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Original Scientific Paper

Prestauroneis blazenciciae, a seventh species of the genus proposed as new to science

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ABSTRACT: A specimen-rich diatom population with various stages of the cell cycle of an undescribed species was found on a slide from the Krasske collection. At that time, it was erroneously identified as *Navicula integra* var. *truncata*. All life cycle stages have strictly lanceolate, but never truncate or elliptical, valve outlines. The specimens exhibited a complex of characters that conforms to *Prestauroneis*, but not to any known species, and it is thus here named *Prestauroneis blazenciciae*.

Keywords: saline springs, *Prestauroneis*, *Navicula*, *Prestauroneis blazencicae*

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INTRODUCTION

Using data on molecules and cell morphology, Bruder & Medlin (2008) proposed that *Navicula integra* (W.Smith) Ralfs, originally based on *Pinnularia integra* W. Smith, is clearly distinct from *Navicula* Bory sensu stricto and *Placoneis* Mereschkowsky, falling instead within the *Stauroneis* clade. Bruder & Medlin (2008) placed it in a new monotypic genus, *Prestauroneis* Bruder & Medlin. Later, Levkov (Levkov & Williams 2011) added a second species, *P. tumida* Levkov, and Liu *et al*. (2015) added two more species, *P. nenwai* Q. Liu, Kociolek, Wang & Fu and *P. lowei* Liu, Kociolek, Wang & Fu. In addition, Liu *et al*. (2015) transferred *Parlibellus protractus* (Grunow) Witkowski, Lange-Bertalot & Metzeltin and *Parlibellus protractoides* (Hustedt) Witkowski, Lange-Bertalot & Metzeltin to *Prestauroneis* as *Prestauroneis protracta* (Grunow ex Cleve) Q. Liu & Kociolek and *Prestauroneis protractoides* (Hustedt) Q. Liu & Kociolek, respectively.

MATERIAL AND METHODS

The slide no 2218 = A III139, made from recent diatom material from the Georg Krasske collection housed in „Museum für Naturkunde, Kassel", Germany, was recently re-investigated. It contains predominantly halophilous diatom taxa from Wisselsheim (see below under Observations, type locality). The symbol A III signifies salt springs („Solquellen") from various locations situated mainly in Germany. In total, that part of the collection consists of 292 slides. Material for SEM investigations is not available.

Light microscope studies were carried out using apochromatic lenses with a numerical aperture of 1.4 (Leitz Laborlux S Microscope). Photographs were taken with a monochrome CCD-camera (The Imaging Source, Charlotte, NC, USA).

Observations

Prestauroneis blazenciciae sp. nov.
Frustules in girdle view appear roughly rectangular with moderately concave margins proximally (Fig. 1: 1, 2). Valve mantle rather broad, narrowing towards poles. Visible parts of the girdle are comparatively narrow, but details remain indistinct when focusing due to the low refractive power of the mounting medium („Styrax"). Valves lanceolate with obtusely rounded, hardly perceptible,

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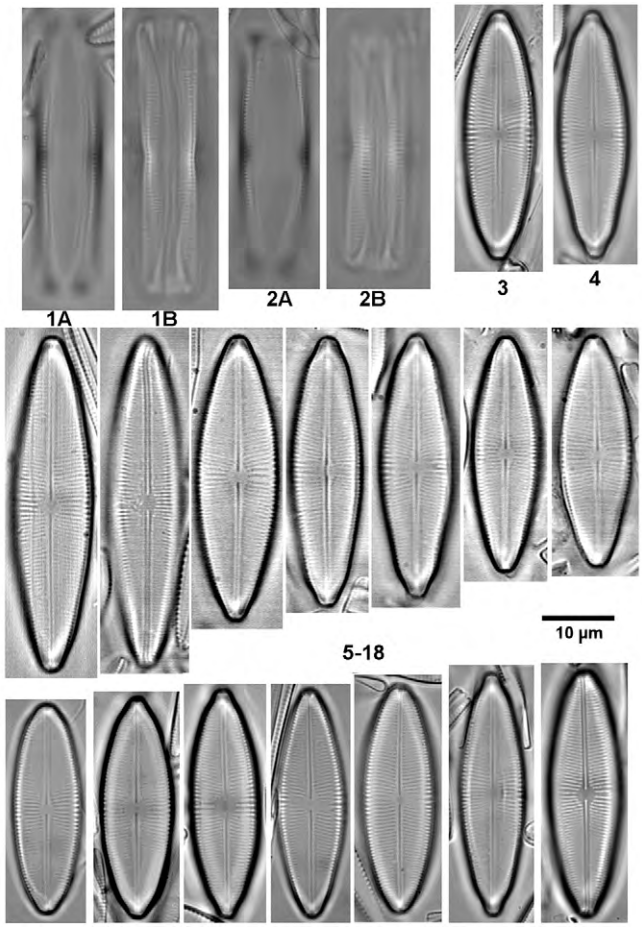

Figure 1. 1A, 1B; 2A, 2B. Girdle view of two specimens, both in different focus; 3-18 Smallest specimens on the type slide.

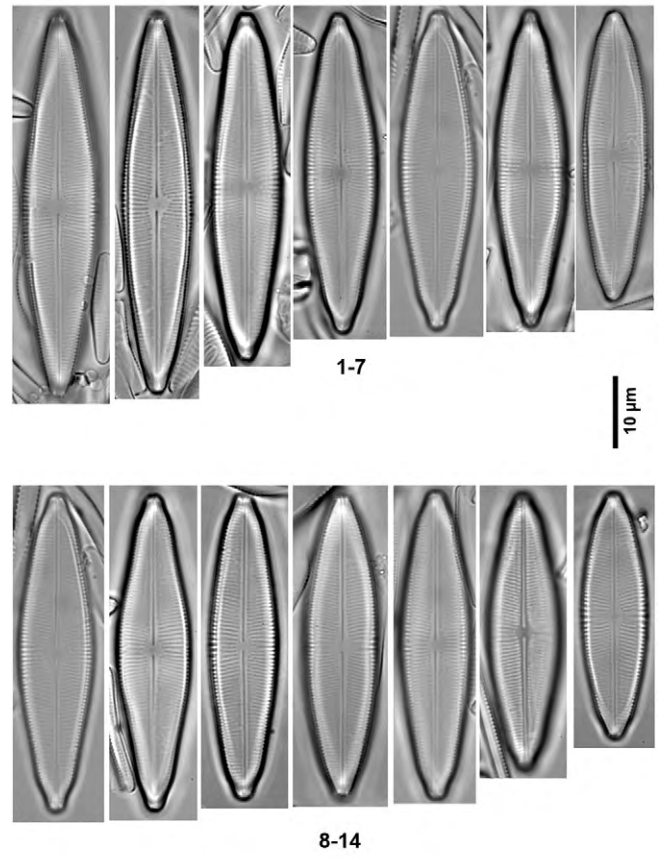

Figure 2. 1-14. Largest cells on the type slide; 2 -holotypus.

short-protracted ends. A short pseudoseptum becomes detectable by appropriate focusing. Valve margins not, or at most indistinctly, undulate. Length 30.5-57.0 µm, breadth 9.8-13.0 µm. Length-to-breadth ratio 3.1 - c. 4.4. Raphe almost filiform, straight, proximally expanded, but without distinct central pores; distal parts curving unilaterally, as can be discerned by appropriate focusing (Fig. 1: 6). Axial area linear, c. 1 µm wide. Central area small, set off, approximately circular to somewhat irregularly shaped, about 2.5 µm wide. Striae radiate, becoming subparallel towards the poles, 19 in 10 µm beyond the valve centre, where a few striae are clearly wider spaced. Areolae rather irregularly spaced, about 24 in 10 µm.

Differential diagnosis vs. *Prestauroneis integra* (W.Smith) Bruder & Medlin

Prestauroneis integra is doubtless the most similar species, mainly because of the valve outlines, being lanceolate to elliptical-lanceolate, conspicuously undulate and with prominently set off rostrate ends; distinct pseudosepta are present. Raphe, striae position and density are similar in both taxa. Other similar taxa are discussed below (see Discussion).

Holotypus (designated here): Slide A III 139 (= no. 2218) in collection Georg Krasske, Museum für Naturkunde, Kassel, Germany (holotype specimen = Fig. 2: 2).

Type locality: Saline spring in Wisselsheim, Bad Nauheim, Hesse, Germany (leg. G. Krasske, 05-06-1928).
Etymology: The species is named in honor of Prof. Dr. Jelena Blaženčić, University of Belgrade.

DISCUSSION

Another very similar but distinct species is *Prestauroneis tumida* Levkov in Levkov & Williams (2011, p. 11, figs. 69-89) described from the ancient Lake Ohrid in Macedonia, which is based on the earlier misidentified *Parlibellus protractus* (Grunow) Witkowski, Lange-Bertalot & Metzeltin sensu Levkov *et al.* (2007) from Lake Prespa, Macedonia, depicted in Levkov *et al.* (2007, figs. 64: 10-12). This species is mainly characterised by bluntly protracted, broadly rounded ends, while the position and density of striae, area and raphe features conform closely to *Prestauroneis blazenciciae*. Except for the valve outlines, which include tapering and acutely rounded ends, the complex of morphological characters also conforms to *Parlibellus crucicula* (W. Smith) Witkowski, Lange-Bertalot

& Metzeltin (Witkowski *et al*. 2000, p. 321, fig. 103: 11-13) and *Parlibellus cruciculoides* (Brockmann) Witkowski, Lange-Bertalot & Metzeltin (Witkowski *et al*. 2000, p. 324) - in both of these species the generic relationships may need further discussion. An illustration of a specimen named *Navicula* sp. (fig. 54: 13 in Krammer & Lange-Bertalot 1986 at a lower magnification of x1000) that is arranged together with speciemens of *Navicula cruciculoides* is worthy of mention in this context, as it conforms more with *P. blazenciciae*.

Navicula integra var. *truncata* Hustedt (Husted 1911, p. 289, fig. 2: 29; holotype illustrated in Simonsen 1987, p. 21, fig. 5: 1, 2) was later synonymised with and included in *Navicula integra*, as it was determined to be a product of the cell division mode ("Kümmerform" or "elliptische Kleinform") by Hustedt (1962, p. 315). The holotype specimen designated by Simonsen (1987) is represented by the two valves of a single frustule, unnamed and unmarked by Hustedt on the slide taken from wood with the bryophyte *Hypnum* in the Wumme River, northwestern Germany.

Hustedt's opinion that the specimen represents a poorly developed stage ("Kümmerform") of the cell cycle of *P. integra* appears more doubtful than the supposition that it is an independent species of the genus *Prestauroneis*. In comments on *N. integra* (Hustedt 1962, p. 315), he mentions the smallest elliptical stages of the valves when *N. integra* occurs in mass development, where valve outlines appear without protracted rostrate ends. We could find no such stages on the slide (Coll. Krasske no. A III 139) where he records *N. integra* var. *truncata* as "m" (= mass development), but we could find many specimens of *P. blazenciciae* that do not fit either var. *truncata* or the elliptical forms of var. *elliptica* Krasske nom. inval. (Krasske 1932, p.142). Without doubt the various stages present of distinctly lanceolate, larger to medium-sized specimens must have been neglegted or misidentified as other taxa by Krasske; these were also misinterpreted by Hustedt in the case of the mineral salt spring Wisselsheim material. It is certain that the cell cycle of *P. blazenciciae* represents a species independent from *P. integra* and other established taxa such as *P. tumida*.

REFERENCES

Bruder K. & Medlin LK. 2008. Morphological and molecular investigation of naviculoid diatoms. **II**. Selected genera and families. *Diatom Research* **23**: 283-329.

Hustedt F. 1911. Beiträge zur Algenflora von Bremen. **IV**. Bacillariaceen aus der Wumme. *Abhandlungen herausgegeben vom Naturwissenschaftlichen Verein zu Bremen* **20**: 257-315.

Hustedt F. 1962. Die Kieselalgen Deutschlands, Österreichs und der Schweiz unter Berücksichtigung der übrigen Länder Europas sowie der angrenzenden Meeresgebiete. In: Rabenhorsts L (ed.), *Kryptogamen Flora von Deutschland, Österreich und der Schweiz*, Bd. **7** (Teil 3, Lief. 2), pp. 161-348, Leipzig: Akademische Verlagsgesellschaft.

Krammer K & Lange-Bertalot H. 1986. Süßwasserflora von Mitteleuropa **2/1**: Bacil-lariophyceae. **1**.Teil: Naviculaceae. In: Ettl H, Gerloff J, Heynig H & Mollenhauer D (eds.), *Süßwasserflora von Mitteleuropa*, Band **2/1**, pp. 1-876, Gustav Fischer Verlag, Stuttgart-New York.

Krasske G. 1932. Diatomeen deutscher Solquellen und Gradierwerke **II**. *Hedwigia* **72**: 135-143.

Levkov Z, Krstic S, Metzeltin D & Nakov T. 2007. Diatoms of Lakes Prespa and Ohrid. About 500 taxa from ancient Lake system. *Iconographia Diatomologica* **16**: 1-611.

Levkov Z & Williams DM. 2011. 15 new Diatom (Bacillariophyta) species from Lake Ohrid, Macedonia. *Phytotaxa* **30**: 1-41.

Liu Q, Kociolek JP, Wang QX & Fu CX. 2015. Two new *Prestauroneis* Bruder & Medlin (Bacillariophyceae) species from Zoige Wetland, Sichuan Province, China and comparison with *Parlibellus* E. J. Cox. *Diatom Research* **30**: 133-139.

Simonsen R. 1987. *Atlas and Catalouge of the Diatom Types of Friedrich Hustedt*. J. Cramer Berlin-Stuttgart.

Witkowski A, Lange-Bertalot H & Metzeltin D. 2000. Diatom Flora of Marine Coasts **I**. *Iconographica Diatomologica* **7**: 1-925.

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REZIME

Prestauroneis blazenciciae, sedma vrsta roda predložena za novu za nauku

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Na preparatu iz kolekcije koju je prikupio Krasske, nađena je populacija dijatomeja bogata vrstama u različitim fazama ćelijskog ciklusa. U to vreme je pogrešno identifikovana kao *Navicula integra* var. *truncata*. Svi faze životnog ciklusa imaju isključivo lancetaste, i nikada nazubljene ili eliptične konture valvi. Primerci ispoljavaju karaktere koji odgovaraju rodu *Prestauroneis*, ali nijednoj poznatoj vrsti, i stoga su označeni kao *Prestauroneis blazenciciae*.

Ključne reči: slani potoci, *Prestauroneis*, *Navicula*, *Prestauroneis blazencicae*