

Recognition of the marine gastropod *Caecum tumidum* Carpenter, 1858 (Caenogastropoda, Truncatelloidea) in the Pliocene of the North Sea Basin

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In 1858 Carpenter described the fossil "*Caecum trachea*" sensu Wood (1842, 1848) from the Pliocene British Crag Mollusca as new to science and named it *Caecum tumidum*. A lectotype is selected to stabilize the species. *C. tumidum* appears also present in the Pliocene of Belgium and The Netherlands. As *C. tumidum* until recently has been mistaken for *Caecum trachea* (Montagu, 1803) = *Caecum imperforatum* (Kamacher, 1798) as well as for *Caecum mammillatum* Wood, 1848, diagnostic characters and photographs are presented to distinguish the three species.

Key words: Gastropoda, Caenogastropoda, Truncatelloidea, Caecidae, Caecinae, *Caecum*, Pliocene, North Sea Basin, Belgium, The Netherlands, United Kingdom.

INTRODUCTION

The family Caecidae consists of a group of interstitial benthic gastropods, in which the shell, after the larval stage which is regularly coiled, is formed by a long, slightly curved tube. During the growth, early stages may be either preserved (subfamilies Strebloceratinae and Pedumicrinae) or discarded and the posterior end sealed by a septum (subfamily Caecinae) (Pizzini et al., 2013: 1). In this paper we only deal with represen-

tatives of the Caecinae.

In his catalogue of shells from the Crag, Wood (1842: 459) listed a specimen of "*Caecum trachea*?" found in the Coralline Crag (Pliocene; Sutton, Suffolk, UK). The question-mark indicates that Wood at that time had doubts about this identification that he expressed as follows, "The recent British shell is regularly annulated and smooth, the annuli in my single crag specimen are more irregular and rugose."

In his Monograph of the Crag Mollusca, Wood (1848: 115-116) omitted the question-mark, evidently considering his species to be conspecific with the Recent *Caecum trachea* (Montagu, 1803).

Ten years later Carpenter (1858: 426-427), "having subjected all the specimens in the British Museum, as well as some sent me by Mr. Wood, to a very rigid examination under the microscope", recognized and described "*C. trachea*" sensu Wood as new to science, naming it *Caecum tumidum*.

Jeffreys (1867: 76), discussing *C. trachea*, wrote, "I do not consider it a British fossil; for I believe the shells described and figured by Searles Wood from the Coralline Crag are not this species, but his *C. mammillatum*." Jeffreys did not refer to the description by Carpenter.

Wood (1872: 87) did not respond to Jeffreys. He positively responded to Carpenter by inserting in his Supplement to the Monograph of the Crag Mollusca a

survey of "the Crag Caecidae according to Carpenter's views (though I do not fully agree with him)", together with a footnote in which Wood reminded readers of his "note of interrogation against *C. trachea*" in his catalogue (Wood, 1842: 459; see above). Despite this footnote, two years later in 1874, Wood listed "*C. trachea*" in the Synoptical List (page 209) and Index (page 224) of his Supplement, merely mentioning "*C. tumidum* Carp." in the column of 'Remarks' (page 209).

Harmer (1923: 848) repeated Jeffreys' opinion on the fossil "*C. trachea*", but followed Wood: "Jeffreys considered that the Coralline Crag fossil described by Wood under the present name could not be identified with the recent *C. trachea* of Montagu, in which the concentric ribs are more distinct and closely arranged, preferring to regard it as a variety of Wood's *C. mammillatum*. On the whole, however, ... I adopt Wood's view, which is the one most generally accepted." Harmer did not even mention Carpenter's description of *C. tumidum*.

Since 1874 the taxon *Caecum tumidum* Carpenter, 1858 seems to have been forgotten. Unjustly, as we will show.

In preparation for Part II of the atlas *De fossiele schelpen van de Nederlandse kust* Hoeksema & Raad (2015) studied the family Caecidae. Thanks to the support of the members of the Werkgroep Geologie of the Koninklijk Zeeuwsch Genootschap der Wetenschappen (Middelburg, The Netherlands) a dozen samples of fossil *Caecum* specimens collected from the beaches of the Westerschelde, province of Zeeland, The Netherlands, were made available for study. The samples contain undisputed specimens of *Caecum glabrum* (Montagu, 1803) and *C. mammillatum* Wood, 1848. Shells of a third *Caecum* species at first sight resembled *C. trachea*, but a closer examination showed consistent differences. Consequently the first author studied the fossil *Caecum* shells in the Royal Belgian Institute for Natural Sciences (Brussels, Belgium) and those from Dutch boreholes deposited in the Naturalis Biodiversity Center (Leiden, The Netherlands). The *C. trachea*-like species is present in both museums, all specimens were obtained from Pliocene deposits, which indicates that the beach-collected specimens also can be considered to be of Pliocene origin. Studying the publications on the British Pliocene Crag Mollusca mentioned above, Carpenter's description of *C. tumidum* appeared strikingly applicable to this species. The second author tracked down the specimens of "*C. trachea*" sensu Wood in the Natural History Museum (London, UK), the syntypes on which Carpenter (1858: 426-427) had based his description of *C. tumidum*, and, as expected, they proved to be conspecific with the mentioned fossil *C. trachea*-like specimens from Belgium and The Netherlands.

MATERIAL AND METHODS

Diagnostic characters. – Nofroni et al. (1997: 5) summarized four validly diagnostic characters that may distinguish *Caecum* species: 1. shell size, 2. shape of septum, 3. presence/absence and type of

(micro-)sculpture and 4. presence/absence of an apertural varix. They add, "It is stressed that the morphological characters here employed (especially the septum and the microsculpture) are validly diagnostic when observed in full-grown, well preserved specimens; the range of variability of many characters in some instance, forces to analyse as many characters as possible in each case, and as large samples as possible to avoid misinterpretations." For example the microsculpture should not be handled as the only diagnostic feature, "Often species that are usually striate, present specimens with very weak (or even nearly absent) microsculpture (and vice versa)."

Terminology. – Based on Fretter & Graham (1978: 234), Lightfoot (1992: 172-173) and Nofroni et al. (1997: 4-5): apical end – the smaller, narrower, closed upper end of the tube; septum – closure of the shell after the previous stage is discarded; mucro – appendage often visible on the septum; aperture – the round opening at the lower end of the tube; apertural end – the lower end of the tube; varix – transverse thickening or ring preceding the edge of the aperture, which always signifies an adult shell and the end of growth; dorsal side – convex side of the tube (dorsal aspect of septum is "twelve o'clock"); ventral side – concave side of the tube; ribs – longitudinal, raised sculpture (equivalent to the spiral sculpture of the normally coiled gastropods); rings – transverse, raised sculpture (equivalent to the axial sculpture of the normally coiled gastropods); microsculpture – sculpture visible at high magnification.

Systematics. – The current systematics is based on the World Register of Marine Species (Bouchet & Gofas, 2015), consulted in July 2015.

Abbreviations and acronyms. – AR: coll. A.C. (Riaan) Rijken, Middelburg, The Netherlands; DH: coll. D.F. (Dick) Hoeksema, Middelburg, The Netherlands; coll.: collection; fig(s): figure(s); Fig(s): figure(s) in the present paper; FN: coll. F.A.D. (Freddy) van Nieulande, Nieuw- en St. Joosland, The Netherlands; frm(s): fragment(s); GS: coll. G.F. (George) Simons, Middelburg, The Netherlands; HJ: coll. H.A.A. (Bart) de Jong, Middelburg, The Netherlands; HR: coll. H.J. (Harry) Raad, Kruijning, The Netherlands; LK: coll. L. (Lex) Kattenwinkel, Goes, The Netherlands; NHMUK: Natural History Museum (formerly British Museum of Natural History), London, United Kingdom; NMR: Natuurhistorisch Museum Rotterdam, Rotterdam, The Netherlands; pl(s): plate(s); PM: coll.

P.W. (Peter) Moerdijk, Middelburg, The Netherlands; RBINS: Royal Belgian Institute for Natural Sciences, Brussels, Belgium; RGM: Fossil Mollusca coll. Naturalis Biodiversity Center (formerly Rijksmuseum van Geologie en Mineralogie), Leiden, The Netherlands; spm(s): specimen(s); WoRMS: World Register of Marine Species (Bouchet & Gofas, 2015).

Type material. – In the Natural History Museum (London, UK), no type specimens selected by Carpenter himself could be found. The only sample of “*C. trachea*” from the Coralline Crag Formation is lot NHMUK PI G2066, donated to the museum by Wood (Fig. 1). The whole lot comprises 19 specimens adhered to a thin black paper strip glued onto a thicker white piece of card. Originally at least another four specimens were present, but at some time these have been removed and the present whereabouts of these shells are unknown. On the card one can read in Wood’s handwriting in pencil “Cor. Crag / *Caecum trachea*? / Sutton”; a cross and green sticker indicate the specimen that has been figured (Wood, 1848: pl. 20 fig. 5), which is confirmed by a cross on the museum label (Fig. 2). As Carpenter (1858: 427) based his description of *C. tumidum* on “all the specimens in the British Museum, as well as some sent me by Mr. Wood” and as all 19 specimens seem conspecific, lot NHMUK PI G2066 can be considered a type series of syntypes. The specimen which has been figured (Wood, 1848: pl. 20 fig. 5) and to which Carpenter (1858: 427) referred in his original description, is here selected as lectotype and renumbered NHMUK PI G2066(1) (Fig. 3), making the other 18 specimens paralectotypes. The lectotype is 2.79 mm long and among the largest of the 19 type specimens.

Other material examined. – Bergen op Zoom (province of Noord-Brabant, The Netherlands), borehole 2, RvD 9283, 90-91 m below surface, Oosterhout Formation – mollusc zone Mol D1, Pliocene (Piacenzian), 1 spm, RGM.937740; Dongen (province of Noord-Brabant, The Netherlands), borehole B44G.0043, 175-176 m below surface, Oosterhout Formation – mollusc zone Mol D1, Pliocene (Piacenzian), 1 spm, RGM.937737.a (Figs 7b, 8-10); Kallo (province of Oost-Vlaanderen, Belgium), Verrebroekdok, Lillo Formation, Oorderen Member, *Atrina* level, Pliocene (Piacenzian), 1 spm, RBINS no. IRScNB IST 5897 (Marquet, 1997: 18, 28-29; Marquet, 1998: 70 fig.; as *C. mammillatum*); Kallo, Deurganckdok, Lillo Formation, Luchtbal or Oorderen Member, Pliocene (Late Zanclean to Piacenzian), 4 spms, LK; Baarland (province of Zeeland, The Netherlands), beach near Camping Scheldeoord, in sand dredged from the Westerschelde at the ‘Overloop van Hansweert’ and/or the ‘Drempel van Hansweert’ in the Westerschelde estuary, derived from Pliocene deposits (Moerdijk &

Pouwer, 2013: 9-10, fig. 1), 1 spm ex coll. AR, RGM.1008223 (Fig. 7a); 2 spms, 1 frm LK; Borssele, De Kaloot (province of Zeeland, The Netherlands), beach, 2 spms (Figs 4-6), 2 frms FN; 4 spms, 5 frms HJ; 2 spms, 1 frm HR; 1 frm PM; Nieuwvliet, Zwarte Polder (province of Zeeland, The Netherlands), beach, 1 frm HR; Domburg (province of Zeeland, The Netherlands), beach, 1 spm, RGM, ex coll. J. van Dalsum (infortunately lost).

Specimens labeled as “*C. imperforatum*” in RGM from Pliocene deposits in boreholes in The Netherlands all appeared to belong to *C. tumidum* (April 2015).

In addition to the specimens of *C. tumidum* the first author studied for comparison a sample of beached specimens of fresh dead *C. trachea* (ex coll. G.J. Geuze, DH; Figs 11-14) from Martinhal, S. Portugal, and samples of *C. mammillatum* washed ashore at the beaches of Baarland (see above; AR, LK; Figs 15-17), Borssele/De Kaloot (FN, HJ, HR), Ritthem (GS), Vlissingen (HR), Nieuwvliet/Zwarte Polder (HJ) and De Banjaard (HJ), province of Zeeland, The Netherlands.

SYSTEMATICS

Class Gastropoda Cuvier, 1795
Subclass Caenogastropoda Cox, 1960
Order Littorinimorpha Golikov & Starobogatov, 1975
Superfamily Truncatelloidea Gray, 1840
Family Caecidae Gray, 1850
Subfamily Caecinae Gray, 1850

Caecum Fleming, 1813

Caecum tumidum Carpenter, 1858 (Figs 3-10)

Caecum trachea? - Wood, 1842: 459 (question-mark by Wood).

Not *C. trachea* Montagu, 1803.

Caecum trachea - Wood, 1848: 115-116, pl. 20 fig. 5; 1872: 87;

1874: 209, 224. Harmer, 1923: 847-848, pl. 64 fig. 32. Trausel & Sliker, 2015: NMR 26235. Not *C. trachea* Montagu, 1803.

Caecum (Anellum) tumidum - Carpenter, 1858: 426-427.

Caecum mammillatum - Jeffreys, 1867: 76. Marquet, 1997: 18, 28-29 fig. 3; 1998: 70 fig.

Caecum imperforatum - Van Regteren Altena, Bloklander & Pouderoeyen, 1955: 29, pl. 6 fig. 58; 1965: 17, pl. 6 fig. 58.

Original description. – *Caecum (Anellum) tumidum* Carpenter, 1858.

Testa tereti, sublaevi seu annulis obsoletis ornata; apertura haud contracta, annulo tumido cincta; septo mammillato, plus minusve tumente; margine laterali convexo, dorsum versus subangulato; operculum ?-.

Long. 0.11, lat. 0.018-0.024.



Figs 1-10. *Caecum tumidum*, Carpenter, 1858. 1, type series from the Coralline Crag Formation, Pliocene (Zanclean), Sutton, Suffolk, UK, NHMUK PI G2066; 2, museum label of NHMUK, with a cross indicating that the cross on the card of the type series identifies the figured specimen; 3, lectotype, length 2.79 mm, NHMUK PI G2066(1) = the spm pictured by Wood (1848: pl 20 fig 5); 4-6, 2 spms, length 2.7 and 2.9 mm, washed ashore at Borssele, De Kaloot, FN; 4, scale 500 micrometer; 5, apertural end Fig 4a, showing a varix, scale 100 micrometer; 6, detail lower part tube Fig 4a, showing microscopic pitting, scale 50 micrometer; 7-10, 2 spms; 7, scale 500 micrometer; 7a, 1 spm, length 2.5 mm, Baarland beach, province of Zeeland, The Netherlands, Pliocene, ex coll. AR, RGM.1008223; 7b, 1 spm, length 2.8 mm, Dongen (province of Noord-Brabant, The Netherlands), borehole B44G.0043, 175-176 m below surface, Oosterhout Formation – mollusc zone Mol D1, Pliocene (Piacenzian), RGM.937737.a; 8, apertural end Fig 7b, scale 100 micrometer; 9, apical end, scale 100 micrometer; 10, detail lower part tube Fig 7b, showing microscopic pitting, scale 50 micrometer.

Hab. Sutton, Cor. Crag. Mus. Brit. &c.
= *C. trachea*, Searles Wood, Crag. Moll. p. 115, pl. 20, f. 5 (? pars), non Mont. et auct.
[Shell slender, round, almost smooth or obsoletely annulated; aperture not constricted, with swollen ring; septum mamillate, more or less swollen; lateral sides (i.e. *hac specie dorsali* (Carpenter, 1858: 420) = observed from the dorsal side) convex, dorsal side inclined to being somewhat angular; operculum unknown. Length 2.79 mm, diameter 0.46-0.61 mm].

Remarks: Carpenter's measurements are in inches, 1.0 inch = 25.4 mm. According to Sclater (1893: 440), pages 413-432 of Carpenter's paper were published in 1858, and pages 433-448 in 1859. As *C. tumidum* was described on pages 426-427, the year of publication of this species is 1858.

Diagnosis. – A fossil *Caecum* with an entirely or partially transversely rugose tube; the septum elevated, hemispherical, obliquely truncated with a keel and the apertural end often with a varix. Sometimes microscopic pits, largest between the rugae. Length: 2.9 mm.

Revised description. – The adult shell is a minute, brittle, regularly curved tube. The surface of the shell usually bears, entirely or partially, irregular, rugose, ring-shaped, transverse thickenings (Figs 3-10). The tube and septum show an irregular pattern of microscopic pits, largest between the rugae (Marquet, 1997: 18, 28-29 fig. 3, 1998: 70 fig.; Figs 5-6, 8-10). The apical end is sealed by an elevated, more or less hemispherical septum, often somewhat obliquely truncated at the ventral side and cylindrical with a keel at the dorsal side (the keel is usually positioned at 12 o'clock to 3 o'clock, sometimes also weakly present around the rest of the septum; Figs 4, 7, 9). The apertural end

often shows a thickening or an elevated smooth ring preceding the edge of the aperture (Figs 4-5, 7-8; compare Van Regteren Altena et al., 1955 & 1965: pl. 6 fig. 58, as *C. imperforatum*). Dimensions of the longest specimen measured (Fig. 4b): length 2.93 mm, diameter 0.49 mm (apical end) - 0.62 mm (aperture); measured like L, d and D in fig. 2 of Porta et al. (1993: 3).

Locus typicus. – Sutton, Suffolk, United Kingdom
Stratum typicum. – Ramsholt or Sudbourne Member, Coralline Crag Formation, Pliocene (Late Zanclean).

Distribution. – *C. tumidum* is widely distributed in the Pliocene of the North Sea Basin, geographically from United Kingdom (Sutton, Suffolk) to Belgium (province of Oost-Vlaanderen) and The Netherlands (provinces of Zeeland and Noord-Brabant) and stratigraphically from Late Zanclean (Coralline Crag Formation, United Kingdom and possibly Luchtbal Member, Belgium) to Piacenzian (Oorderen Member, Belgium and Oosterhout Formation – mollusc zone Mol D1, The Netherlands).

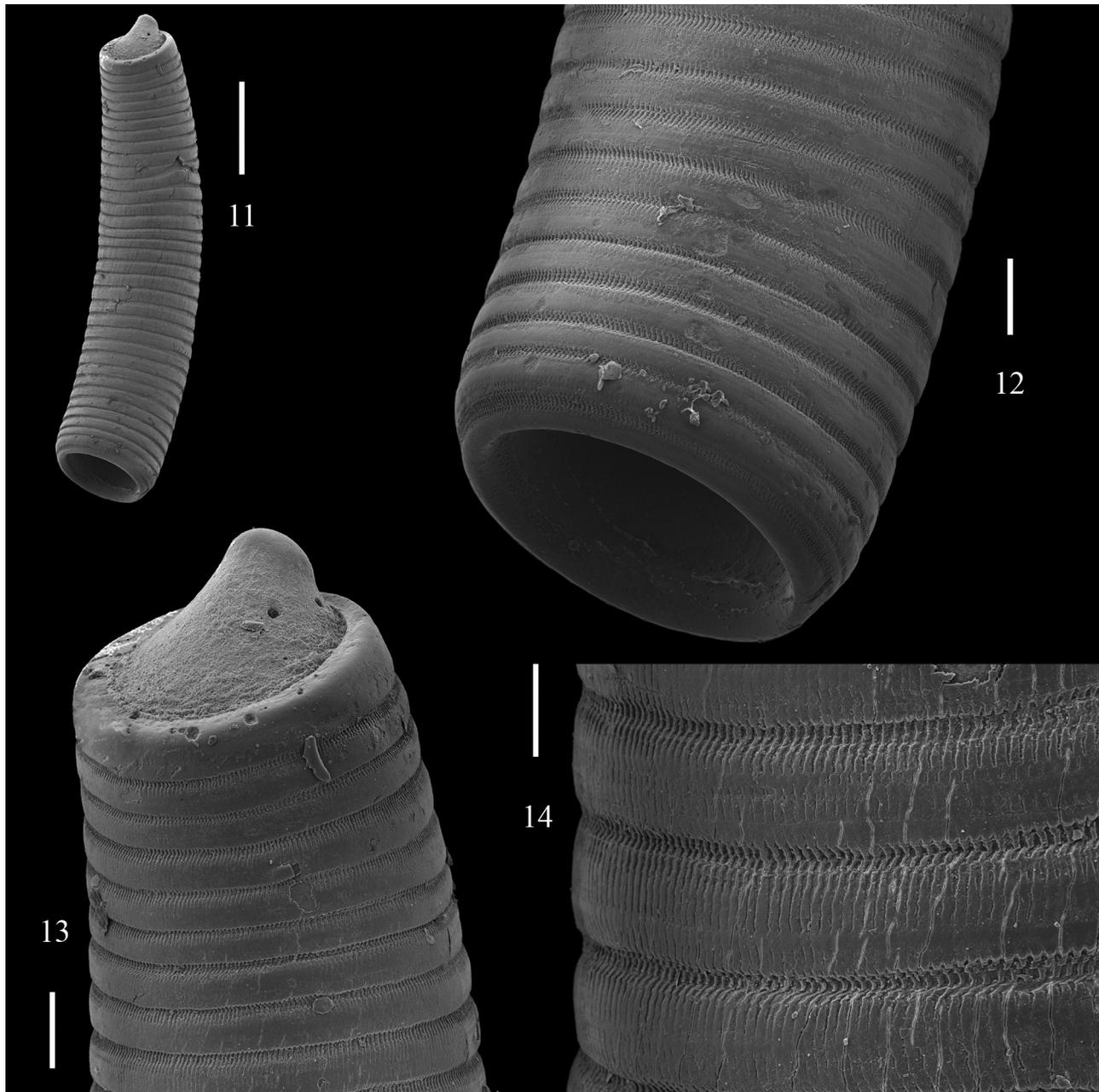
DISCUSSION

In the study of *C. tumidum* three other taxa play an important role, viz. *C. imperforatum* (Kanmacher, 1798), *C. trachea* (Montagu, 1803) and *C. mammillatum* Wood, 1848. According to WoRMS (consulted in July 2015) *C. imperforatum* has to be considered a *dubious synonym* of *C. trachea*.

Caecum trachea (Figs 11-14) occurs from the Miocene until the present day and is still a constituent of the Recent European and NW African fauna. The tube is entirely or partially covered with rings, the apical end with a somewhat sunken septum

	<i>C. tumidum</i> Figs 3-10	<i>C. trachea</i> Figs 11-14	<i>C. mammillatum</i> Figs 15-17
macrosculpture tube	entirely or partially with transversely rugose, ring-shaped thickenings	entirely, sometimes partially, covered with rings	entirely smooth or with some faint transverse ring-shaped thickenings
microsculpture tube	irregular pits	often longitudinal striae	often longitudinal striae
septum	elevated, hemispherical, obliquely truncated, with a keel	somewhat sunk, with a rounded mucro	sunk, with a narrow papilliform rounded mucro
apertural end	often with a thickening or an elevated smooth ring preceding the edge of the aperture	sometimes with a thickening preceding the edge of the aperture	sometimes with a thickening or an elevated smooth ring preceding the edge of the aperture, and/or a narrow engraved ring at some distance from the aperture
maximum length	2.9 mm	3.8 mm	3.4 mm

Table 1. *C. tumidum* shows consistent differences from *C. trachea* and *C. mammillatum*.

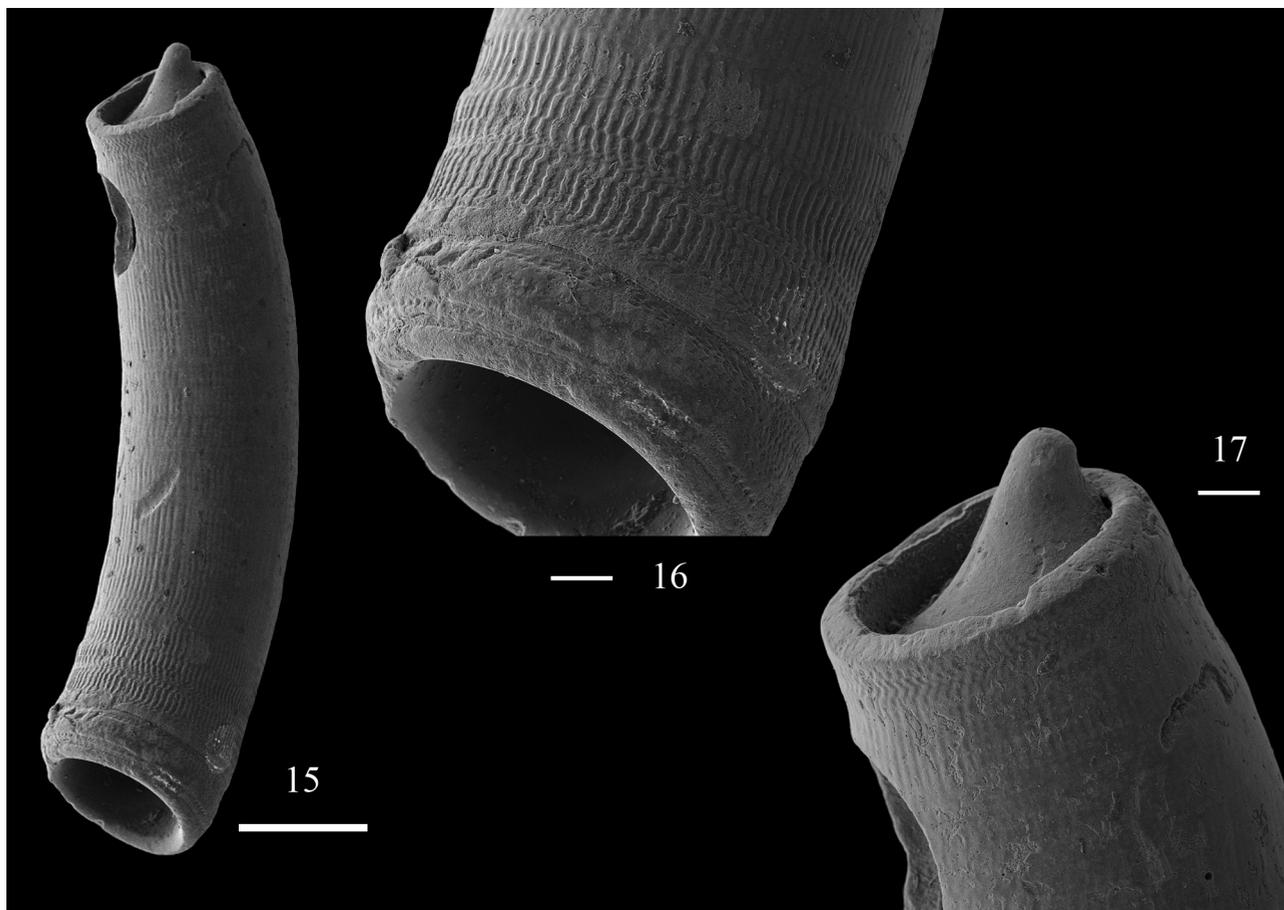


Figs 11-14. *Caecum trachea* (Montagu, 1803), 1 spm, length 2.8 mm, Martinhal beach, Algarve, S. Portugal, Recent, ex coll. G.J. Geuze, DH; **11**, scale 500 micrometer; **12**, apertural end, scale 100 micrometer; **13**, apical end, scale 100 micrometer; **14**, detail tube, showing microscopic longitudinal striae, scale 50 micrometer.

with a protruding, eccentric (12-1 o'clock), rounded mucro, the apertural end sometimes with a thickening preceding the edge of the aperture. Often a microsculpture of longitudinal striae. Length: 3.8 mm. (Van Aartsen, 1977: 15 figs 22-23, 17; Chirli, 2006: 66-68, pl. 28 figs 7-10; Chirli & Linse, 2011: 89, pl. 26 fig. 3a; Fretter & Graham, 1978: 233-234; Jeffreys, 1867: 75-77; Landau et al., 2004: pl. 14 fig. 1, 61-62; Van der Linden & Moolenbeek, 2000: 89-91 figs 27-28; Panetta, 1980: 288-289, 294-295 figs 4-6; Porta et al., 1993: 2-5 figs 1-9).

Caecum mammillatum (Figs 15-17) is a fossil *Caecum*

from Pliocene deposits in the North Sea Basin. The tube has a smooth surface, sometimes with some faint rings, the apical end with a sunken septum with a narrow, (often very) protruding, eccentric (12-1 o'clock), papilliform, rounded mucro, the apertural end sometimes with a thickening or an elevated smooth ring preceding the edge of the aperture, and/or a narrow engraved ring at some distance from the aperture (compare Van Regteren Altena et al., 1955 & 1965: pl. 6 fig. 56). Often a microsculpture of longitudinal striae. Length: 3.4 mm. (Wood, 1848: 116, pl. 20 fig. 4; Harmer, 1923: 847, pl. 64 fig. 31; Van Regteren Altena



Figs 15-17. *Caecum mammillatum* Wood, 1848, 1 spm, length 3.4 mm, showing microscopic longitudinal striae, Baarland beach, province of Zeeland, The Netherlands, Pliocene, ex coll. AR, RGM.1008222; **15**, scale 500 micrometer; **16**, apertural end, showing a varix, scale 100 micrometer; **17**, apical end, scale 100 micrometer.

et al., 1955: 29, 1965: 17, pl. 6 fig. 56; Hoeksema & Raad, 2015: 28 fig. 10). The septum looks somewhat like that of the Recent *Caecum vitreum* Carpenter, 1859 (Nofroni et al., 1997: 9 fig. 16).

The microsculpture on the tube of a *Caecum* shell, if present, is usually only visible on well preserved specimens. It can be observed on *C. tumidum*, *C. trachea* and *C. mammillatum* using oblique lighting at microscope magnifications greater than respectively 40x, 40x and 10x.

Considering the specimens of *C. tumidum* now present in the type series, the description of "*C. trachea*" sensu Wood (1848: 115-116, pl. 20 fig. 5) is not accurate in all respects. The observations "length 1/8 of an inch" (= about 3.18 mm) and "the closed termination precisely resembling the recent species in being obliquely truncated and obtusely pointed" are not correct. The figs 5 (with longitudinal striae, clearest visible between the rings) and 5a (a septum with rounded mucro) are reminiscent of *C. trachea*. In Carpenter's (1858: 427; 1859: 435) opinion the septum of fig. 5a probably fits within the range of variation of *C. mammillatum*, some forms like fig. 5a approaching

C. trachea. Most likely also fig. 9 of Hoeksema & Raad (2015: 28; as *C. trachea*) can be referred to such a specimen of *C. mammillatum* (here figured in Fig. 18). So Wood's fig. 5a may represent *C. trachea* or perhaps *C. mammillatum*, but not *C. tumidum*.

Studying surveys of the European and North African Caecidae, neither the present day fauna (Van Aartsen, 1977; Panetta, 1980; Nofroni et al., 1997; Van der Linden & Moolenbeek, 2000) nor other fossil faunas (Porta et al., 1993; Landau et al., 2004; Chirli, 2006; Chirli & Linse, 2011) contain a *Caecum* species matching *C. tumidum*. The septum of the present species, more or less hemispherical with a keel, most closely resembles that of *Caecum armoricum* De Folin, 1869, but the tube of that Recent species is smooth, with a delicate longitudinal microsculpture and without an apertural varix (Hoeksema & Segers, 1993: 81, 82 figs 1A-E 2A-D, 85, 87 fig. 7A-B). The irregular, rugose, ring-like transverse thickenings are reminiscent of *Caecum gougeroti* Moroni & Ruggiere, 1985, but the transverse thickenings on the surface of this Miocene-Pliocene species are mainly concentrated on the apical end of the tube and the septum of *C. gougeroti*



Fig 18. *Caecum* cf. *mammillatum* Wood, 1848. 1 worn spm, showing a *C. trachea*-like septum, length 2.7 mm, Domburg beach, province of Zeeland, The Netherlands, Pliocene, ex coll. M. Donze, RGM.794216.

shows a triangular, rounded mucro (Chirli, 2006: 63-64, pl. 27 figs 5-8).

Caecum tumidum seems, like *C. mammillatum*, to be restricted to the Pliocene of the North Sea Basin, the latter being the commonest species present. *C. glabrum* is relatively rare in the Pliocene of the North Basin (Wood, 1848: 117; Marquet, 1997: 18-19, 1998: 71), but remains a constituent of the NE Atlantic and North Sea fauna (Fretter & Graham, 1978: 234-235; De Bruyne et al., 2013: 205). A fourth Pliocene *Caecum*-species from the North Sea Basin, *Caecum liratum* Carpenter, 1858, is only known from the Coralline Crag Formation of Sutton by the holotype in the Natural History Museum (London, UK) and which requires re-study (Carpenter, 1858: 421). In contradiction to the distribution given by Chirli (2006: 67-68) and Chirli & Linse (2011: 89), we conclude that the presence of fossil *C. trachea* in the North Sea Basin still lacks convincing evidence.

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