



Chelonicola and *Poulinea*, two new gomphonemoid diatom genera (Bacillariophyta) living on marine turtles from Costa Rica

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Abstract

Marine mammals such as whales and dolphins have been known for a long time to host a very specific epizoic community on their skin. Less known however is the presence of a similar community on the carapaces of sea turtles. The present study is the first describing new taxa inhabiting sea turtle carapaces. Samples, collected from nesting olive ridley sea turtles (*Lepidochelys olivacea*) on Ostional Beach (Costa Rica), were studied using light and scanning electron microscopy. Two unknown small-celled gomphonemoid taxa were analysed in more detail and are described as two new genera, closely related to other gomphonemoid genera with septate girdle bands, such as *Tripterion*, *Cuneolus* and *Gomphoseptatum*. *Chelonicola* Majewska, De Stefano & Van de Vijver *gen. nov.* has a flat valve face, uniseriate striae composed of more than three areolae, simple external raphe endings, internally a siliceous flap over the proximal raphe endings and lives on mucilaginous stalks. *Poulinea* Majewska, De Stefano & Van de Vijver *gen. nov.* has at least one concave valve, uniseriate striae composed of only two elongated areolae, external distal raphe endings covered by thickened siliceous flaps and lives attached to the substrate by a mucilaginous pad. *Chelonicola costaricensis* Majewska, De Stefano & Van de Vijver *sp. nov.* and *Poulinea lepidochellicola* Majewska, De Stefano & Van de Vijver *sp. nov.* can be separated based on stria structure, girdle structure composed of more than 10 copulae, raphe structure and general valve outline. A cladistics analysis of putative members of the Rhoicospheniaceae indicates that the family is polyphyletic. *Chelonicola* and *Poulinea* are sister taxa, and form a monophyletic group with *Cuneolus* and *Tripterion*, but are not closely related to *Rhoicosphenia*, or other genera previously assigned to this family. Features used to help diagnose the family such as symmetry and presence of septa and pseudosepta are homoplastic across the raphid diatom tree of life.

Key words: Bacillariophyta, cladistics, Costa Rica, epizoic diatoms, marine turtles, new genus, phylogenetic analysis

Introduction

During a survey of the epizoic flora on marine olive ridley sea turtles (*Lepidochelys olivacea* Eschscholtz 1829), several small, unknown gomphonemoid diatom taxa were observed that could not be identified using the currently available (though sparse) literature about these genera. At present, several small-celled gomphonemoid genera are known from the marine environment. *Cuneolus* Giffen (1970: 90) was described in 1970 from the African coast. Two others were split off in 1986 by Medlin and Round from the freshwater genus *Gomphonema* Ehrenberg (1832: 87): *Gomphonemopsis* Medlin in Medlin & Round (1986: 207) and *Gomphoseptatum* Medlin & Round (1986: 212). An interesting feature of *Cuneolus* and *Gomphoseptatum* is the presence of septa on the valvocopulae (lacking in *Gomphonemopsis*), usually only found in araphid genera (Van de Vijver *et al.* 2012). Holmes *et al.* (1993a) described a third gomphonemoid genus bearing similar septa, living epizoically on the skin of porpoises: *Tripterion* R.W.Holmes *et al.* (1993a: 7). So far, these septa-bearing genera are rather species-poor with only two species known in *Gomphoseptatum* (Medlin & Round