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FIRST RECORD OF *Reimerothrix floridensis* (FRAGILARIACEAE: BACILLARIOPHYTA) FOR MÉXICO

Primer registro de *Reimerothrix floridensis* (Fragilariaceae: Bacillariophyta) para México

Resumen. *Reimerothrix floridensis* forma parte de un grupo de diatomeas con forma arqueada que generalmente son confundidas con *Cylindrotheca closterium*, *Psammosynedra closterioides* y *Nitzschia longissima* var. *reversa*. En este trabajo se presenta el primer registro de la diatomea arqueada *Reimerothrix floridensis*, recolectada en Dzilam de Bravo (costa norte de la Península de Yucatán) en el extremo sur del Golfo de México. Este hallazgo se realizó en el marco de la identificación de las especies de diatomeas que conformaron una proliferación de fitoplancton suscitada en las costas de la Península de Yucatán durante 2011, y en donde *C. closterium* y *N. longissima* var. *reversa* fueron especies dominantes. Las características de *R. floridensis* coinciden con la descripción original de la especie, excepto por las areolas asociadas al sternum. Dado que esta especie solo había sido registrada en la Bahía de Florida, su observación en México en la costa norte de la Península de Yucatán representa su registro más sureño, lo cual extiende el rango geográfico de esta especie. Por otra parte, debido a que la observación de *R. floridensis* se realizó durante la presencia de una proliferación de *C. closterium* y *N. longissima*, especies con las que generalmente es confundida, se pone de manifiesto la importancia de realizar determinaciones taxonómicas cuidadosas acompañadas de descripciones detalladas que den certeza a los estudios ecológicos.

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Reimerothrix floridensis A.K.S.K. Prasad, belongs to a group of diatoms with arcuate form whose taxonomic diversity has been discussed by Prasad *et al*. (2001). This author agrees with Round (1993) in that species with said morphology are easily confused with *Cylindrotheca closterium* (Ehrenberg) Reimer & Lewin, a common taxón in coastal phytoplankton. According to Prasad *et al*. (2001) these species can be discriminated live by observing the number and form of the chloroplasts. In *C. closterium* there are two plate form organelles; whilst in *Psammosynedra closterioides* and *R. floridensis* there is only one with a similar form. Another way to distinguish between them is on the basis of their movement. In *C. closterium* it consist of directional gliding, while *P. closterioides* (Round, 1993) and *R. floridensis* (Prasad *et al*., 2001) are sessil forms. However, in ecological studies of coastal phytoplankton when blooms of arcuate species are present, such as *C. closterium, Nitzschia longissima* and *N. longissima* var. *reversa*, this observations are very difficult to perform, mainly because samples are generally fixed with acid lugol solution, that modifies the plastids and precludes the motility of cells. An alternative is to rely on general morphology and of the apex, nonetheless, the great amount of mucilage produced by the cells and the organic matter from re-suspension make their distinction difficult. Thus, a better alternative to identify *R. floridensis* with certainity is to examine acid-cleaned material under SEM (Prasad *et al*., 2001).

Based on the above, the aim of our work is to present the first record of the arcuate diatom *Reimerothrix floridensis* during a bloom of *C. closterium* off the coasts of the Yucatán peninsula in 2011, as well as to provide a brief description of this taxon relying on electron microscopy.

Our study area, Dzilam de Bravo, Yucatán shows three climate seasons: dry (March-May), rainy (June-October), and nortes or norths from November to February (Capurro, 2002). This locality registers underground water discharge into the sea, which derives in high nutrient concentrations and low salinities (Troccoli-Ghinaglia *et al*., 2004). Environmental conditions in the study area promote phytoplankton blooming, such the one that occurred in 2011, when *C. closterium*, *N. logissima* and *Nitzschia longissima* var. *reversa* were recorded as the most important taxa. In order to monitor this phytoplankton bloom monthly samplings were carried out by taking surficial water samples with 250 ml bottles and fixing them with lugol solution. Simultaneously, hydrological variables such as salinity, temperature, and nitrate, phosphate and silicate concentrations were measured. In order to observe and identify the bloom forming diatom species, their frustules were cleaned following Siqueiros-Beltrones & Voltolina (2000). Afterwards, the samples were observed under a Jeol JSM-7600F field emission electron microscope. In this manner *Reimerothrix floridensis* was observed for the first time in Mexico in the northern coasts of the Yucatán peninsula. The species occurred in September, 500 m from the coast-line off Dzilam de Bravo. Hydrological variables reached the following values: salinity 28.9 ups, temperature 30 °C, nitrate concentration 1.8 mmol/l^{-1}, phosphate

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0.38 mmol/l^{-1} and silicates 0.89 mmol/l^{-1}.

Description. The described specimens showed the following characteristics: narrow, elongated cells at the center of the valve, from which arcuate valval extensions are projected (Fig. 1). The apex of the valval extensions slightly rostrated (Fig. 1, arrows). Length of the apical axis 172 µm; transapical 4.5 µm (at the elongated part). Valval extensions 0.6 µm in width and up to 1 µm at the ápex. The distance from the center of the valve to the end of the valval extensions was 95 µm. The central area of the valve shows a wide sternum with a single line of poroid areolae (31 in 10 µm) associated to the union between the mantle and the valval face (Fig. 2). The valval extensions had 35-36 uniseriate poroid areolae in 10 µm (Fig. 3), whilst in the area near the apex these became biseriate (Fig. 4). Each apex presented a rimoportula (Fig. 4, arrow), a rectangular pore field, and four poroid areolae between the field and the rimoportula (Fig. 4).

Except for the density of the areolae associated to the sternum, the above description depicts *Reimerothrix floridensis* as described by Prasad *et al*. (2001). Such variation in striae density could be explained as adaptations to nutrient and salinity conditions in the study area, as it has been observed for different species of *Nitzschia* (Trobajo *et al*., 2011) and was attributed to variations at species level. On the other hand, Prasad *et al*. (2001) outline that in spite the occurrence of *R. floridensis* in various densities in the water column it is mainly a benthic-epiphytic form, and it is generally associated to *Climaconeis koenigii*, *C*. *colemaniae*, *Synedra bacillaris* and *Cocconeis scutellum*. Although in this study no samples of *Thalassia testudinum* were examined, earlier Hernández-Almeida *et al*. (2013) observed that on said host *Climaconeis* aff. *coxii*, *Synedra bacillaris* and *Cocconeis scutellum* were common, thus suggesting the likely presence of *R*. *floridensis* within the epiphytic assemblages along the coasts of the Yucatán peninsula. This range extension on the distribution of *R*. *floridensis* underlines the need for more taxonomic efforts that allow us to know with a higher degree of certainty which species may develop blooms along the coastal waters of México.

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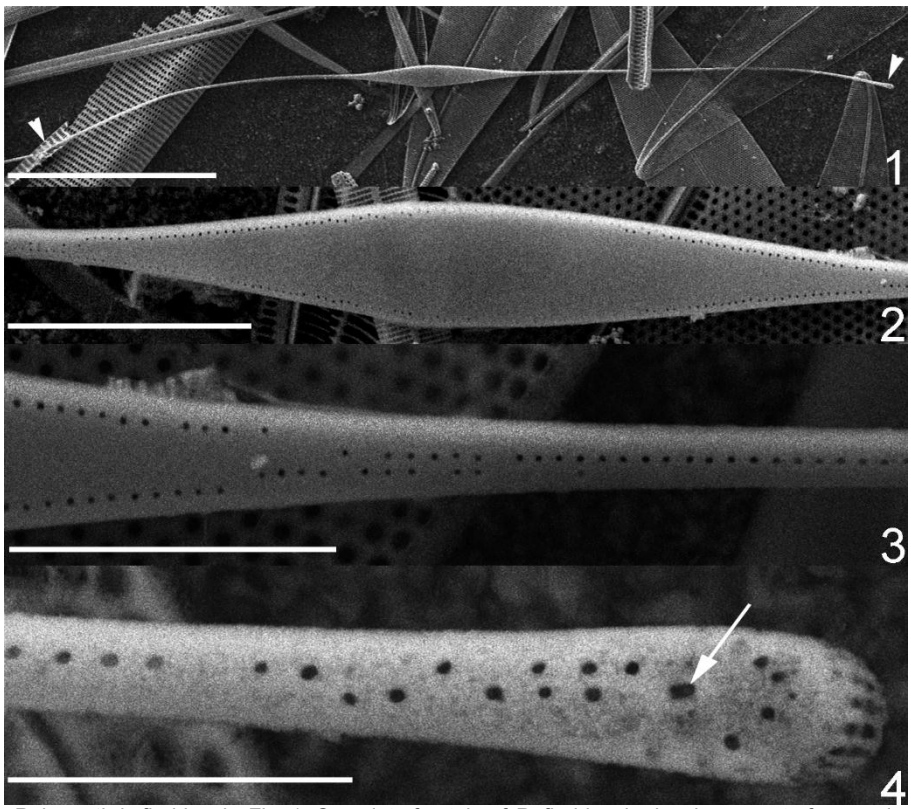

Figures 1-4. *Reimerothrix floridensis*. Fig. 1. Complete frustule of *R. floridensis* showing arcuate form and rostrate apexes (arrows). Scale bar = 50 mm. Fig. 2. Sternum with uniseriate line of areolae assciated to the union between mantle and valval face; scale bar = 10 mm. Fig. 3. Detail of valval extension with uniseriate areolae; scale bar = 5 mm. Fig. 4. Detail of apex showing the rimoportula (arrow) and pore field; scale bar = 2.5 mm.

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