

The taxonomic status of *Xanthidium paraguayense* Borge and *Cosmarium paraguayense* Borge (Desmidiaceae, Zygnematophyceae)

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Borge (1903), based on samples from Paraguay, described two desmid species: *Cosmarium paraguayense* Borge (1903: 88, pl. 2: fig. 16; type locality: Areguá, Paraguay) and *Xanthidium paraguayense* Borge (1903: 104, pl. 4: fig. 3; type locality: Areguá, Paraguay). These species are morphologically identical, the former differing only in having smaller cells (49-52 µm length, 43-45 µm wide), and projections less spine-like, whereas the latter has cells somewhat larger (53-58.5 µm length, 45.5-49.5 µm wide).

Taylor (1939: 117, fig. 1: 1-3), described a similar species, *Cosmarium guatemalense* W.R. Taylor based on samples from Lake Zotz, Petén District, Guatemala, and commented on the considerable similarity between *Cosmarium paraguayense* and *X. paraguayense*. Taylor (1939: 118) suggested that these two taxa were not distinct. Thomasson (1971: 43) mentioned Taylor's observations, remarking on the strong affinities of *X. paraguayense* with *Cosmarium*. Couté & Tell (1981) further studied *Cosmarium paraguayense*, based on specimens from Argentina, under SEM and noticed the presence of scrobicles at the preisthmal region, which may have an irregular or almost regular distribution.

We agree with Taylor's view and, due to both names being introduced in the same publication and from same study area, as well as having the characteristic morphology of *Cosmarium*, we consider that there is no justification for retaining the two names, particularly at the genus level. The difference considered by Borge at that time probably was a variable morphological feature of the same taxon. Hence, *Xanthidium paraguayense* should be synonymized under *Cosmarium paraguayense*, as follows:

Cosmarium paraguayense Borge, *Arkiv für Botanik* 1: 88, pl. 2, fig. 16a-c. 1903 (Figs 1-2)

Synonym: *Xanthidium paraguayense* Borge, *Arkiv für Botanik* 1:104, pl. 4: fig. 3 a-c. 1903

Note: As both names appeared in the same publication, they have equal priority, and we herewith choose *Cosmarium paraguayense* Borge in accordance with ICN Art. 11.5 (Turland *et al.* 2018).

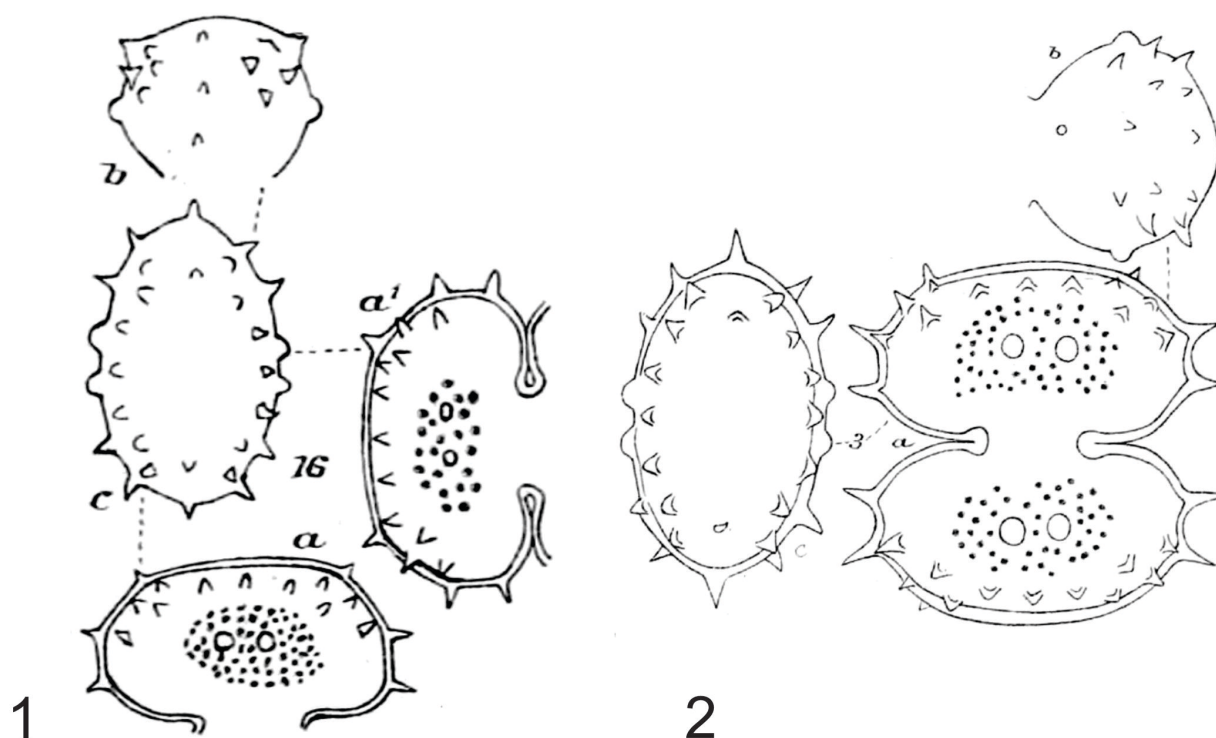
Cosmarium paraguayense is an endemic species from South America, with records from Paraguay (Borge 1903), Brazil (Lemmermann 1914, Thomasson 1971, De-Lamonica-Freire & Heckman 1996), Argentina (Couté & Tell 1981), Bolivia (Thérézien 1985), and Venezuela (Salazar & Guarrera 2000).

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Borge, O. (1903). Die Algen der ersten Regnellschel Expedition. 2. Desmidiaceen. *Arkiv für Botanik* 1: 71-138.

Couté, A. & Tell, G. (1981). Ultrastructure de la paroi cellulaire des Desmidiacées au microscope électronique à la balayage. *Beihefte zur Nova Hedwigia* 68: 1-228.

- De-Lamonica-Freire, E.M. & Heckman, C.W. (1996). The seasonal succession of biotic communities in wetlands of the tropical wet-and-dry Climatic Zone: III. The algal communities in the Pantanal of Mato Grosso, Brazil, with a comprehensive list of the known species and revision of two desmid taxa. *Internationale Revue der gesamten Hydrobiologie* 81(2): 253-280
- Lemmermann, E. (1914) Algologische Beiträge, 13: über das Vorkommen von Algen in den Schläuchen von *Utricularia*. *Abhandlungen des Naturwissenschaftlichen Vereins zu Bremen* 23:1, p. 261-267, 1914
- Salazar, C. & Guarrera, S. (2000). *Cosmarium*, *Actinotaenium* and *Cosmocladium* (Desmidiaceae, Chlorophytes) associated to Gramineae, with the proposition of four new taxa for science. *Acta Biologica Venezuelica* 20(3): 1-16.
- Taylor, W.R. (1939). Fresh-water algae from the Petén District of Guatemala. *Botaniska Notiser* 1939: 112-124.
- Thérézien, Y. (1985). Contribution a l'étude des algues d'eau douce de la Bolivie. Les Desmidiaceae. *Nova Hedwigia* 41: 506-576.
- Thomasson, K. (1971). Amazonian algae. *Mémoires Institut Royale des Sciences Naturelle de Belgique, ser. 2*, 86: 1-57.
- Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado, J., Price, M.J. & Smith, G.F., editors (2018). *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code)* adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017. *Regnum Vegetabile*, Vol. 159. pp. [i]-xxxviii, 1-253.



Figs 1-2. *Cosmarium paraguayense* Borge. **Fig 1.** Original drawings of *Cosmarium paraguayense* in Borge (1903: pl. 2: fig. 16 a-c). **Fig 2.** Original drawings of *Xanthidium paraguayense* in Borge (1903: pl. 4: fig. 3 a-c).