

The last chapter of the *Discoplea* story

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SUMMARY - *The last chapter of the Discoplea story* - The name *Discoplea* was introduced by C.G. Ehrenberg in 1840 as a new genus within the centric diatoms (Bacillariophyta). In the 1980s, almost all species of the genus *Discoplea* housed in the Ehrenberg Collection were studied by H. Håkansson. But in 2003, P. Silva published a comprehensive paper on the nomenclature of the genus *Discoplea* declaring it as invalidly published. He also included a list of later validations of individual species names. This list includes *Discoplea kuetzingii* and *Discoplea sorrentina* which for different reasons were neither checked by H. Håkansson nor by P. Silva. Material of these species was retrieved in the Ehrenberg Collection and is here evaluated and illustrated for the first time. The specimens are discussed with respect to their taxonomical and nomenclatural relevance. In addition, the original material of Ehrenberg's *Discoplea comta*, validated as *Cyclotella comta* by F.T. Kützing, was re-evaluated in order to understand the type of *Cyclotella comta* which is published as conserved with Grunow's slide in the International Code of Botanical Nomenclature. Consequently, *Discoplea comta* is here epitypified with Ehrenberg's material.

RIASSUNTO - *L'ultimo capitolo della questione Discoplea* - Il nome scientifico *Discoplea* venne introdotto da C.G. Ehrenberg nel 1840 per indicare un nuovo genere di diatomee (Bacillariophyta) centriche. Negli anni Ottanta, quasi tutte le specie di questo genere conservate nella Collezione Ehrenberg vennero studiate da H. Håkansson. Tuttavia, nel 2003 P. Silva diede alle stampe un articolato lavoro sulla nomenclatura del genere *Discoplea* concludendo che questa era stata pubblicata in maniera non valida. Egli riportava anche un elenco delle successive validazioni dei singoli epiteti specifici. Questa lista include *Discoplea kuetzingii* e *Discoplea sorrentina*, specie che, per diverse ragioni, non furono verificate né da H. Håkansson né da P. Silva. I materiali relativi a queste specie vennero recuperati dalla Collezione Ehrenberg, e sono valutati e illustrati per la prima volta in questa sede. Gli esemplari sono discussi in relazione alla loro rilevanza tassonomica e nomenclaturale. Inoltre, il materiale originale della *Discoplea comta* di Ehrenberg, validato come *Cyclotella comta* da F.T. Kützing, è stato rivalutato per consentire la corretta definizione del tipo di *Cyclotella comta*, che è inesattamente pubblicato nel Codice Internazionale di Nomenclatura Botanica come conservato con un preparato permanente di Grunow. Di conseguenza, *Discoplea comta* viene epitypizzata in questa sede facendo riferimento al materiale di Ehrenberg.

Key words: *Discoplea*, *Cyclotella*, Bacillariophyta, nomenclature, typification

Parole chiave: *Discoplea*, *Cyclotella*, Bacillariophyta, nomenclatura, tipizzazione

1. INTRODUCTION

Discoplea Ehrenb. was established as a new genus in 1840 including two species, *D. graeca* Ehrenb., currently known as *Puncticula graeca* (Kütz.) Håkansson and *D. kuetzingii* (as "Kützingii"). Håkansson (1986) revised all available original material of the genus *Discoplea* Ehrenb. and summarized her work in a later paper on cen-

tric diatoms (Håkansson 2002). Silva (2003) described the nomenclatural history of the genus *Discoplea* Ehrenb. in detail, and therefore all nomenclatural and taxonomical problems seem to be solved. However, the taxonomic evaluation of Ehrenberg's *Discoplea kuetzingii* and *D. sorrentina* are still outstanding. Håkansson (1986) was not able to check the identity of *Discoplea kuetzingii* because the questionable preparation was not available

at the Ehrenberg Collection in Berlin prior to 1995 (see Lazarus & Jahn 1998). Later the availability of original material was not checked again (Håkansson 2002), and the material was cited as missing (Silva 2003).

In this paper, the voucher specimen of *Discoplea kuetzingii* is shown for the first time and its priority in respect to *Cyclotella meneghiniana* is discussed. The conserved type of *Cyclotella comta* Kütz. (invalidly described as *Discoplea comta* Ehrenb.) is also discussed. The aim of this study is to complete our knowledge of Ehrenberg's invalidly published but intensively discussed genus.

2. MATERIAL AND METHODS

The Ehrenberg Collection in Berlin (BHUPM) was checked for original material. Photographs were taken with an Olympus DP 50 and BX 51 with an Olympus 80x IC 80/0.75. More details about the work in the Ehrenberg collection have been published in Jahn & Kusber (2004).

3. RESULTS

Discoplea Ehrenb. in *Ber. Bekanntm. Verh. Königl. Preuss. Akad. Wiss.*, Berlin, 1840: 208. 1840, nom. inval.

Type of the name of the genus (according to Round *et al.* 1990): *Discoplea kuetzingii* Ehrenb. in *Ber. Bekanntm. Verh. Königl. Preuss. Akad. Wiss.* Berlin 1840: 208. 1840.

Comment: An explicit generic description is missing in Ehrenberg (1840), but both species descriptions include partly the same wording: "testula disciformi in lateribus planis". This is neither a differential diagnosis nor a description, characterizing a single genus. The wording is applicable to a number of centric genera. Hence there is, in respect to Silva (2003) no new argument to validate the genus.

Discoplea kuetzingii Ehrenb. in *Ber. Bekanntm. Verh. Königl. Preuss. Akad. Wiss.*, Berlin 1840: 208. 1840, nom. inval. (Pl. 1).

Ind. loc.: "Berolini. In Gelatina nidulatur socialis." [Berlin, Germany].

Voucher specimen: BHUPM 540067-6. (Trockenpräparate II Polygastrica No. LXVII: 6).

Further original material: drawing sheet no. 478 in BHUPM, reproduced as plate 1A.

Description by Ehrenberg (1840): "minor testula disciformi in lateribus planis margine solum radiatim striata. Diam. 1/288 - 1/96". The minimum size of 7.8 µm

refers to another centric diatom which was too small to see any details for Ehrenberg. The maximum size of 23.5 µm is close to our measurements.

The left part of Ehrenberg's drawing sheet No. 478 in BHUPM has the date "22. Sept. 1837" and further information "in *Lemna* zum Naide papillosa". In the "Taxonomic Index" in the Ehrenberg Collection there is only one mica sub "*Discoplea*" with neither an epitheton, nor a locality. This preparation was identified as being the basis for Ehrenberg's drawing from living material from *Lemna* periphyton (Pl. 1B). Valves from this preparation are depicted in plate 1B-F.

From the images of Ehrenberg's preparation and the measurements, we assume that Ehrenberg described a species from a living periphyton sample from Berlin, Germany, which was later validly described by Kützing (1844) as *Cyclotella meneghiniana*. Since Ehrenberg did not validly publish his findings, Kützing's *Cyclotella meneghiniana* has priority. Kützing's treatment of *C. kuetzingii* as a synonym of *C. operculata* was not correct (see Kützing 1844: 50). Our findings provide the first dated occurrence for *Cyclotella meneghiniana* (as *Discoplea kuetzingii*) in Berlin (1837 instead of 1895, as published in Geissler & Kies 2003). There is no unmounted material for modern slide or SEM preparations available at BHUPM.

Cyclotella comta Kütz. in *Sp. Alg.*, 20. 1849 (Pl. 2).

= *Puncticulata comta* (Kütz.) Håkansson in *Diatom Res.* 17: 113. 2002.

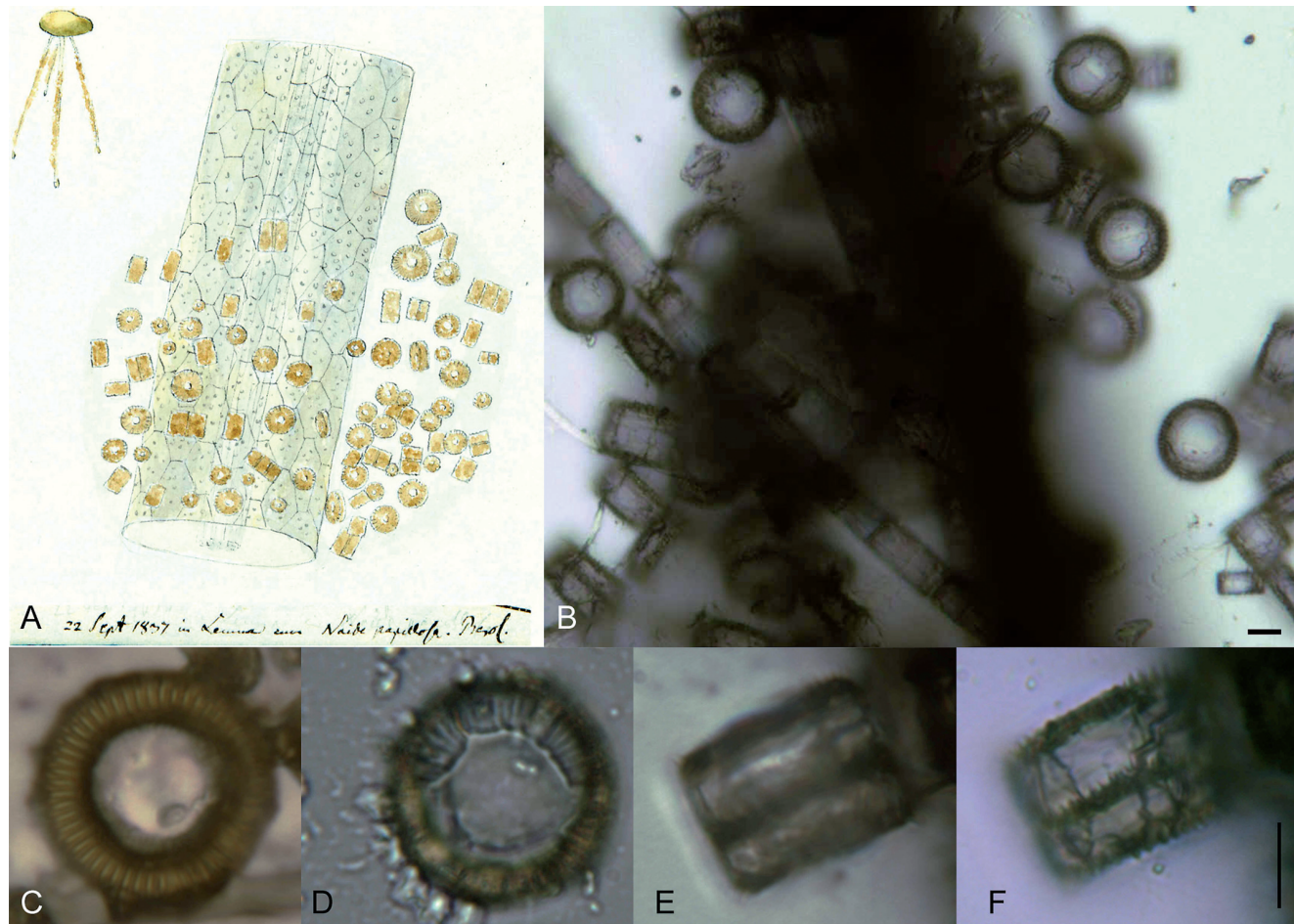
- *Discoplea comta* in Ehrenberg (1844b) non *Discoplea comta* Ehrenb. in *Ber. Bekanntm. Verh. Königl. Preuss. Akad. Wiss.* Berlin 1844: 267. 1844, nom. inval. (in Ehrenberg 1844a).

Type (conserved): Germany, Hochsimmer, Grunow 1298 (W), the name typified was given as *Discoplea comta* Ehrenb. in Greuter *et al.* (2000: 376) and corrected to *Cyclotella comta* Kütz. in McNeill *et al.* (2006: 421).

Epitype (hic designatus!): BHUPM 410811-1 (Label: "Lectotypus Håkansson") (Pl. 2A-B). Isoepitype (hic designatus!): BHUPM 410802-2 (Pl. 2C-D).

The reasons for our epitypification are twofold: 1) the epitype is in better accordance with the historical and current taxonomic understanding than Grunow's material which is the conserved type (represented by Håkansson's figure 411 of 2002) and 2) this specimen was in Ehrenberg's hand at the time of description; Kützing had validated this species based on Ehrenberg's (1844b) *Discoplea comta* by recombining it with a valid genus.

Discoplea sorrentina Ehrenb. in *Ber. Bekanntm. Verh. Königl. Preuss. Akad. Wiss.*, Berlin 1859: 734, 792. 1860, nom. inval. (Pl. 3).



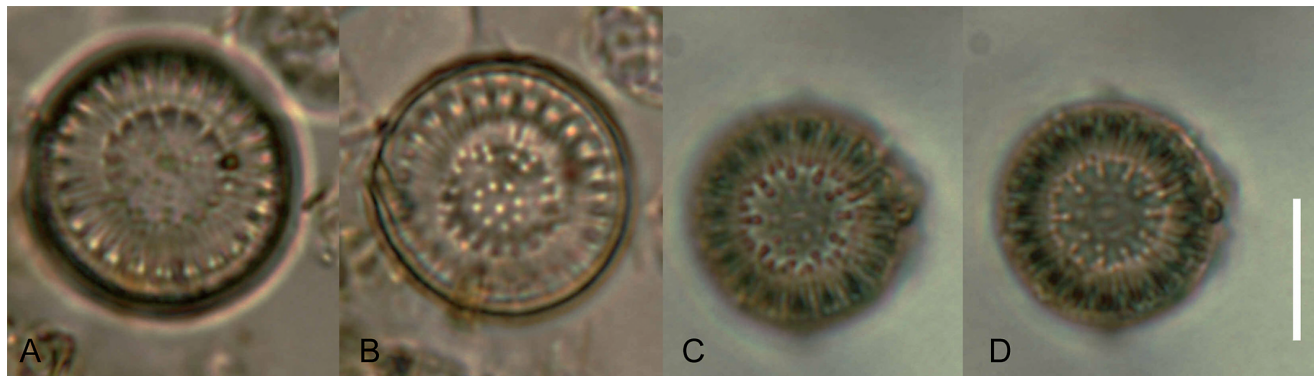
Pl. 1 - *Cyclotella meneghiniana* Kützing. A. Ehrenberg's drawing sheet no. 478 in BHUPM showing a *Lemna* plant (left site) and a detail of the plant with epiphytic centric diatoms named *Discoplea kuetzingii* Ehrenberg [nom inval.]. B-F. Voucher slide (mica) 540067-6 in BHUPM (compare Tab. 1). C-D. Close up of two valvar views. Note valve face fuloportulae. E-F. Close up of two cells in girdle view. E. Note the slight tangential undulation. Scale bars 10 µm.

Tav. 1 - *Cyclotella meneghiniana* Kützing. A. L'illustrazione di Ehrenberg no. 478 in BHUPM che mostra una pianta di *Lemna* (sulla sinistra) e un dettaglio della pianta con diatomee centriche epifitiche indicate come *Discoplea kuetzingii* Ehrenberg [nom inval.]. B-F. Preparato permanente di riferimento (mica) 540067-6 in BHUPM (si confronta con Tab. 1). C-D. Dettaglio con due visioni valvari. Si notino le fuloportule sulla faccia della valva. E-F. Dettaglio con due cellule in visione commesurale. E. Si noti la debole ondulazione tangenziale. Le barre con la scala misurano 10 µm.

Tab. 1 - Morphological features of *Discoplea kuetzingii* and *Cyclotella meneghiniana*. Mean values underlined.

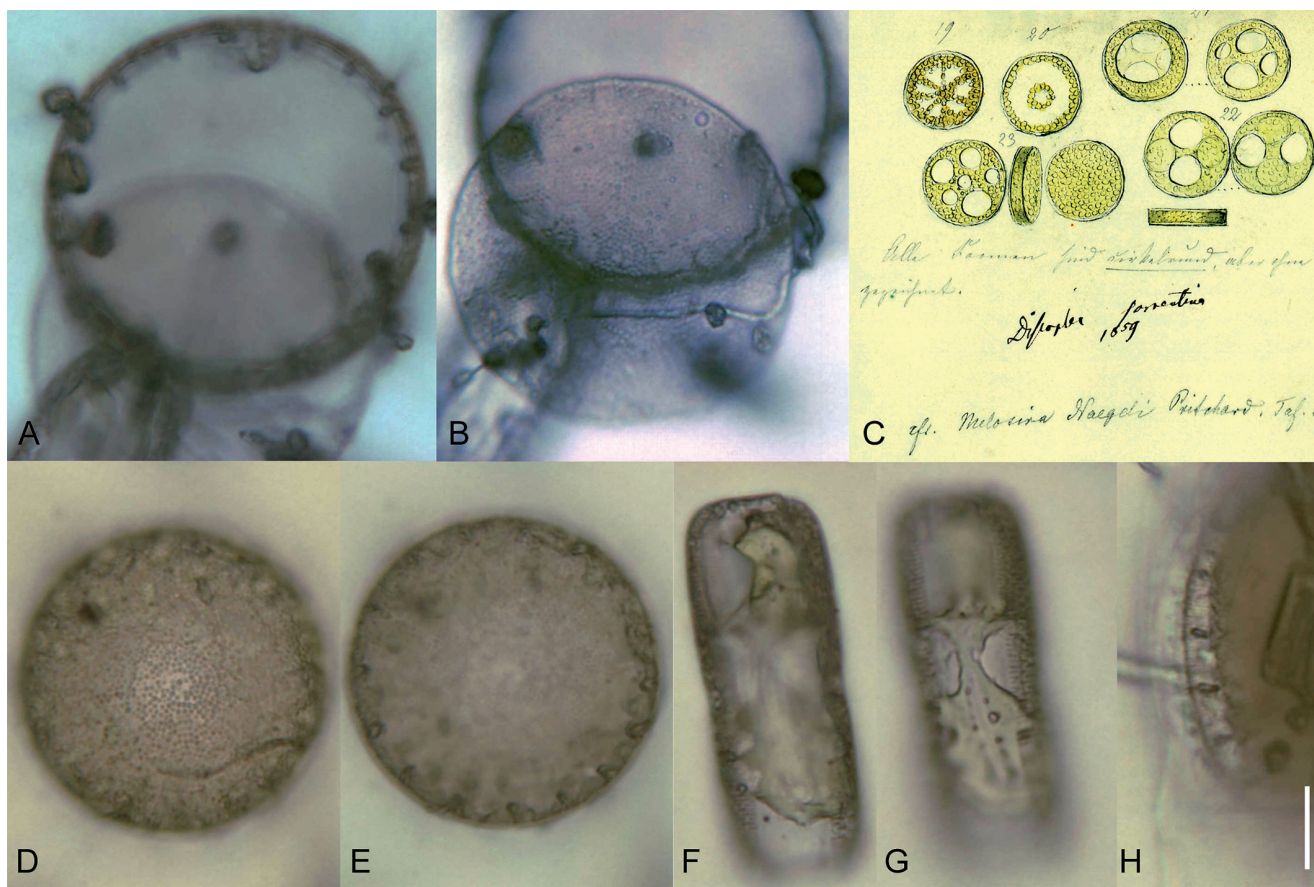
Tab. 1 - Caratteristiche morfologiche di *Discoplea kuetzingii* e di *Cyclotella meneghiniana*. I valori medi sono sottolineati.

	<i>Discoplea kuetzingii</i> (original material in BHUPM)	<i>Cyclotella meneghiniana</i> (from Håkansson 2002)
Central area	valve face more or less tangentially undulate	valve face more or less tangentially undulate
Valve diameter (µm)	16.8- <u>25.0</u> -27.6 (n= 30)	5.0-45.0
Valve face fuloportulae	1- <u>2</u> -3 (n= 30)	1-3
Central field / valve diameter	0.41- <u>0.54</u> -0.57 (n= 30)	
Radiating striae per 10 µm	8-9 (n= 2)	6-10
Valve diameter / mantle height	1.72- <u>2.41</u> -3.07 (n= 5)	



Pl. 2 - *Cyclotella comta* Kützing. A-B. BHUPM 410811-1, epitype of *Cyclotella comta*; valve in two different views. C-D. BHUPM 410802-2, isopitype; valve in two different views. Scale bar = 10 µm.

Tav. 2 - *Cyclotella comta* Kützing. A-B. BHUPM 410811-1, epitypo di *Cyclotella comta*; valva in due differenti visioni. C-D. BHUPM 410802-2, isopitypo; valva in due differenti visioni. La barra con la scala misura 10 µm.



Pl. 3 - *Discoplea sorrentina* Ehrenberg [nom inval.]. A-B. Labiate processes and valve face with pseudonodulus on voucher slide (mica) BHUPM 290103-2; valve in two different views. C. Ehrenberg's drawing sheet no. 479 of in BHUPM. D-E. Valvar views on slide (mica) BHUPM 290103-5; valve in two different views. F-H. Girdle views of air dried cells on slide (mica) BHUPM 290103-3. D-E respectively F-G. Valve in two different views. Scale bar 10 µm.

Pl. 3 - *Discoplea sorrentina* Ehrenberg [nom inval.]. A-B. Processo labiale e faccia della valva con pseudonodulus sul preparato permanente di riferimento (mica) BHUPM 290103-2; valva in due differenti visioni. C. L'illustrazione di Ehrenberg no. 479 in BHUPM. D-E. Visioni valvari sul preparato permanente (mica) BHUPM 290103-5; valva in due differenti visioni. F-H. Visioni commessurali di cellule fatte seccare sul vetrino (mica) BHUPM 290103-3. D-E rispettivamente F-G. Valva in due differenti visioni. La barra con la scala misura 10 µm.

Ind. loc.: "In mari neapolitano ad Sorrentum Augusto valde frequer cum algis".

Voucher specimens: BHUPM 290103-2, BHUPM 290103-3, BHUPM 290103-5 "Mare Neapolit. Sorrenta 30 Aug. 1858".

Further original material: drawing sheet no. 479 in BHUPM, reproduced as Pl. 3C.

D. sorrentina is a centric with a marginal ring of rimoportulae (Pl. 3A) and one single pseudonodulus (Pl. 3B). Areolation is not clearly radiate.

The mounted valves show a marine centric cf. *Ropertia* Grunow ex Pelletan (compare Round *et al.* 1990: 198). Because not enough details can be seen on the preparation in BHUPM (Pl. 3A-B, D-H), the taxonomic identity of the species remains unclear.

4. DISCUSSION

In accordance with Silva (2003), we consider the genus *Discoplea* as being invalidly published in 1840 (with respect to the ICZN (International Commission on Zoological Nomenclature 1999) as well as to the ICBN (McNeill *et al.* 2006)).

If validly published, the type of the name of the genus *Discoplea* would have been *D. kuetzingii* as stated by Round *et al.* (1990). If validly published *D. kuetzingii* would have priority over *C. meneghiniana*.

With respect to *Cyclotella comta*, the conserved type in W has to be commented. We fully agree with the typification of *C. comta* with Hochsimmer material because of name stability. But since Kützing referred explicitly to Ehrenberg, it is unreproducible why Grunow's material of Hochsimmer was selected as the conserved type. Håkanson's (2002) figure 411 of Grunow's specimen on slide no. 1298 does not unambiguously represent the taxonomic entity intended to be conserved, we doubt that her figure 410 really belongs to the cited preparation because of the different quality in resolution. Ehrenberg's voucher specimen of Hochsimmer in BHUPM shows exactly what Ehrenberg depicted and described. Without correcting the conserved type we are thus providing an epitype on the basis of the conserved type for further usage of the name, which is also type of the name of the genus *Puncticulata* Håk.

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