

A NEW LATE MIOCENE SPECIES OF THE GENUS *TOLEDONIA* (GASTROPODA, DIAPHANIDAE) FROM NORTHERN GERMANY

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A new species of the diaphanid genus *Toledonia* Dall, 1902, *T. flensburgensis*, preserved in erratic boulders of late Miocene (Gramian) age from northern Germany, constitutes the first pre-Pleistocene record of this gastropod genus.

Key words — Mollusca, Gastropoda, Diaphanidae, Miocene, Gramian, Germany, new taxon.

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INTRODUCTION

According to Wenz (1959-1960, p. 36), the diaphanid genus *Toledonia* Dall, 1902 is known from the Arctic and Antarctic Pleistocene-Recent. This paper describes the first late Miocene representative of this genus from erratic boulders of Gramian (late Miocene) age. These boulders consist of fine-grained sands, and some of them contain small amounts of clay as well, and almost fifty percent contain very well-preserved molluscs. Some 10 years ago the excavation of these heavily worn erratic boulders started near Hüllerup, south of Flensburg (northern Germany), and isolated occurrences are known from the immediate vicinity. As early as 1966, I collected such a boulder near Flensburg-Weiche, close to Hüllerup, but at that time I was unable to identify it.

The age of these boulders is Gramian (late Miocene; Janssen, 1989, p. 121), its molluscan fauna, however, differing from that of the Gram Clay at Gram (Denmark). The fine-grained sandy boulders contain especially many gastropods and are as rich in species as

e.g. the Sternberger Gestein and Holsteiner Gestein. As these boulders are commonly found near Flensburg I have coined the name 'Flensburger Gestein' for them.

SYSTEMATIC DESCRIPTION

Order	Cephalaspeida Fischer, 1883
Family	Diaphanidae Brown, 1927
Genus	<i>Toledonia</i> Dall, 1902

Type species — *Toledonia perplexa* Dall, 1902.

***Toledonia flensburgensis* n. sp.**
Pl. 1, Figs 1, 2; Text-fig. 1

Derivatio nominis — After Flensburg, near which the type locality is situated.

Holotype — No. RGM 393 049 in the collections of the Nationaal Natuurhistorisch Museum at Leiden (The Netherlands; formerly Rijksmuseum voor Geologie en Mineralogie).

Locus typicus — Hüllerup, south of Flensburg, northern Germany.

Stratum typicum — erratic boulders of Gramian (late Miocene) age, contained in Pleistocene meltwater deposits.

Diagnosis — A diminutive, thin-shelled species of *Toledonia*, adult whorls showing tiny, crater-shaped pits.

Description — The shell is ovoid (slender variety being cylindrical) and only slightly higher than wide. The protoconch is heterostroph and sunken, under an angle of 160-165° to the shell's long axis, smooth and shiny, consisting of 1½ whorls, with the nucleus only slightly protruding. The boundary with the teleoconch is clearly marked by a ridge and by the onset of ornament (Pl. 1, Fig. 1).

The largest available specimen has an angular middle whorl. The depth of the suture causes the upper part of the whorl to form a rounded ledge, from which the whorl passes faintly rounded into the lower suture.

The ultimate whorl occupies *c.* 4/5 of total shell height, and passes rounded into the base. The growth lines have an opisthocline course, the sinus being found in the upper quarter of the ultimate whorl; elsewhere they proceed to the base in a broad convexity.

The aperture is elongate-oval, swung backwards in its upper part and filled with matrix in all available specimens. A small umbilicus is seen in a number of specimens. The thin outer lip follows the course of the growth lines, while the narrow inner lip is almost straight. To study the columella as well as the nucleus a number of less well-preserved specimens were broken. A columellar fold is absent; in a single specimen an almost vertical thickening is seen (Text-fig. 1a).

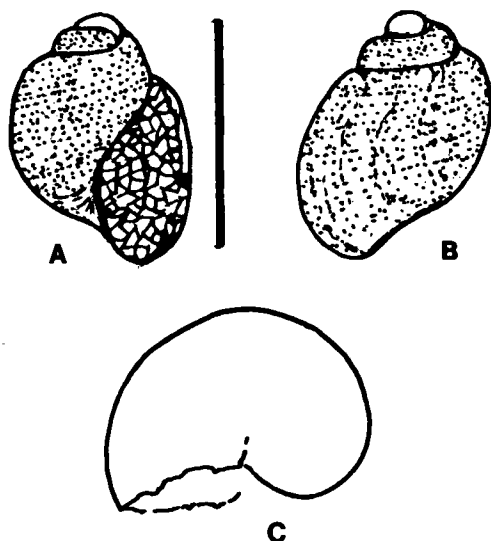


Fig. 1a-c. *Toledonia flensburgensis* n. sp.; a, b - paratype, Weinbrecht Collection, no. 1008, scale bar equals 1 mm; c - nucleus, Weinbrecht Collection, natural size 0.25 mm (specimen inadvertently destroyed).

The ornament consists of crater-shaped pits, arranged in spirals. Under the microscope it looks as if the spirals are interrupted by pits, but the photomicrographs (Pl. 1, Figs 1, 2) show its real nature.

Dimensions —

	height (mm)	width (mm)	W/H
- holotype			
RGM 393 049	0.85	0.7	0.82
- paratypes			
SMF 310424	1.0	0.8	0.8
SMF 310425	0.8	0.75	0.94
(4 specimens)	0.7	0.6	0.86
RGM 393 050	1.0	0.8	0.8
RGM 393 051	0.95	0.75	0.79
GPIM B 5	0.9	0.75	0.83
GPIM B 6	1.0	0.85 ?	0.85
author's coll. 1008	1.1	0.8	0.73
author's coll. 1009	0.55	0.5	0.91

(GPIM = Geologisches-Paläontologisches Institut der Universität Münster, Germany)

Discussion — The new species differs from the taxa listed below as follows:

- *Toledonia perplexa* Dall, 1902 (p. 513), a Recent species from the Strait of Magellan, east of Punta Arenas, has smooth whorls and attains a larger size;
- *Odostomiopsis typica* Thiele in Martens, 1903 (p. 68), Kerguelen (Recent), is larger and smooth;
- *Odostomiopsis circumrosa* Thiele in Martens, 1903 (p. 69), Kerguelen (Recent), is larger, with a shallow suture;
- *Ohlinia limnaeiformis* Strebel, 1905 (p. 597), Hope Harbour, Puerto Pantalon (Strait of Magellan, Recent), is larger and smooth;
- *Ptisanula limnaeoides* Odhner, 1913 (p. 329), fossil (Cainozoic strata at Kapellbacken, Uddevalla north of Göteborg, Sweden) and Recent (Spitzbergen), is larger, with only weak, irregular spirals on the central part of whorls.

Dell (1990, pp. 254-263) described a number of species from the Antarctic; the new species differs from these as follows:

- *Toledonia elata* Thiele, 1912 is larger and more slender, and lacks ornament;
- *Toledonia globosa* Hedley, 1916 is larger and has smooth whorls;

- *Toledonia limnaeaeformis* (Smith, 1817) is larger and has smooth whorls;
 - *Toledonia major* (Hedley, 1911) is a considerably larger and more slender species, its protoconch and first teleoconch whorl with rows of pits arranged in spirals, the other whorls with growth lines only;
 - *Toledonia striata* Thiele, 1917 is a larger and more slender species, with punctate spirals on the protoconch and first teleoconch whorl. The other adult whorls show weak spirals, which strengthen on the base;
 - *Toledonia punctata* Thiele, 1912 is a larger and much more slender species, its protoconch showing punctate spirals;
 - *Toledonia palmeri* Dell, 1990 is more slender and has a different apertural outline and spirals on the protoconch;
 - *Toledonia parelata* Dell, 1990 has a different outline, is much larger and more slender, with the protoconch showing punctate spirals, the adult whorls being smooth, only occasionally showing very fine, irregular spirals.
- Remarks** — With the exception of a single specimen, preserved in a small piece of rock, all other specimens were collected from washing residues of prepared samples.

The new species is easily overlooked on account of its small size. In view of the extreme fragility of the shell, complete specimens are rare. In overall shape, *T. flensburgensis* strongly resembles an immature specimen of the ringiculid genus *Ringicula* Deshayes, 1838 (Pl. 1, Fig. 3), in which the columella has broken off. As *R. buccinea* (Brocchi, 1814) occurs commonly in these boulders, very young specimens of this species are often ignored during preparation, which explains why for years I did not recognise the new diaphanid species described herein. However, *T. flensburgensis* is easily distinguished from immature ringiculids, which have different apertures, two well-developed columellar folds, prosocline growth lines, strong spiral sculpture and much thicker shells (Pl. 1, Fig. 3).

In all papers describing representatives of the genus *Toledonia* that I know of, the protoconch is not described in detail. Lemche (1948, p. 41) did not describe the apex of *T. limnaeoides* either, and despite the fact that on pp. 16-17 he provided illustrations of the heterostroph embryonic whorls of a number of cephalaspid species, none are given for species of *Toledonia* (Lemche, 1948, p. 16). It should be borne in mind that it is extremely difficult to prepare the embryonic whorls in such small shells; but a few of my attempts proved successful.

In the collection of Mr H. Moths (Geesthacht) is a small shell from the Gram Clay of Gram (Denmark), which on the basis of ornament as well as size might belong to *T. flensburgensis* (compare Text-fig. 2). Unfortunately, in this specimen the apex and aperture

have suffered from compaction, thus precluding a more detailed comparison. It is hoped that additional, better preserved specimens will be found in the Gram Clay in future. Only then will it be possible to decide whether or not these shells are conspecific with *T. flensburgensis*.

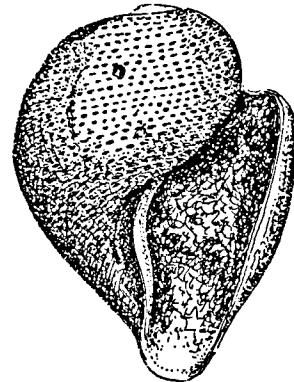


Fig. 2. Gastropoda indet., possibly conspecific with *Toledonia flensburgensis* n. sp., from the type Gramian (Gram Clay) at Gram (Denmark), H. Moths Collection (Geesthacht, Germany), actual size 0.56 mm.

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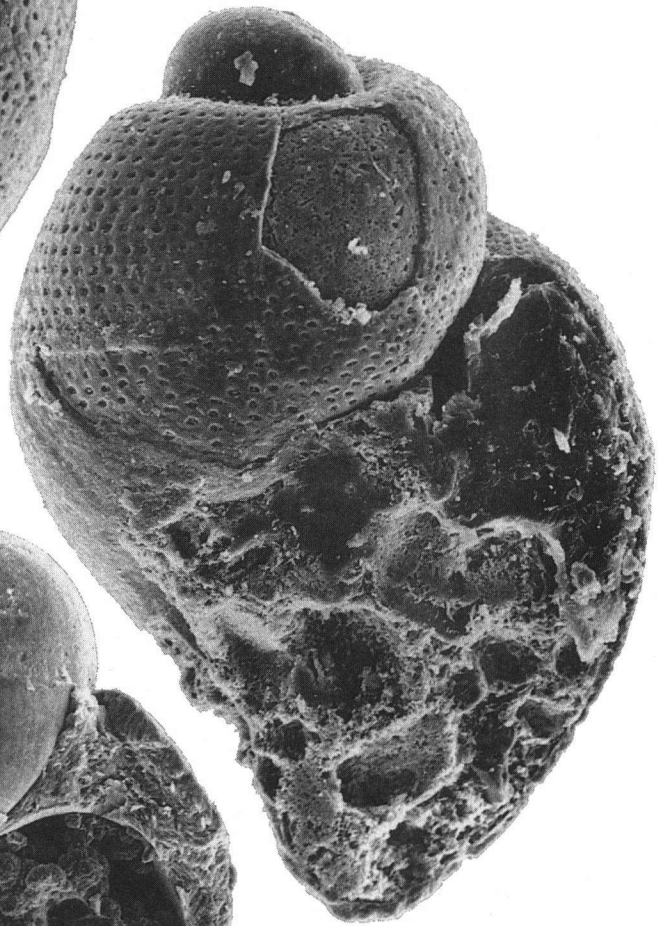
PLATE 1

- Figs 1, 2. *Toledonia flensburgensis* n. sp., 1 - holotype (RGM 393 049); 2 - paratype (RGM 393 050), from erratic boulders of late Miocene (Gramian) age, Hüllerup near Flensburg (northern Germany), x 160 (SEM).
- Fig. 3. Immature ringiculid gastropod (RGM 393 363) for comparison with *T. flensburgensis*, from erratic boulders of late Miocene (Gramian) age, Hüllerup near Flensburg (northern Germany), x 160 (SEM).

PLATE 1



1



2



3