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Reply to: Comments on Mertens et al. (2022): the taxonomic identity of *Micracanthodinium setiferum* (Lohmann) Deflandre (Dinophyceae incertae sedis) remains elusive, and its epitypification is not achieved

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Abstract :

We here epitypify *Micracanthodinium setiferum* by selecting a previously published micrograph from the Ionian Sea, and we typify both formae. We also clarify several points that were raised by our critics.

Keywords : cladopyxidaceans, dinoflagellates, setae, holotype

Gottschling et al. (2022) remarked that in our attempt to epitypify the dinoflagellate *Micracanthodium setiferum* (Lohmann) Deflandre we did not report images of the setae, and that ‘we did not show or mention the characteristic number and arrangement of the seta.’ Although it is correct that no images were shown of these setae in light microscopy, we did mention that we have two kinds of cells and we noted the arrangement of the setae and its importance for its identification: ‘... some had thin, slender processes or setae, arranged as described by Lohmann (1903) and Schiller (1937) while others were devoid of such processes. As there were no differences in the plate tabulation pattern between the two types, only one description is presented here since it applies to both. Most of the cells observed in the present study presented a shape more like that seen in the holotype designated by Lohmann; so we consider that our cells must be identified as *Micracanthodinium setiferum*’ (Mertens et al., 2022, p. 3, under the Remarks section).

In addition, Gottschling et al. (2022) claimed that we show no evidence that the described setae of *Micracanthodinium* were incomplete. However, it is well known that the setae in *Micracanthodinium* break easily (Dodge 1995). It is notable that in a close relative, *Fensomea setacea*, which also carries setae, scanning electron microscope (SEM) micrographs do not show the setae even though they are visible in the light microscope images, confirming that there is a change due to the preparations for SEM: there are some *Fensomea* cells shown without setae, others with setae (Gottschling et al. 2021, fig. 2). In addition, on page 5, we stated that we studied a total of 30 cells with setae and 33 cells without setae (all of them using SEM), showing that there is a large variation.

Gottschling et al. (2022) furthermore claimed that the lack of light microscope images showing setae places doubt on our identification of *Micracanthodinium setifera*. Such light images should not be necessary: citing Taylor (1976, p. 2) ‘One of the greatest assets from the point of view of the taxonomist of microplankton is that it is relatively easy to relate SEM micrographs of whole specimens with light microscope images ...’

We acknowledge that we incorrectly designated the epitype, in not using the phrase ‘designated here’ as required under Art. 7.11, Note 2, of the International Code for Algae, Fungi and Plants. To correct this, we propose a correctly designated epitype from the Mediterranean, based on a cell which has setae as seen on SEM micrographs (Mertens et al. 2022, Suppl. Plate S1, fig. 4). All the cells observed by Mertens et al. (2022) have exactly the same tabulation and same apical pore.

Micracanthodinium setiferum (Lohmann) Deflandre 1937, p. 114. Holotype: *Cladopyxis setifera* Lohmann 1902: 64, pl. 1: fig. 15. Epitype, designated here: SEM micrograph of specimen from the Ionian Sea (station 214 sampled by R/V Meteor MED, 112, 37.4762° N 17.1438° E), as previously shown by Mertens et al. 2022, Suppl. Plate S1, fig. 4, and re-illustrated as Plate 1, Fig. 1 in the present article.

Gottschling et al. (2022) pointed out that we assigned no types to the formae we proposed. We rectify this here by assigning holotypes:

Micracanthodinium setiferum f. *setiferum* (autonym): this forma bears setae (= *Micracanthodinium setiferum* sensu Dodge (1995, his fig. 6). The type is automatically that of the species.

Micracanthodinium setiferum f. *anacantha* Mertens & Carbonell-Moore forma nov.: this forma does not bear setae. Holotype (designated here): SEM micrograph from Station 1238 from the Indian Ocean, sampled by WOCE I-2, 4.4638°S 42.1112°E, previously illustrated by Mertens et al. 2022, Plate 1, figure 2.

It is important to note that studies that attempting to rediscover type material or epitypify taxa, e.g. *Scrippsiella acuminata* (Kretschmann et al. 2015) and *Blepharocysta splendor-maris* (Elbrächter et al. 2019), can be interpreted as incorrect in their identification (e.g. Gómez 2022; Carbonell-Moore 2018, respectively). This is generally because the match between the originally, (inaccurately) drawn illustration and the rediscovered material is considered incorrect. In such cases, reasonable doubt frequently remains. We have observed a large number of cells with the same tabulation distributed in different oceans, including the Mediterranean, that we consider to match Lohmann's *Micracanthodinium setiferum*, as discussed more at length in Mertens et al. (2022). Our identification is no more elusive than those of *S. acuminata* and *B. splendor-maris* mentioned above. We agree that the addition of DNA sequences would indeed be beneficial for future work, but this was not possible since our samples did not allow us to extract DNA sequences. Even so, taxonomic work that does not include DNA data remains useful as shown by Tillmann and Akselman (2016).

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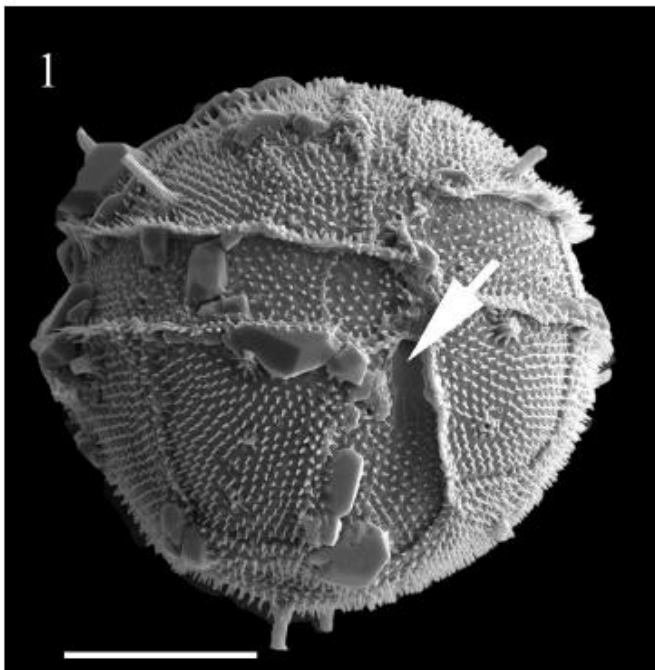
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Plate 1. Scanning electron photomicrographs (SEM) of *Micracanthodinium setiferum*. 1. Cell from the Mediterranean Sea. Ventral view. White arrow points to the area without ornamentation on the posterior sulcal plate. Scale bar = 5 μ m.



75x76mm (300 x 300 DPI)