Phytotaxa 207 (2): 143–162
www.mapress.com/phytotaxa/

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.207.2.1

Seven new species expand the morphological spectrum of *Haslea*. A comparison with *Gyrosigma* and *Pleurosigma* (Bacillariophyta)

FRITHJOF A.S. STERRENBURG[1], MARY ANN TIFFANY[2], FRIEDEL HINZ[3], WULF E. HERWIG[4] & PAUL E. HARGRAVES[5]

[1] *Stationsweg 158, Heiloo, the Netherlands. Email: fass@wxs.nl (corresponding author)*
[2] *Dept. of Biology, San Diego State University, 5500 Campanile Dr., San Diego CA 92182, USA. Email: mtiffany24@yahoo.com*
[3] *Friedrich-Hustedt-Zentrum für Diatomeenforschung, Alfred-Wegener-Institut,Helmholtz-Zentrum für Polar- und Meeresforschung, Am Handelshafen 12, 27570 Bremerhaven, Germany. Email: Friedel.Hinz@awi.de*
[4] *Freidingstrasse 11, 30559 Hannover, Germany. Email: WEHerwig@arcor.de*
[5] *Affiliate Research Professor, Harbor Branch Oceanographic Institute, Florida Atlantic University and Research Associate, Smithsonian Institution Marine Station, Ft. Pierce, Florida, USA. E-mail: Hargravespe@gmail.com*

Abstract

Seven new *Haslea* species demonstrate that the genus has evolved a richer morphological repertoire than so far reported. *H. feriarum* sp. nov. has a valve contour suggesting an *Amphora; H. staurosigmoidea* sp. nov. has a sigmoid valve with a pseudostauros; *H. tsukamotoi* sp. nov. and the closely similar *H. meteorou* sp. nov. possess uniquely shaped external central raphe endings and a fully sideways-tilted internal raphe system; *H. clevei* sp. nov. and *H. avium* sp. nov. also have central raphe ending shapes not yet described in the genus; *H. amicorum* shows interrupted longitudinal fissures besides the continuous fissures characteristic of *Haslea*. A survey of the *Haslea* species described, for differentiation of our taxa, led to two conclusions: 1) the data in the protologue of *H. indica* Desikachary & Prema are spurious and 2) *"Navicula" duerrenbergiana* Hustedt is here transferred to the genus *Haslea*. The basic *Haslea* morphology is a sandwich-type valve, with a grate-like inner layer (here called **basal layer**) and an outer layer (here called **tegumental layer**) perforated by continuous longitudinal fissures. These two layers are shored by upright longitudinal "bulkheads", here called **saepes**, seen to be perforated in the valves that permitted their observation. This morphology is closely similar to that of *Gyrosigma* (and *Pleurosigma*). The great variety of central external raphe ending patterns in *Haslea*, *Gyrosigma* and *Pleurosigma* is shown and discussed.

Introduction

The genus *Haslea* was erected in Simonsen (1974:46), based on *Haslea ostrearia* (Gaillon) Simonsen (1974: 47; basionym: *Vibrio ostrearius* (*ostrearia*) Gaillon 1820: 93), to include the fusiform diatoms with straight transapical and apical striae, previously classified as Naviculae fusiformes (Hustedt 1961: 34). The similar delicate fusiform species *Navicula gigantea* Hustedt (1961: 40), *Navicula frauenfeldii* (Grunow) Grunow (1877: 179; basionym: *Amphipleura frauenfeldii* Grunow 1863: 14) and *Navicula trompii* Cleve (1900: 932) were logical candidates for inclusion in *Haslea*. More robust naviculoid species such as *Navicula britannica* Hustedt & Aleem (1951: 184) and species with a pseudostauros such as *Navicula crucigera* (W. Smith) Cleve (1894: 111; basionym: *Schizonema cruciger* W. Smith 1856: 74) and *Stauroneis spicula* Hickie (1874: 290) have also been included in *Haslea.* In those cases where such transfer has been based on examination of type material in SEM, the valve exterior displayed continuous longitudinal fissures. For a review of the literature on the genus see Gastineau *et al.* (2014).

Valve shape in *Haslea*, however, is not limited to a lanceolate contour. In the early 1990s, Stuart R. Stidolph (pers. comm.) noted that the taxon named *Gyrosigma nipkowii* Meister (1932: 43) also showed such continuous longitudinal fissures and Poulin *et al.* (2004) presented morphological, biochemical and molecular evidence for its inclusion in the genus *Haslea*. Recently, Talgatti, Sar & Torgan (2014) described another sigmoid *Haslea* with a pseudostauros.

Here we describe *Haslea feriarum* sp. nov., which has an amphoroid valve contour, and *H. staurosigmoidea* sp. nov., a markedly sigmoid species with a pseudostauros, illustrating the great variety in *Haslea* valve contour. *H. tsukamotoi* sp. nov., *H. meteorou* sp. nov., *H. clevei* sp. nov., and *H. avium* sp. nov. have external central raphe fissure endings entirely different from the simple homolaterally deflected pattern generally attributed to *Haslea*. In *H.*

Accepted by David Williams: 15 Apr. 2015; published: 8 May 2015