 550 370 cells/l (Pacheco, 1988).

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Table 1. Thecal information of *Thompsodinium intermedium*

Species	Measures (μm)	Plate formula*	Additional character	Location	Reference
<i>Peridinium intermedium</i>	32-39 long, 33-40 wide	4', 3a, 6'', 5''', 1p, 2''', remotum or contactum	No	Abandoned clay pit, Chanute, Kansas, USA	Thompson (1950)
<i>Peridinium intermedium</i>	30-46 long, 28-40 diameter	4', 3a, 6'', 5''', 2''''	Wing-like rim	Laguna del Tesoro, Cuba	Popovský (1970)
<i>Thompsodinium intermedium</i>	No information	4', 3a, 6'', 5''', 1p, 2''''	No	No information	Bourrelly (1970)
<i>Peridinium pseudointermedium</i>	36-40 long, 30-33 wide	Po, 4', 3a, 6'', 5''', 2''''	No	Ivory Coast, Maraoué, Africa	Couté and Iltis (1984)
<i>Thompsodinium intermedium</i>	No information	Po, 4', 3a, 6'', 6c, 4s, 5''', 2''''', remotum or conjunctum	Wing like flange	Small ponds in Brazos County, Texas, USA	Carty (1989)
<i>Thompsodinium intermedium</i>	32-39 x 33-40	3', 4a, 6'', 5''', 1p, 2'''' or 4', 3a, 6'', 5''', 2p, 1''''	No	USA and Cuba	Popovský and Pfister (1990)
<i>Thompsodinium intermedium</i>	No information	4', 3a, 6'', 5''', 2''''	antapical plates with fine teeth subtending the sulcus	Ponds in Tiffin, Ohio, USA	Carty (1993)
<i>Thompsodinium intermedium</i>	39.6-46.2 $\times$ 29.0-41.8	Po, x, 4', 3a, 6'', 5c, 4s, 5''', 2''''	Sometimes 4 small spines	Lake Buchack Ukraine	Krakhmalny (2011)
<i>Thompsodinium intermedium</i>	22-33 length 20-32 wide	Po, x, 4', 3a, 6'', 6c, 4s, 5''', 2''''', remotum or contactum	No	Cenote Dzityá, Mexico	This work

*given or based in information provided by the author

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