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Stauroneis kingstonii sp. nov. (Bacillariophyta: Naviculales), a new diatom species from the Black Swamp, Arkansas, USA

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Abstract

A freshwater diatom species, *Stauroneis kingstonii sp. nov.,* is described from cypress-tupelo wetlands of the Cache River, Arkansas, USA. *Stauroneis kingstonii* can be distinguished from other *Stauroneis* species by its narrow lanceolate shape, high length:breadth ratio, coarse areolae and striae, and lateral raphe bounded by a broad axial area and straight proximal raphe ends. The diatom is currently known only from the Cache River Watershed and found living benthic or epiphytic on submerged bald cypress and water tupelo tree bark, in slightly acidic, and fresh to slightly brackish waters.

Introduction

Stauroneis Ehrenberg (1843: 311), a freshwater diatom genus erected by Ehrenberg (1843a) and later typified by Boyer (1927), is characterized by uniseriate striae, long narrow valves, and a thickened transverse central area referred to as a stauros. *Stauroneis* taxa are commonly found in epipelic, mossy, or aerophilic habitats (Round *et al.* 1990). Traditionally considered to have low diversity, much recent work has expanded the richness of this genus to include 17 new species in Sardinia (Lange-Bertalot *et al.* 2003), 6 new species in Germany (Werum & Lange-Bertalot 2004), 40 new species in Antarctica (Van de Vijver *et al.* 2004), and 21 new species in western North America (Bahls 2010, 2012). These findings contrast with typical reports from the USA such as the U.S. Geological Survey's National Water Quality Assessment (NAWQA) Program that record less species richness. For example, NAWQA (U.S. Geological Survey 2014) found the greatest *Stauroneis* richness for Arkansas within the Cache River, but these only included six known taxa (*S. anceps* Ehrenberg (1843b: 306), *S. obtusa* N.Lagerstedt (1873: 36), *S. producta* Grunow (in van Heurck 1880: pl. 4), *S. smithii* Grunow (1860: 564), *S. smithii* f. *incisa* Pantocsek (1902: 21), and *S. thermicola* (J.B.Petersen) Lund (1946: 61)) and one unknown species (*Stauroneis* sp. 0A UL NAWQA KM).

The Cache River, in Arkansas, flows from north to south within the Mississippi River Alluvial Plain (MAP). The MAP ecoregion is the large floodplain stretching from southern Illinois to the mouth of the Mississippi River, comprising 141,958 km^2 of glacial-fluvial outwash (Omernik 1987). The humid, sub-tropical climate of the MAP is advantageous for wetland vascular plant communities dominated by bottomland hardwood forests (Hodges 1997). As part of the MAP, the Cache River Watershed (CRW) was formed from the deposition of Pleistocene glacial-fluvial outwash (Saucier 1994), and millennia of river meanderings have resulted in numerous wetlands and oxbow lakes (Fig. 1). Based on their hydrology and geomorphic setting within the floodplains, connected depressions are hydrogeomorphically classified wetlands that are common throughout the CRW and MAP (Klimas *et al.* 2004). Forests of bald cypress, *Taxodium distichum* (L.) Rich. (1810: 298) and water tupelo, *Nyssa aquatica* L. (1753: 1058), dominate connected depressions, which are subject to regular inundation (Dale & Ware 2004). In addition to beneficial nutrient sequestration and floodwater retention, cypress-tupelo wetlands have been shown to be vital wildlife habitat for a variety of fish (Killgore & Baker 1996) and song birds (Wakeley & Roberts 1996).

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TABLE 3: Physiochemical parameters and percent forested land-use within the 100m buffer for 13 wetlands with *Stauroneis kingstonii.*

Parameter	Mean	Minimum	Maximum
pH	6.47	5.78	7.12
DO (mg l^{-1})	2.22	0.08	6.01
Conductivity (µS cm^{-1})	192.77	71.17	537.00
Turbidity (NTU)	36.01	8.61	176.93
NO_3-N (mg l^{-1})	0.05	0.02	0.12
NO_2-N (mg l^{-1})	0.01	0.00	0.05
TN (mg l^{-1})	1.59	0.76	7.18
TP (mg l^{-1})	0.49	0.10	3.93
PO_4-P (mg l^{-1})	0.21	0.03	2.08
Forest (%)	51.75	14.06	79.88

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