



Article

***Bicudoa amazonica* gen. nov. et sp. nov. (Bacillariophyta)—a new freshwater diatom from the Amazon basin with a complete raphe loss in the Eunotioid lineage**

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Abstract

Bicudoa amazonica C.E. Wetzel, Lange-Bertalot & Ector gen. nov. et sp. nov. is described using light and scanning electron microscopy. It differs from ‘araphid’ genera by a unique combination of characters such as the absence of a raphe system, helictoglossae, rimoportulae, apical pore fields and linking spines, while other features including striae, areolae apparently without occlusion on valve and girdle elements, structure of the cingulum, and displacement of axial area place *Bicudoa* close to *Eunotia*. The taxonomic placement of the new organism at the class and family levels is discussed and it is concluded that placing *Bicudoa* in any of the current Fragilariophyceae families would be inappropriate. Instead, we place *Bicudoa* in the Bacillariophyceae and reserve the decision to place it in a family until further evidence is gathered. Based on ultrastructure, it is proposed that *Bicudoa* is a rather recent result of a complete loss of the raphe system and associated structures in a relatively recent eunotioid ancestor. *Bicudoa amazonica* was found in the upper reaches of the Rio Negro basin (Brazilian Amazon), a low pH, black water river (oligotrophic and humic). While the taxon was rare in plankton and benthic samples, it was rather common in excrement samples of the turtle *Podocnemis erythrocephala* (Testudines, Podocnemididae). The discovery of *Bicudoa amazonica* besides to the recent description of several new eunotioid taxa from Rio Negro basin suggests that speciation and isolation leading to endemism in Amazonian oligotrophic/dystrophic habitats is remarkable.

Key words: Amazon, Bacillariophyceae, *Bicudoa*, endemism, *Eunotia*, Eunotiaceae, freshwater, raphe system

Introduction

The Amazonian rainforest region, an immense forested region of 6×10^6 km², comprises leveled or hilly plains extending from the eastern base of the Andes to the Atlantic coast near the mouth of the Amazon River. During the early phases of exploration of the Amazon, naturalists had already posed the question related to the origin of the innumerable species that inhabit this vast hydrographical basin (Haffer 2008). However, tropical South America in particular has been rather neglected concerning diatoms. Among the most relevant contributions on the taxonomy and systematics of diatoms in the latter region are those of Patrick (1940a, b), Hustedt (1952a, b, 1955, 1965) and Hohn (1966). Additionally, the collection of illustrations in “*Atlas der Diatomaceen-Kunde*” (Schmidt 1874–1959) already contained several new species from the Guyanas. Many recent floristic surveys have shown that diatom diversity is greater than previously suspected (Metzeltin &