

PROPOSALS TO CONSERVE OR REJECT NAMES

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(2607) Proposal to conserve the name *Heterocapsa* (*Dinophyceae*) with a conserved typeMarc Gottschling,¹ Urban Tillmann,² Wolf-Henning Kusber,³ Mona Hoppenrath⁴ & Malte Elbrächter⁵¹ Department Biologie, Systematische Botanik und Mykologie, GeoBio-Center, Ludwig-Maximilians-Universität München, Menzinger Str. 67, 80638 München, Germany² Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung, Am Handelshafen 12, 27570 Bremerhaven, Germany³ Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, Königin-Luise-Straße 6–8, 14195 Berlin, Germany⁴ Senckenberg am Meer, German Centre for Marine Biodiversity Research (DZMB), Südstrand 44, 26382 Wilhelmshaven, Germany⁵ Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung, Wattenmeerstation Sylt, Hafenstr. 43, 25992 List/Sylt, Germany

Author for correspondence: Marc Gottschling, gottschling@bio.lmu.de

DOI <https://doi.org/10.12705/673.16>(2607) *Heterocapsa* F. Stein, Organism. Infusionsthier 3(2): 13. Nov 1883, nom. cons. prop.Typus: *Heterocapsa steinii* Tillmann & al. (in J. Phycol. 53: 1320. 10 Oct 2017), typ. cons. prop.

The currently accepted taxonomic concept of *Heterocapsa* F. Stein is based on the author's published drawings (Organism. Infusionsthier 3(2): t. III figs. 30–40. 1883). However, the formal type of the name was established by Loeblich & Loeblich (in Stud. Trop. Oceanogr. 3: 35. 1966), who uncritically selected *Heterocapsa triquetra* (Ehrenb.) F. Stein (l.c.: 13), based on *Glenodinium triquetrum* Ehrenb. (in Ber. Bekanntm. Verh. Königl. Preuss. Akad. Wiss. Berlin 1840: 200. 1840), as type of *Heterocapsa*. Unfortunately, *G. triquetrum* applies to a species belonging to *Kryptoperidinium* Er. Lindem. (Tillmann & al. in J. Phycol. 53: 1305–1324. 2017; Gottschling & al. in Taxon 67: 179–185. 2018). Stein (l.c.: 13) preliminarily included two further species in his new generic taxon, namely *Heterocapsa quadridentata* F. Stein and *Heterocapsa umbilicata* F. Stein. Today, the first species is considered a member of *Blixaea* Gottschling (Hansen in Phycologia 34: 169. 1995; Okolodkov & al. in Mar. Pollut. Bull. 108: 289–296. 2016). The drawing and the depicted plate pattern of the other species do not correspond to *Heterocapsa*, but also do not allow a clear assignment to any other dinophyte lineage. Thus, none of the original elements assignable to the names of the three species included by Stein (l.c.) correspond to the current usage of *Heterocapsa*.

We analysed Ehrenberg's original material of *G. triquetrum* at the Institut für Paläontologie, Museum für Naturkunde, Berlin (BHUPM), with the conclusion that Stein never consulted any original material of *G. triquetrum* before publishing the new combination *H. triquetra*. The confusion associated with the name *H. triquetra*, and its fatal nomenclatural consequences, are surveyed in detail in Gottschling & al. (l.c.). These authors noted that Stein (l.c.) considered *Heterocapsa* to be a flagellate and an animal, and so its publication falls under the rules of the *ICZN* (Ride & al., Int. Code Zool. Nomencl., ed. 4. 1999 & <http://www.nhm.ac.uk/hosted-sites/iczn/code/>). This is important for two reasons:

(1) Because Stein included more than one species in *Heterocapsa*, Art. 38.5 of the *ICN* (McNeill & al. in Regnum Veg. 154. 2012) does not apply. The description applicable explicitly to the taxon at generic level is very brief: “Am Hinterleibe konnte ich nur schwache Spuren von Gliederung wahrnehmen” (at the abdomen, I observed weak structures

only), but Stein (l.c.: 13) provided clear diagnoses against *Glenodinium* having no shell: “[die] Gatt. *Glenodinium* ist [...] auf solche Peridinen zu beschränken, welche einen ganz homogenen, nicht getäfelten Panzer besitzen” (the genus *Glenodinium* is to be restricted to such peridiniids with an entirely homogenous shell without pattern), whereas *Heterocapsa* has a shell (though incomplete); and against *Peridinium* having an alternative pattern than *Heterocapsa*: “Vorderleib[e] [...] aus [...] fast gleich grosse[n] Tafeln [...], die sich nicht auf die Zahlenverhältnisse und die Gliederungsweise der Peridinen zurückführen liessen” (prosoma consisting of plates almost equal in size, which do not correspond to the numbers and arrangements in Peridinia). We conclude that the generic name satisfies the requirement of Art. 38.1(a) of the *ICN*, but, if it were thought not to do so, as, prior to 1931, a generic name was made available under the *ICZN* (Art. 12.2.5 and example; Ride & al., l.c.: 16) by “the use of one or more available specific names in combination with it”, *Heterocapsa* would in any case be validly published under the provisions of Art. 45.1 of the *ICN*.

(2) Although the name *Heterocapsa* was clearly accepted by Stein (l.c.) in other parts of this original publication (for example the detailed legends to the figures) and was not “merely proposed in anticipation of the future acceptance of the taxon”, Stein also wrote “Deshalb habe ich aus dem *Glenodinium triquetrum* eine eigene, jedoch nur provisorische Gattung *Heterocapsa* gebildet” (Therefore, I have formed from *Glenodinium triquetrum* a separate, but only provisional, genus *Heterocapsa*), and this could be considered contrary to Art. 36.1 of the *ICN*, even as this article was amended at the Shenzhen Congress (see Turland & Wiersema in Taxon 66: 246. 2017; Turland & al. in Taxon 66: 1240. 2017). However, as before 1961, Art. 11.5.1 of the *ICZN* (Ride & al., l.c.: 11) provided that a name was not made unavailable by being “proposed conditionally”, and *Heterocapsa* is again, in any case, validly published under Art. 45.1 of the *ICN*.

Because Stein (l.c.) misapplied Ehrenberg's (l.c.) *G. triquetrum* to *Heterocapsa*, no validly published species name has existed for *H. triquetra* sensu Stein (l.c.) until, therefore, Tillmann & al. (l.c.: 1320) described a new species, namely *Heterocapsa steinii* Tillmann & al., typified with Stein's (l.c.) illustration (and epitypified with newly collected material from the type locality). Following the guidelines specified by McNeill & al. (in Taxon 64: 163–166. 2015; cf. bullet point (2) under “Conservation and rejection procedures”) and applying *ICN* Art. 14.9, we here propose to conserve the name *Heterocapsa* with *H. steinii* as conserved type (procedure 2).

Acceptance of our proposal will permanently link the historical and current usage of *Heterocapsa* formally to this name, but remove a severe pitfall in dinophyte nomenclature and will assure the current usage of *Heterocapsa*, an important and frequently applied protist name (Tillmann & al., l.c.: 1305–1307). As a consequence, it is necessary to accept the name *H. steinii* for the species formerly known as *H. triquetra*, which was consistently misapplied for more than a century. We consider this name change an advantage rather than a disadvantage, as future students of the species using this correct name will demonstrate their awareness of the nomenclatural problem surveyed here and in Gottschling & al. (l.c.). If students use the name *H. triquetra* in future, then, until a decision is made on the present proposal, it remains unclear whether the historic usage (i.e., species of *Heterocapsa*) or the nomenclaturally correct determination (i.e., species of *Kryptoperidinium*) is being adopted.

Rejection of the present proposal (and if no further formal action is taken) will force two well-established generic names of dinophytes

to change. Specifically, the taxonomic concept of *Heterocapsa* will shift from Stein's (l.c.) work to the taxon that was originally described by Ehrenberg (l.c.) corresponding to the modern concept of *Kryptoperidinium*. Under such a scenario, all species currently assigned to *Heterocapsa* would have to be transferred to *Cachonina* A.R. Loeb. (in Proc. Biol. Soc. Wash. 81: 92. 1968; Morrill & Loeblich III. in J. Plankt. Res. 3: 53–66. 1981), and *Kryptoperidinium* would become a later synonym of *Heterocapsa* requiring transfers to the latter taxon. Two common, well-studied species currently referred to as *H. triquetra* and *Kryptoperidinium foliaceum* (F. Stein) Er. Lindem. would also be forced to change names and concepts. Particularly, the well-established name *H. triquetra* must be currently applied for a species with which nobody associates it. This radical change would most probably not be accepted by the scientific community and with the present proposal, we aim at cutting the Gordian knot described in Gottschling & al. (l.c.).