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Surirella capensis Ehrenberg ex Cocquyt *et* R. Jahn sp. nov., a rare and historical diatom species from South Africa

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Abstract – The rare and probably endemic diatom *Surirella capensis* is described and its type designated in slides made by Ehrenberg in 1843 from material collected in South Africa. The type specimen and further specimens found in Ehrenberg's historical material are illustrated with the light microscope. Ehrenberg had named this taxon *S. capensis*, but had never published a picture or a diagnosis. The distinction between *S. capensis* and the closely related *S. sparsipunctata*, a diatom known from Central Africa, is discussed.

Diatoms / *Surirella capensis* / Taxonomy / Typification / Ehrenberg Collection / South Africa

Résumé – ***Surirella capensis* Ehrenberg ex Cocquyt *et* R. Jahn sp.nov., une espèce de diatomie, rare et historique d'Afrique du Sud**. *Surirella capensis*, diatomée rare et probablement endémique, est nouvelle décrite ; son type est désigné dans les préparations faites par Ehrenberg en 1843 à partir de matériel provenant d'Afrique du Sud. Ehrenberg a donné le nom de *S. capensis* a cette diatomée mais il n'a jamais publié aucune illustration ni diagnose. Le spécimen type et d'autres spécimens retrouvés dans le matériel historique de Ehrenberg sont illustrés en microscopie ordinaire. Les différences entre *S. capensis* et *S. sparsipunctata*, une diatomée très proche d'Afrique Centrale, sont discutées.

Diatomées / *Surirella capensis* / Taxonomie / Typification / Collection Ehrenberg / Afrique du Sud

INTRODUCTION

In "*Mikrogeologie*", Ehrenberg (1854) referred to a new taxon *Surirella capensis* that he had found in a sample obtained from Cape Province, South

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Africa. Since a picture or a diagnosis was never published, this name is a *nomen nudum*. Consequently, VanLandingham (1978) reported this taxon under his category: "invalid, poorly described, or doubtful taxonomic entries, the use of which is not recommended". However, the slides containing the specimens of this taxon and the original drawing made by Ehrenberg are still available at the Ehrenberg Collection in Berlin, so that the identity of this taxon can be resolved and its name validated. These are the objectives of the present paper.

MATERIAL AND METHODS

The following mica preparations of the Ehrenberg Collection, Institut für Paläontologie, Museum für Naturkunde der Humboldt Universität zu Berlin (BHUPM) were examined: Kasten 13, Buch 7, mica-strips 15 and 16. On three micas the specimens of *S. capensis* were named and indicated with yellow, orange and red ring marks by Ehrenberg [130715b yellow, 130715e orange & 130716c red] (for information on the Ehrenberg collection see also Lazarus & Jahn, 1998). The original material was collected in January 1843 by Mr. Drège in a valley of the Camdebus mountain in the vicinity of Graaf Reinet, Cape Province, South Africa. Ehrenberg (1854: 244) wrote "Der Camdebusberg in der Nähe von Graaf Reinet wurde von Hrn. Drège im Januar besucht. An *Juncus oxycarpus* aus einer Valy in 4000 bis 5000 Fuss Höhe (s. Flora 1843, Anhang S. 59, 60) ist eine … graubrauner Erde erhalten … In 10 Analysen waren 50 Arten … bestimmbar. … *Pinnularia caffra* und *Surirella capensis* sind ausgezeichnete neue Arten, erstere nur ein schönes Fragment, letzteres in mehreren Exemplaren als lebend getrocknete Form". The name of this *Surirella* species is not mentioned in the species index of the illustrations and the table on p. 254 gives only the collection details.

Ehrenberg drew this specimen on the right side of his Drawing Sheet 1135 (see Fig. 1), sample no. 813.

Photographs of the original material were taken using an Olympus BX 51 microscope equipped with an Olympus DP50 camera.

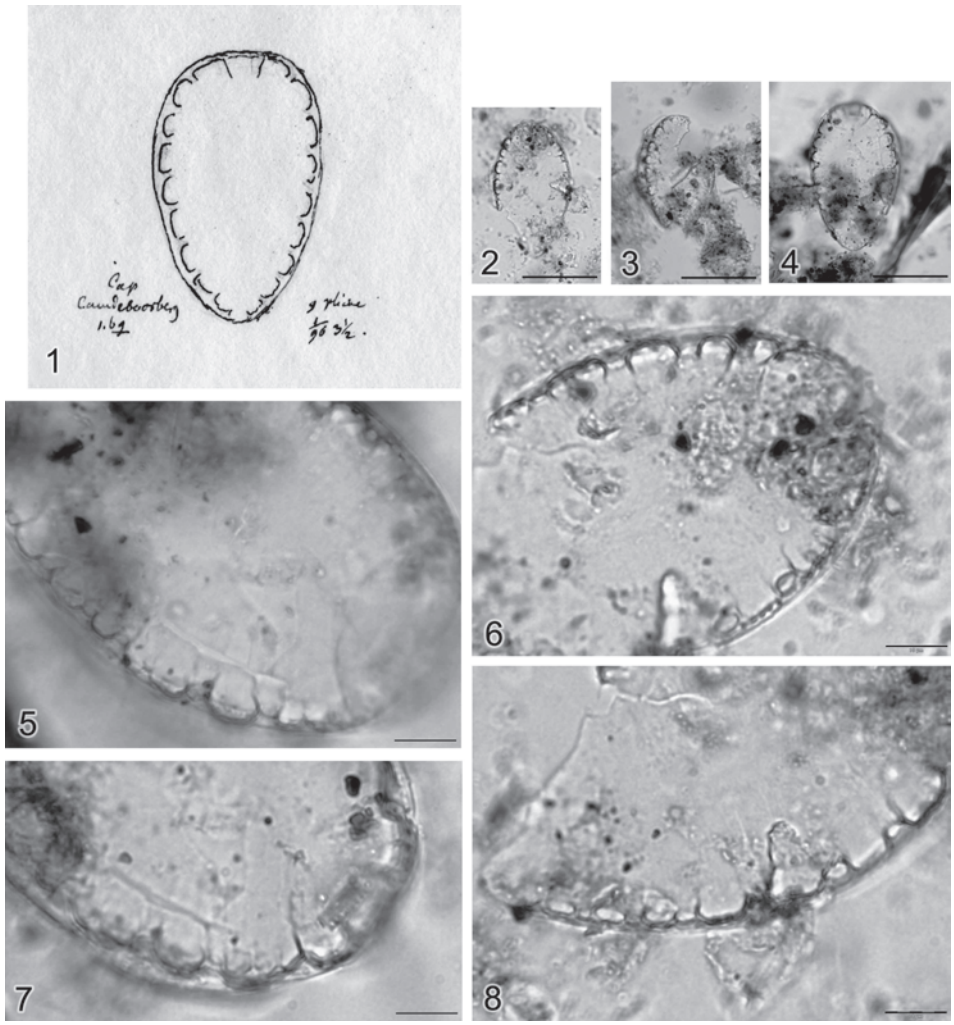
RESULTS

***Surirella capensis* Ehrenberg ex Cocquyt *et* R. Jahn sp. nov.**

Diagnosis : *Valvae heteropolares, ovatae, 78.5-100 µm longae, 48-61.5 µm latae, polo ad capitulum late rotundato, polo ad pedem subacuto. Superficies valvarum plana. Canales alares 10 in 100 µm fere, aliquantum pluribus densis ad polo. Alae latae effectae debiliter, non nisi superficies valvarum visibiles ad marginem valvarum. Omnis alae latae subdivisae canaliculis vel binis vel ternis. Spatio inter alas 4 µm fere. Striae punctaque pseudorapheque invisibiles in superficiebus valvarum.*

Holotypus: preparatio 130715 b in collectione Ehrenberg (BHUPM)

Locus typicus: lacus in monte Camdebo Graaf Reinet proximo, Provincia Capensis, Africa Meridionalis.



Figs 1-8. *Surirella capensis* specimens in the Ehrenberg Collection. LM. **1.** Ehrenberg's drawing, part of Drawing Sheet 1135. **2.** Specimen from mica 130715 e. **3.** Specimen from mica 130716 c. **4.** Holotype specimen from mica 130715 b. **5.** Detail of the holotype specimen. **6.** Detail of specimen from mica 130715 e. **7.** Detail of holotype specimen. **8.** Detail of specimen from 130715 e. Scale bar figs 2-4 = 50 µm, figs 5-8 = 10 µm.

Only four specimens of this taxon were observed on the three ring marks of the mica preparations. No specimens were present outside the ring mark or in the other colored rings mounted on the same preparation. One of the specimens of *S. capensis* could not be measured or photographed, as a crack in the mica obstructed a good view of this specimen.

Table 1. Morphological features of *Surirella capensis* specimens observed in the preparations of the Ehrenberg Collection.

Slide	*length (µm)*	*width (µm)*	*length/width ratio*	*alar canals in 100 µm*
130715 b	100	61.5	1.6	8-10
130715 e	91.5	53.5	1.7	10
130716 c	78.5	48	1.6	10

Light microscopic description (Figs 2-8, Tab. 1): Valves heteropolar, 78.5-100 µm long, 48-61.5 µm wide, ovate with broadly rounded head pole and a subacute base pole. The valve face is flat. About 10 alar canals in 100 µm, somewhat denser near the base pole. Poorly developed broad alae, only visible on the valve face near the valve margin. Each broad alar canal is subdivided in two or three canaliculi. The space between two alae is about 4 µm. No striation or punctation or pseudoraphe visible on the valve face. No girdle views were observed in the slides.

Distribution: At present, no other records of this species exist. The distribution is restricted to the locality of Ehrenberg's material, the Camdebus mountain in the vicinity of Graaf Reinet, Cape Province, South Africa.

Habitat: Greyish brown earth, on *Juncus oxycarpus*.

DISCUSSION

Surirella capensis is related to the Robusta group (Krammer, 1989) by the presence of alae and alar canals, although the alar canals are very short and not reaching far on the flat valve face. The light microscopic observations show that the broad alar canals are subdivided distally in two or three branches, called canaliculi. These structures are similar to those found in *S. sparsipunctata* Hustedt (Cocquyt & Vyverman, 1993) and *S. rorata* Frenguelli, a South American diatom reported from Argentine, Brazil and Chile (Sala, 1990). Because the only material available for *S. capensis* is on micas, no information can be given on the ultrastructure (SEM information) of the canaliculi and no comparison can be made with these structures in *S. sparsipunctata* and *S. rorata.*

Surirella capensis resembles *S. sparsipunctata*, a tropical African diatom reported so far only from Lake Tanganyika and the Rusizi river, the main tributary of this lake (Cocquyt & Vyverman, 1993; Mpawenayo, 1995). However, there are some important differences between these two species (Tab. 2):

– The length to width ratio is somewhat higher in *S. capensis* (1.6-1.7) than in *S. sparsipunctata* (for the smallest specimens between 1.2 and 1.5, for the larger specimens between 1.4 and 1.5, rarely 1.8).

– Although the number of alar canals in 100 µm is the same for *S. capensis* and *S. sparsipunctata* (10-12 in the mid-region, becoming somewhat denser near the poles), the space between two alar canals is much broader in *S. capensis* than in *S. sparsipunctata* , 4 µm and 2 µm respectively.

– The alae are poorly developed only near the valve margin but they reach somewhat further on the valve face than in *S. sparsipunctata*.

Table 2. Maximal and minimal length and width of the valves of *Surirella capensis* (Ehrenberg's material) and *Surirella sparsipunctata*. Data for *S. sparsipunctata* are from Hustedt *in* Huber-Pestalozii (1942), Mpawenayo (1995) and Cocquyt & Vyverman (1993).

	length (µm)	*width (µm)*	*length/width ratio*
S. capensis (this study)	78.5-100	48-61.5	1.6-1.7
S. sparsipunctata			
Hustedt (1942)	70-160	58-110	
Mpawenayo (1995)	59-67.5	40-44	
Cocquyt & Vyverman (1993)	51-160	39-90	1.2-1.5 (1.8)

In conclusion, *Surirella capensis* is an African diatom species, morphologically closely related to the Central African *S. sparsipunctata*. Further investigation on the variability within *S. capensis*, combined with an SEM investigation, could give some insights into the relationship of the two taxa. The collection of additional specimens from the type locality is therefore crucially important. Despite the limited collections currently available, we felt that revisiting this historic and probably endemic taxon was warranted, and in doing so we have also added to the recorded biodiversity of the African continent.

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