FRAGMENTA PALAEONTOLOGICA HUNGARICA
Volume 36 Budapest, 2019 pp. 31–51

Muricidae (Neogastropoda) from the Middle Eocene of the Hungarian Paleogene Basin

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Abstract – A Middle Eocene (Lutetian–Early Bartonian) muricid assemblage with eight species is described and illustrated from the Hungarian Paleogene Basin. Three species and one genus are newly recorded in Hungary, and two new species are described: *Paziella* (*Flexopteron*) *zsoldosi* n. sp. and *Harmatia tokodensis* n. sp. With 31 figures.

Key words – Hungarian Paleogene Basin, Middle Eocene, Muricidae, new species

INTRODUCTION

The aim of this paper is to summarize the Middle Eocene Muricidae assemblage of the Hungarian Paleogene Basin system (HPB) as a contribution to the better understanding of the actual mollusc diversity of the region. Although several papers dealt with Eocene gastropods in Hungary, only two muricid species, ?*Pterochelus contabulatus gantensis* (Szőts) (= *Murex gántensis* Szőts) and *Nucellopsis dudariensis* (Strausz) [= *Cantharus* (*Pollia*) *dudariensis* Strausz, originally attributed to the Buccinidae], as well as a *Murex* sp. were illustrated in previous works. The Middle Lutetian–Bartonian mollusc assemblages of the HPB are similar to those of N Italy and NW France, so the lack of the Muricidae in the literature could be explained by extreme rarity and poor preservation. Middle Eocene muricids are also unknown in the adjacent regions except Ukraine (Zelinskaya *et al.* 1968; Makarenko & Zelinskaya 1982), they were not recorded in the Bulgarian, Czech, Polish, Romanian, Slovakian, and Slovenian literature (see e.g. Papšová 1972; Moisescu *et al.* 1991 and Mikuž *et al.* 2013 with additional references). In the Priabonian muricid specimens appear sporadically in Poland (Kuźniar 1910; Krach 1985) and Bulgaria (Karagiuleva 1964), while the family is relatively diverse in the Ukrainian Archipelago (Klushnikov 1958; Pacaud 2018).

During the last years new Eocene fossiliferous localities were exposed in W Hungary by fossil collectors, and occurrences of numerous previously unrecorded gastropods inclined us to revise the public collections (Hungarian Natural History Museum, Natural History Museum of the Eötvös University, Mining and Geological Survey of Hungary), as well as to search muricid specimens in the available private collections. As a result eight species are described and illustrated in this paper. Three species: *Timbellus barattus* (De Gregorio), *T. micropterus* (Deshayes), *T. priabonicus* Pacaud, and the typhinine genus *Typhina* are recorded for the first time in Hungary. In addition, two new species: *Paziella* (*Flexopteron*) *zsoldosi* n. sp. and *Harmatia tokodensis* n. sp. are designated.

The Alpine Tethys province became a deep sea during the Middle Lutetian sea transgression (Fig. 1A). The Middle–Late Eocene HPB (E Alpine Tethys) is a system of small sub-basins belonging to larger regions (Haas 2012). The studied sites are located in the NE Bakony Mts, the Vértes Hills and the Gerecse Mts regions (Fig. 1B).

The lithostratigraphy of the Eocene formations in Hungary was summarized by Kercsmár (2015). The Middle Eocene palaeogeography and the lithological formations of the Dudar-Balinka Basin (NE Bakony Mts) were treated by Báldi-Beke & Báldi (1990). The diverse uppermost Lutetian shallow marine sublittoral deposits of the area with clayey sand, nummulitic sandstone, and grey marl or siltstone (Csernye Formation) have yielded very rich invertebrate assemblages. Molluscs from the brown coal mine of Dudar were described by Strausz (1966, 1969, 1970*a*, *b*), Ozsvárt (2007), and Vicián *et al.* (2017), while from mines of Balinka by Kecskeméti-Körmendy (1980). The specimens illustrated in this paper from Dudar were collected on mine dumps and from a new opencast brown coal mining excavation (47° 17' 55" N, 17° 55' 31" E). Eocene formations of the Tés Plateau were not treated in detail in the literature, only outcrops of the Upper Lutetian–Bartonian nummulitic Szőc Limestone was mentioned west of Tés village. A new forest road cut locality north of Tés (47° 16' 22" N, 18° 01' 07" E) was discovered by Márton Zsoldos in 2016. The fossiliferous sandy clay belongs to the Csernye Formation, the solitary coral, brachiopod, and mollusc assemblages represent coastal to shallow marine palaeoenvironment.

Middle Eocene deposits of the Vértes Hills were discussed by Budai & Fodor (2008). The fossiliferous beds of the Gánt Depression (S Vértes) with grey silty clay or marl and thin coaly clay intercalations of lagoon or shallow marine origin represent the Upper Lutetian Forna Formation. Mollusc assemblages from the vicinity of Gánt were presented by Szőts (1953), Strausz (1962), Mihály & Vincze (1984), Dell'Angelo *et al.* (2015), and Pacaud & Vicián (2019). Gastropods of the Nagyegyháza-Mány Basin (NE Vértes) were studied by

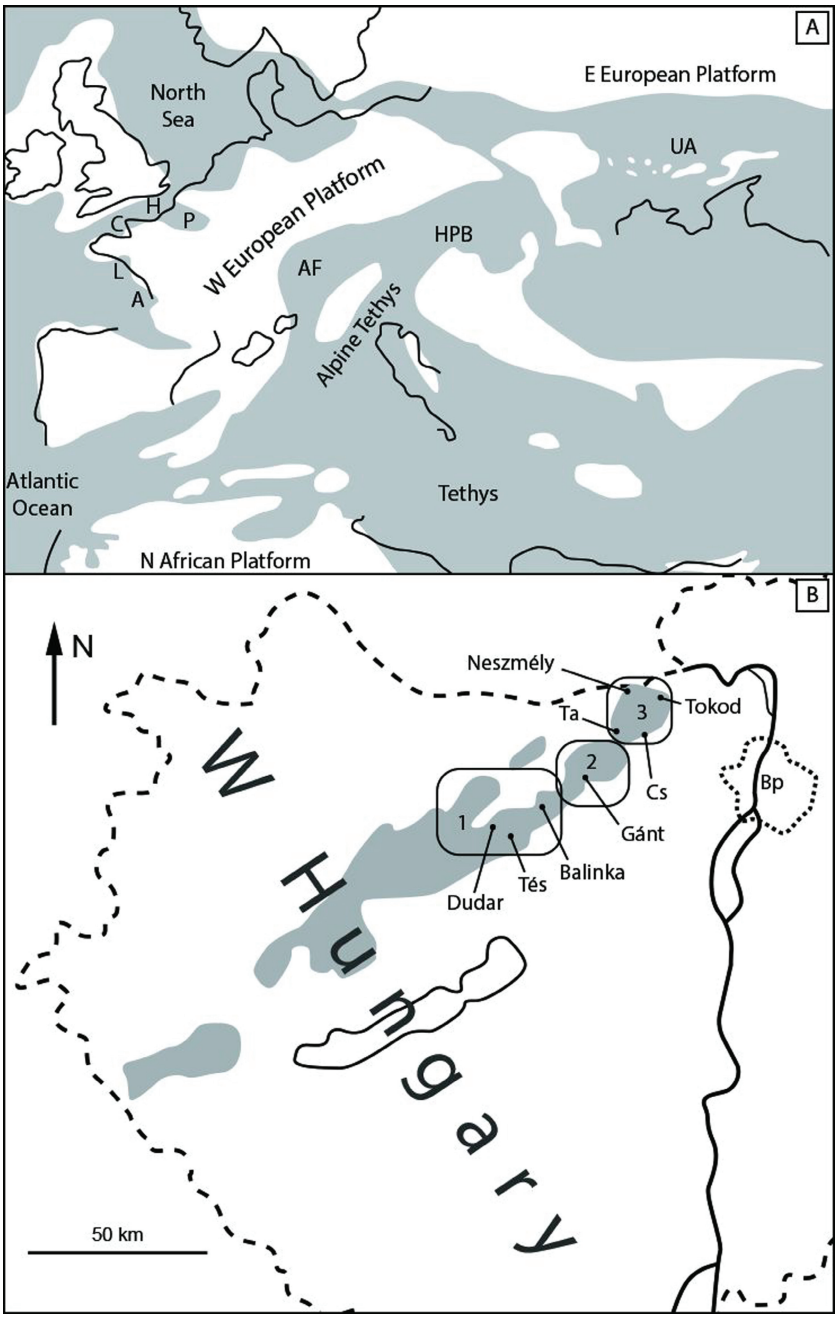


Fig. 1A. Middle Eocene palaeogeography of Europe with the location of the Hungarian Paleogene Basin (HPB) system. A = Aquitanian Basin; C = Cotentin Basin; H = Hampshire Basin; L = Loire Basin; P = Paris Basin; AF = Alpine Foredeep; UA = Ukrainian Archipelago (modified from Bitner *et al*. 2011). **1B.** Lutetian–Lower Bartonian deposits in the HPB, and the locations of the sites mentioned in the text. 1 = NE Bakony Mts; 2 = Vértes Hills; 3 = Gerecse Mts; Bp = Budapest; Cs = Csabdi; Ta = Tatabánya (modified from Haas 2012)

Kecskeméti-Körmendy (1990) from boreholes, and by Ozsvárt (1999) from the Csordakút opencast mine.

The Middle Eocene litho- and biostratigraphy of the Gerecse Mts were summarized by Budai (2018). All specimens studied herein derived from the deep neritic deposits of the Upper Lutetian–Lower Bartonian Csolnok Formation composed of grey clay, clay marl, and silt. The base of the Bartonian Stage in this formation cannot be delimited precisely as it is located within the NN16 Nannoplankton Zone. The Tekeres Creek locality close to Neszmély village (N Gerecse) was studied by Strausz (1974). The mollusc assemblage contains a rich gastropod fauna characterized by the dominance of small-size species. The geology of the Dorog Basin was treated by Less *et al.* (2000), mollusc faunas from boreholes and quarries in the vicinity of Tokod were described by Kecskeméti-Körmendy (1972). Gastropods in the Tatabánya Basin are known only in fauna lists (Szőts 1956).

MATERIALS AND METHODS

The studied materials are stored in the Hungarian Natural History Museum (HNHM), the Mining and Geological Survey of Hungary (MGSH), the International Fossil Shell Museum (IFSM) (the Netherlands), as well as in private collections of Tibor Berta (Veszprém), Zoltán Evanics (Mindszent), István Gurdon (Veszprém), Zoltán Vicián (Budapest), and Márton Zsoldos (Bakonynána), Hungary.

The Muricidae taxonomy and terminology follow Merle (2001, 2005*a*) and Merle *et al.* (2011). Abbreviations: SL – shell length (given in mm), P – primary spiral cord, D – apertural denticle.

SYSTEMATIC PALAEONTOLOGY

Clade Neogastropoda Wenz, 1938
Superfamily Muricoidea Rafinesque, 1815
Family Muricidae Rafinesque, 1815
Genus *Timbellus* De Gregorio, 1885
Type species: *Murex latifolius* Bellardi, 1872

Timbellus barattus (De Gregorio, 1895)
(Fig. 2)

1895 *Murex barattus* De Gregorio – De Gregorio, p. 10, pl. 1, fig. 14.
2011 *Timbellus barattus* (De Gregorio) – Merle *et al.*, p. 444, pl. 100, figs 1–2.

Material – Coll. Gurdon (1 specimen).

Remarks – The specimen figured here is very close in morphology to the *T. barattus* material presented by Merle *et al.* (2011, pl. 100, fig. 1). The species differs from other Middle Eocene *Timbellus* by rounded wide ovate aperture and straight siphonal canal. The presence in the Upper Lutetian deposits of Dudar extends both the geographic and the stratigraphic ranges of *T. barattus*. The species is a new record in the HPB.

Distribution – Lutetian, Hungarian Paleogene Basin: Dudar. Priabonian, NE Atlantic: Aquitanian Basin (France). Rupelian, Alpine Tethys: Bassano (N Italy).

Timbellus micropterus (Deshayes, 1835)
(Figs 3–7)

1835 *Murex micropterus* – Deshayes, p. 596, pl. 82, figs 3–4.
1880 *Murex* (*Pteronotus*) *parvulmicropterus* De Gregorio – De Gregorio, p. 96, pl. 7, fig. 54.
1910–1913 *Murex* (*Pteropurpura*) *micropterus* (Deshayes) – Cossmann & Pissarro, pl. 35, fig. 169/3.
2011 *Timbellus micropterus* (Deshayes) – Merle *et al.*, p. 448, pl. 102, figs 1–5.

Material – HNHM INV 2020.22. (1), Coll. Gurdon (1), Coll. Vicián (1), Coll. Zsoldos (1).

Remarks – The specimens are rather worn or fragmentary but the shell proportions and traces of spiral cords agree with the *T. micropterus* material illustrated by Merle *et al.* (2011, pl. 102, figs 1–5). The type of *Murex parvulmicropterus* De Gregorio is a fragmentary juvenile specimen. It corresponds in size and morphology to *T. micropterus* but slightly differs in sculpture with weakly developed intervarical nodes. *M. parvulmicropterus* was proposed as a junior synonym of *T. micropterus* by Merle *et al.* (2011), this arrangement is accepted herein. The small Late Eocene–Early Oligocene *Timbellus rigidus* (Oppenheim, 1901) (recorded from N Italy, S Czechia and S Poland) is a similar species but distinguishable by stratigraphic range and axial sculpture of marked, narrow intervarical ribs (see Oppenheim 1901, pl. 1, fig. 1; Oppenheim 1922, pl. 5, fig. 6; Krach 1985, pl. 9, figs 8–10). *T. micropterus* is a new record in the HPB.

Distribution – Lutetian–Bartonian, NE Atlantic: Paris, Cotentin, and Loire Basin (France), Hampshire Basin (England), Alpine Tethys: San Giovanni Ilarione (N Italy), Hungarian Paleogene Basin: Dudar, Gánt, Tés.

Timbellus priabonicus Pacaud, 2018
(Figs 8–10)

1889 *Murex trialatus* – Koenen, p. 45, pl. 2, figs 1–3 (non *Murex trialatus* G. B. Sowerby, 1834)
1968 *Typhis schlotheimi* – Zelinskaya *et al.*, pl. 14, figs 13–14.
2018 *Timbellus priabonicus* nom. nov. for *Murex trialatus* Koenen, 1889 – Pacaud, p. 111, fig. 4/E-G.

Material – HNHM INV 2020.23.1–2. (2), Coll. Vicián (3).

Remarks – The morphology of the studied specimens (trivaricate shell, paucispiral protoconch, six rounded teleoconch whorls, long and straight siphonal canal, moderately developed spiral cords: 10–11 on the last whorl, wing-like varices, one fine intervarical rib between the varices) correspond to that of *T. priabonicus*. Other *Timbellus* species also appear in the Middle Eocene Alpine Tethys. From N Italy *T. tripteroides* (Lamarck, 1822) (= *Murex stoppani* De Gregorio, 1880) is known, while *T. crenulatus tricarinatus* (Lamarck, 1803) was recorded by Dainelli (1915) and Fabiani (1915). *T. crenulatus tricarinatus* otherwise shows a wide geographic distribution: NE Atlantic (France, Merle *et al.*

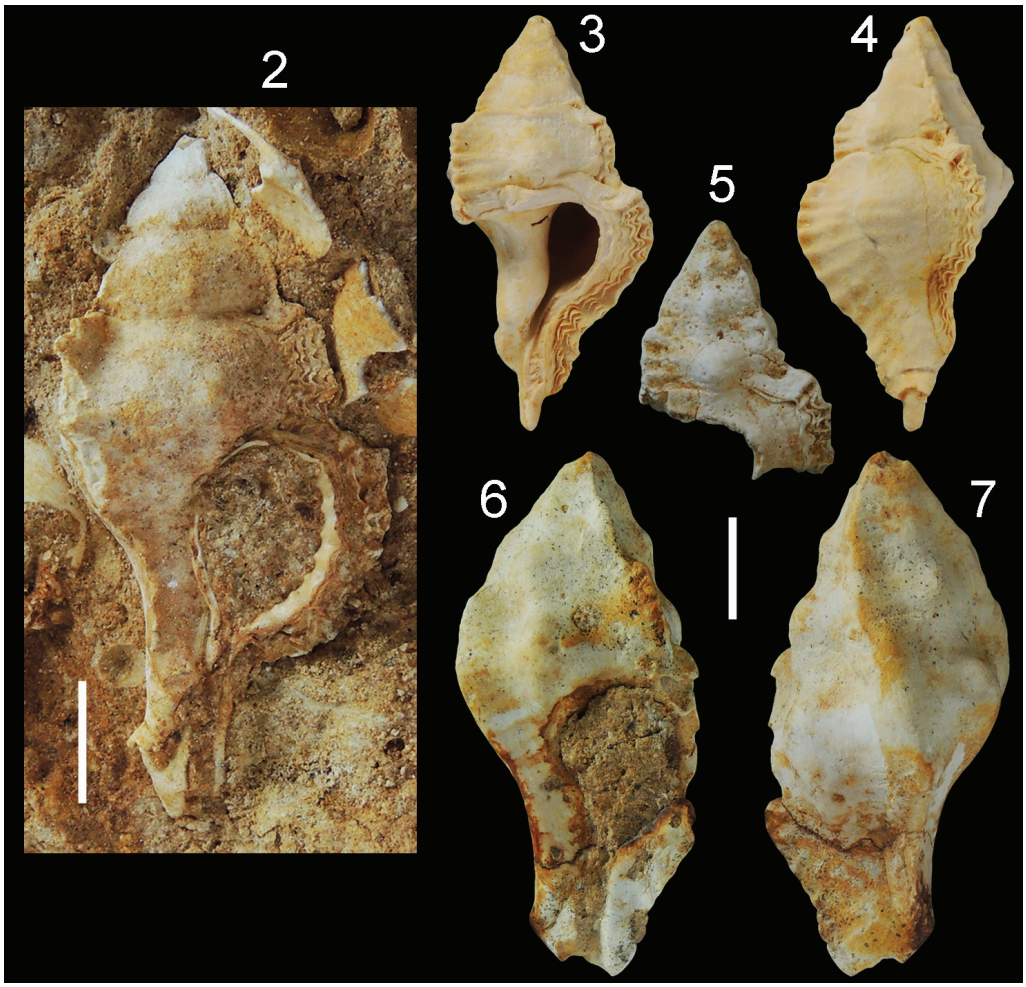
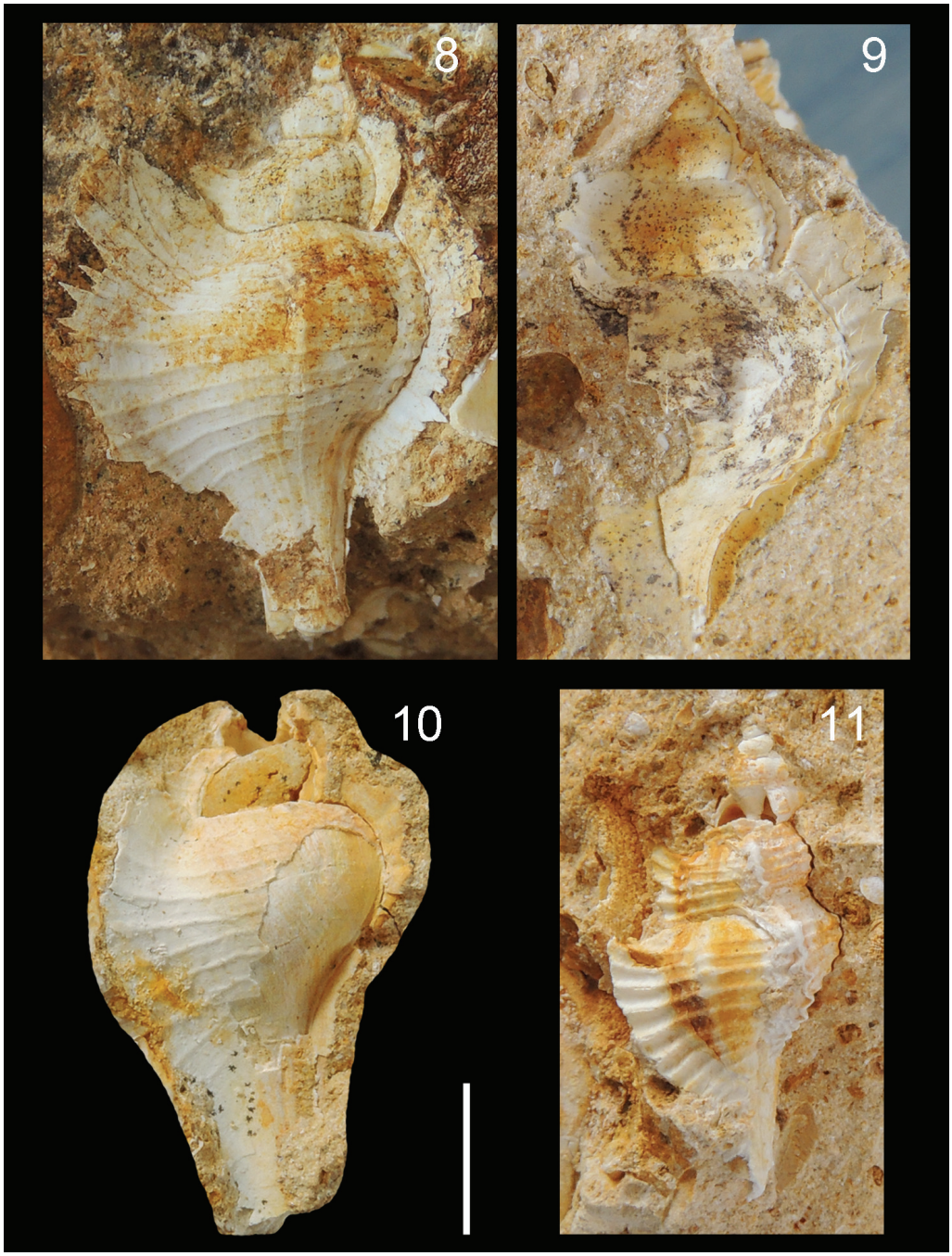


Fig 2. *Timbellus barattus* (De Gregorio), Coll. Gurdon, Dudar, SL 28, apertural view. – **Figs 3–7.** *Timbellus micropterus* (Deshayes). – **Figs 3–4.** Coll. Vicián, Gánt, SL 22. – **Fig. 3.** Apertural view. – **Fig. 4.** Abapertural view. – **Fig. 5.** HNHM INV 2020.22., Tés, SL 13, lateral view. – **Figs 6–7.** Coll. Gurdon, Dudar, SL 26. – **Fig. 6.** Apertural view. – **Fig. 7.** Abapertural view. Scale bar: 5 mm



Figs 8–10. *Timbellus priabonicus* Pacaud. – **Fig. 8.** Coll. Vicián, Dudar, SL 19, abapertural view. – **Fig. 9.** Coll. Vicián, Dudar, SL 20, abapertural view. – **Fig. 10.** HNHM INV 2020.23.1., Dudar, SL 18, abapertural view. – **Fig. 11.** ?*Pterochelus contabulatus gantensis* (Szőts), Coll. Vicián, Dudar, SL 16, abapertural view. Scale bar: 5 mm

2011; England, Tracey *et al.* 1996), North Sea Basin (Belgium, Glibert 1933), NE Alpine Tethys (Tatra Mts, Poland, Kuźniar 1910), Ukrainian Archipelago (Makarenko & Zelinskaya 1982). The specimen illustrated by Zelinskaya *et al.* (1968, pl. 15, figs 13–14) as *Typhis schlotheimi* from the Late Eocene of Ukraine is identical in morphology with the *Murex trialatus* specimen figured by Koenen (1889, pl. 2, fig. 3), therefore it represents *Timbellus priabonicus*. The presence of *T. priabonicus* in the Late Lutetian HPB extends both the stratigraphic and the geographic ranges of the species.

Distribution – Lutetian, Alpine Tethys: Hungarian Paleogene Basin: Dudar. Priabonian, North Sea Basin (Germany), Ukrainian Archipelago.

Genus *Pterochelus* Jousseaume, 1880
Type species: *Murex acanthopterus* Lamarck, 1816

?*Pterochelus contabulatus gantensis* (Szőts, 1953)
(Figs 11–16)

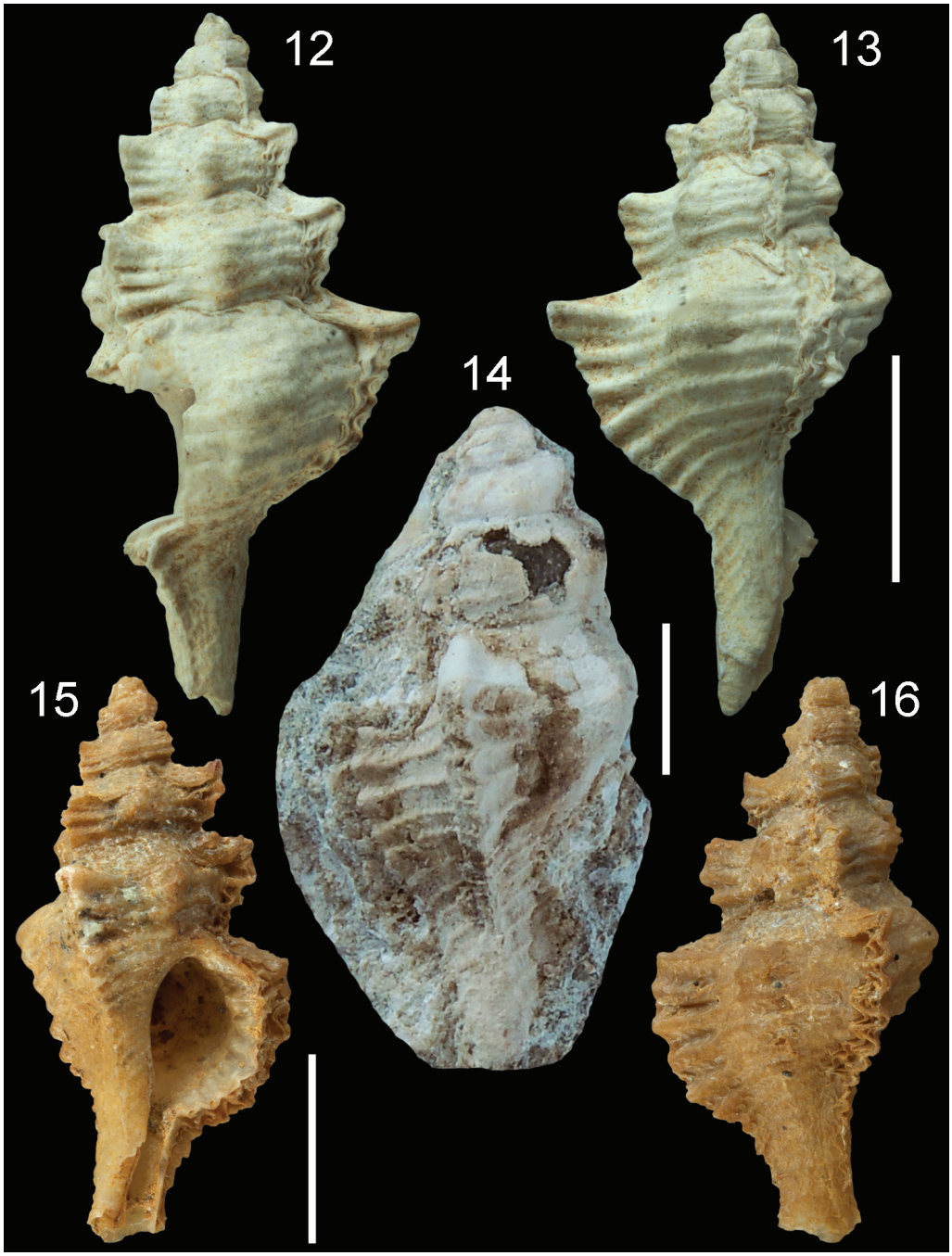
v 1953 *Murex gántensis* (sic.) nov. sp. – Szőts, p. 181, pl. 6, figs 3–5.
v 1974 *Murex* (*Pterynotus*) *contabulatus gantensis* Szőts – Strausz, p. 118, pl. 3, figs 1–2.
2020 *Pterochelus contabulatus* – Dulai, p. 200, fig. E.

Material – MGSH: E.125 (holotype), E.126 (2), E.5194 (1), E.5207 (1), E.5270 (7), E.5285 (6), E.5514 (2), E.5905 (1); HNHM: M.59.7443 (>70), M.59.7444 (10), M.61.2423 (2), INV 2020.24. (1); Coll. Berta (4), Coll. Evanics (1), Coll. Zsoldos (2), Coll. Vicián (1).

Remarks – The "exceptional" similarity between *Murex contabulatus* Lamarck, 1803 and *M. gantensis* nov. sp. was already noted by Szőts (1953). Later Strausz (1974) revised *gantensis*, and emended it as a subspecies of ?*P. contabulatus*. Based on morphological differences (the teleoconch whorls of *gantensis* are more constricted at the base and the spines are slightly more curved than that of *contabulatus*, see Merle *et al.* 2011, pl. 115, figs 5–9) the arrangement suggested by Strausz is accepted herein, and ?*P. contabulatus gantensis* is regarded as a geographic subspecies. "*Murex*" *contabulatiformis* Schauroth, 1865 from the Italian Eocene is a similar form but differs by more angulate whorls. ?*P. contabulatus gantensis* is widespread and relatively abundant in the HPB.

Distribution – Lutetian–Bartonian, Hungarian Paleogene Basin: Dudar, Gánt, Csákvár, Tés, Balinka, Mesterberek, Neszmély, Tatabánya/Felsőgalla.

Genus *Paziella* Jousseaume, 1880
Subgenus *Flexopteron* Shuto, 1969
Type species: *Flexopteron philippinensis* Shuto, 1969



Figs 12–16. ?*Pterochelus contabulatus gantensis* (Szőts). – **Figs 12–13.** MGSH E.125, holotype of *Murex gantensis* Szőts, Gánt, SL 15.4, lateral views. – **Fig. 14.** Coll. Zsoldos, Balinka, SL 22, lateral view. – **Figs 15–16.** HNHM M.61.2423., Tatabánya/Felsőgalla, SL 15. – **Fig. 15.** Apertural view. – **Fig. 16.** Abapertural view. Scale bar: 5 mm

Paziella (*Flexopteron*) *zsoldosi* n. sp.
(Figs 17–21)

1990 *Murex* sp. – Kecskeméti-Körmendy, p. 164, pl. 29, figs 5–6.

Holotype – HNHM PAL 2020.20.1., SL 13 (Figs 19–20).

Type strata and locality – Upper Lutetian sandy clay, Tés, Hungary.

Derivation of name – In honour of the collector: Márton Zsoldos (Bakonynána, Hungary).

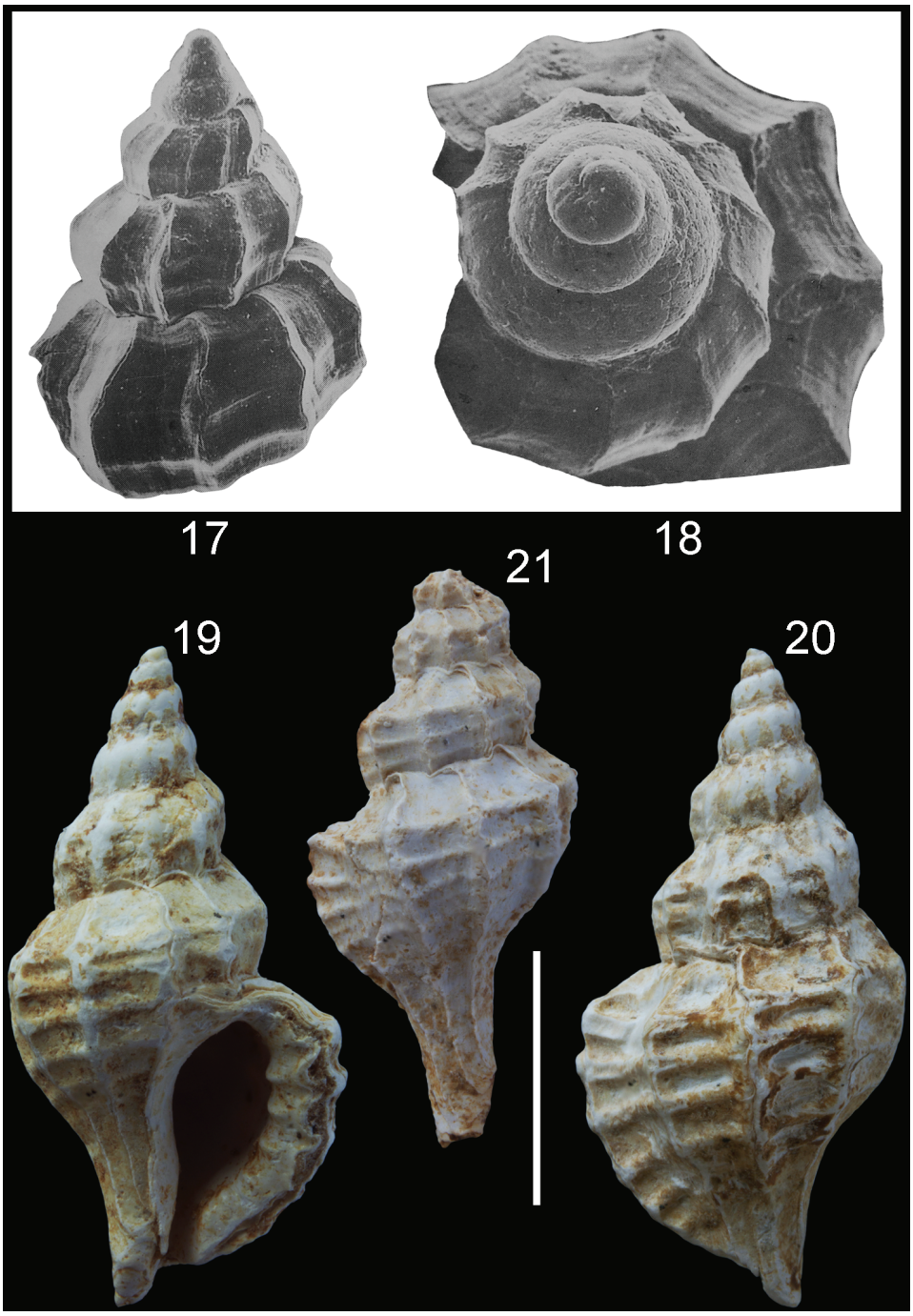
Material – Holotype and two additional specimens (Figs 17–18, 21).

Diagnosis – *Paziella* (*Flexopteron*) species with multispiral protoconch and five teleoconch whorls, ovate aperture with strong denticles within, smooth columella, sculpture of strong spiral cords and numerous axial varices.

Description – Multispiral protoconch of 3 1/4 smooth, rounded whorls, five shouldered teleoconch whorls, elongated spire, broad subsutural slope, ovate aperture, outer lip thickened by growth lamellae, strong denticles within (D1–D5; D1–D3 stronger than D4–D5), weakly developed parietal callus, smooth columella, elongated and slightly curved siphonal canal, spiral sculpture of strong primary cords (P1–P6 on the last whorl), axial sculpture of numerous sharp varices (eight on the last whorl).

Remarks – Based on morphology the new species is assigned to subgenus *Paziella* (*Flexopteron*). The fragmentary *Murex* sp. from the shallow marine deposits of borehole Cs.115 at Csabdi (Kecskeméti-Körmendy 1990, pl. 29, figs 5–6; refigured on Figs 17–18) is considered herein as a representative of *P.* (*F.*) *zsoldosi* n. sp. (unfortunately this specimen is not available in the mollusc collection of the MGSH). According to Kecskeméti-Körmendy (l. c.) the smooth, multispiral protoconch, the rounded early teleoconch whorls, as well as the weakly developed primary spiral cords and the sharp axial varices are closely allied to that of *P.* (*F.*) *flexuosa* (Deshayes). However, these features are common on different Eocene species of the subgenus, consequently the species level determination depends on the adult morphology. The adult shell of *P.* (*F.*) *zsoldosi* n. sp. is distinguishable from the Early Eocene *P.* (*F.*) *flexuosa* (Deshayes, 1865) and *P.* (*F.*) *ogormani* (Cossmann, 1923) by much stronger spiral cords and lack of spines; from the Middle Eocene *P.* (*F.*) *foliacea fraterculus* (Deshayes, 1865) by elongated spire, more widely spaced varices and lack of spines, and from the Middle Eocene *P.* (*F.*) *elatior* (Koenen, 1889) by less elongated shell and different sculpture (see Merle *et al.* 2011, pls 135–138). The teleoconch whorls of *Paziella* (*Flexopteron*) sp. specimens from Tés (Figs 20–22) are broader, they represent another species.

The material came from the sandy clay deposits of the Tés locality. It was associated by coastal to shallow water gastropods: *Pseudobellardia auriculata*



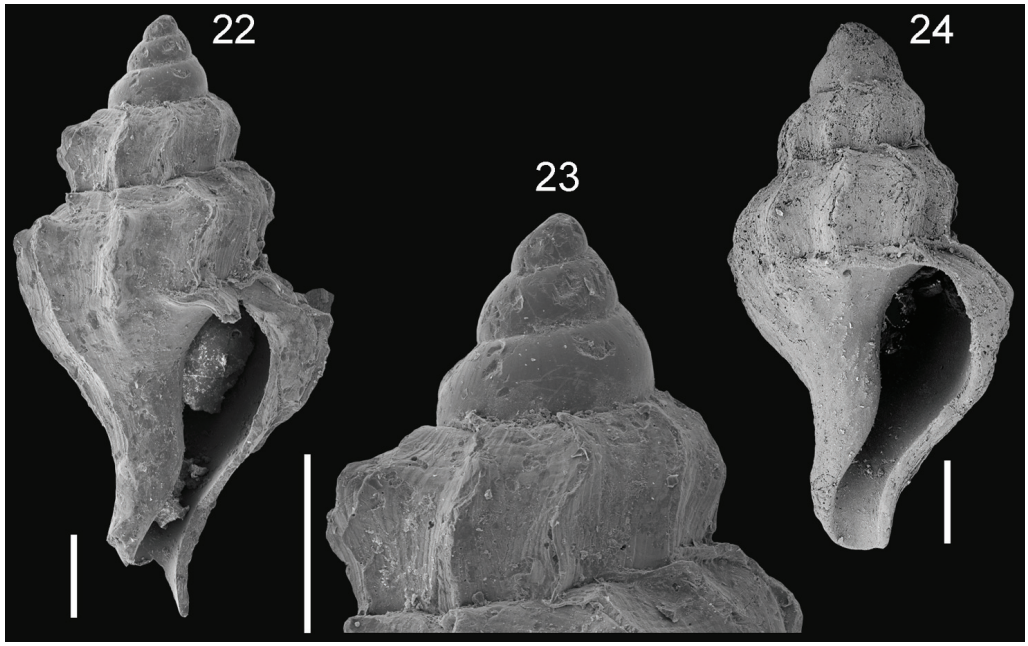
Figs 17–21. *Paziella* (*Flexopteron*) *zsoldosi* n. sp. – **Figs 17–18.** Csabdi, SL unknown. – **Fig. 17.** Lateral view. – **Fig. 18.** Apical view (refigured from Kecskeméti-Körmendy 1990, pl. 29, figs 5–6). – **Figs 19–20.** HNHM PAL 2020.20.1., holotype, Tés, SL 13. – **Fig. 19.** Apertural view. – **Fig. 20.** Abapertural view. – **Fig. 21.** Coll. Zsoldos, Tés, SL 11.4, abapertural view. Scale bar: 5 mm

(Schlotheim, 1820), *Tympanotonos aculeatus* (Schlotheim, 1820), *Cerithium subcorvinum* Oppenheim, 1894, *Editharus roncanus* (Brongniart, 1823), *Ampullina perusta* (Defrance in Brongniart, 1823), *Deshayesia alpina* (d'Orbigny, 1850), *Stilospirula doroghensis* (Oppenheim, 1892), *Tectonatica pasinii* (Bayan, 1870), *Globularia incompleta* (Zittel, 1862), *Clavilithes noae* Lamarck 1803, *Dilatilabrum fortisi* (Brongniart, 1823), *Timbellus micropterus* (Deshayes), ?*Pterochelus contabulatus gantensis* (Szőts), *Paziella* (*Flexopteron*) sp., *Janiopsis* n. sp. and *Hemiconus eszterhazyi* (Papp, 1897).

Paziella (*Flexopteron*) sp.
(Figs 22–24)

Material – HNHM INV 2020.25., INV 2020.26. (2).

Remarks – The juvenile specimens from the Late Lutetian mollusc assemblage of Tés possess multispiral protoconch, sculpture of seven varices on the last whorl, and slightly spiny P1. These features are typical of *P.* (*Flexopteron*). However, early whorls of different Eocene species of the subgenus are very similar (see above), and the species level identification seems impossible in lack of adult morphology. Nevertheless, the specimens indicate diverse occurrence of the subgenus in the Middle Eocene HPB.



Figs 22–24. *Paziella* (*Flexopteron*) sp. – **Figs 22–23.** HNHM INV 2020.25., Tés, SL 3.6, apertural views. – **Fig. 24.** HNHM INV 2020.26., Tés, SL 3.2, apertural view (Photos: A. Dulai). Scale bar: 500 μm

Genus *Harmatia* Noszky, 1940
Type species: *Murex* (*Harmatia*) *stephani* Noszky, 1940

Harmatia tokodensis n. sp.
(Fig. 25)

2020 *Harmatia* sp. – Dulai, p. 202, fig. G.

Holotype – HNHM M.62.7135, SL 72 (P1 spine not included) (Collected by Endre Szőts in 1956).

Type strata and locality – Upper Lutetian–Lower Bartonian grey marl, Tokod, Hungary.

Derivation of name – The name refers to the type locality.

Material – Holotype.

Diagnosis – Trivaricate *Harmatia* species with rounded teleoconch whorls, ovate aperture, long siphonal canal, narrow primary spiral cords, and long primary cord spines.

Description – Medium-sized shell, protoconch missing, subfusiform teleoconch. Spire of three shouldered, rounded whorls. Last whorl 89% of the total length of the preserved shell (without P1 spine). Aperture ovate, internal part not seen. Siphonal canal without cord spines, long, narrow and slightly curved, penultimate siphonal canal present. Spiral sculpture of moderately developed, narrow primary cords (P1–P4 visible on last whorl), axial sculpture of three spiny varices per whorl without intervarical ribs. Well-developed, long and open P1–P6 spines on last whorl, P1 spine slightly adapically curved, no intervarical ribs.

Remarks – The morphology of the new species corresponds to the diagnosis of genus *Harmatia* (see Merle *et al.* 2011). The genus has been known from the Early Oligocene in Hungary and Austria with two species; the Middle Eocene occurrence of *H. tokodensis* n. sp. extends the stratigraphic range. Both *H. stephani* (Noszky 1940, pl. 2, fig. 4; refigured by Merle *et al.* 2011, text-fig. 63/1), and *H. guembeli longispina* (Noszky 1940, pl. 1, fig. 31; refigured by Merle *et al.* 2011, text-fig. 63/2) (Kiscellian, Budapest Újlak) are distinguishable by much lower spire, and *H. stephani* bears almost straight siphonal canal. The spire and sculpture of *H. guembeli guembeli* (Dreger) (Kiscellian, Bad Häring, Budapest Újlak) resemble that of *H. tokodensis* n. sp., the former, however, differs by strongly curved long siphonal canal. This feature cannot be seen on the fragmentary type specimen (Dreger 1892, pl. 4, fig. 5; refigured by Löffler 1999, pl. 12, fig. 1, and Merle *et al.* 2011, text-fig. 63/3), but clearly visible on other specimens illustrated by Löffler (1999, pl. 12, figs 2–5).

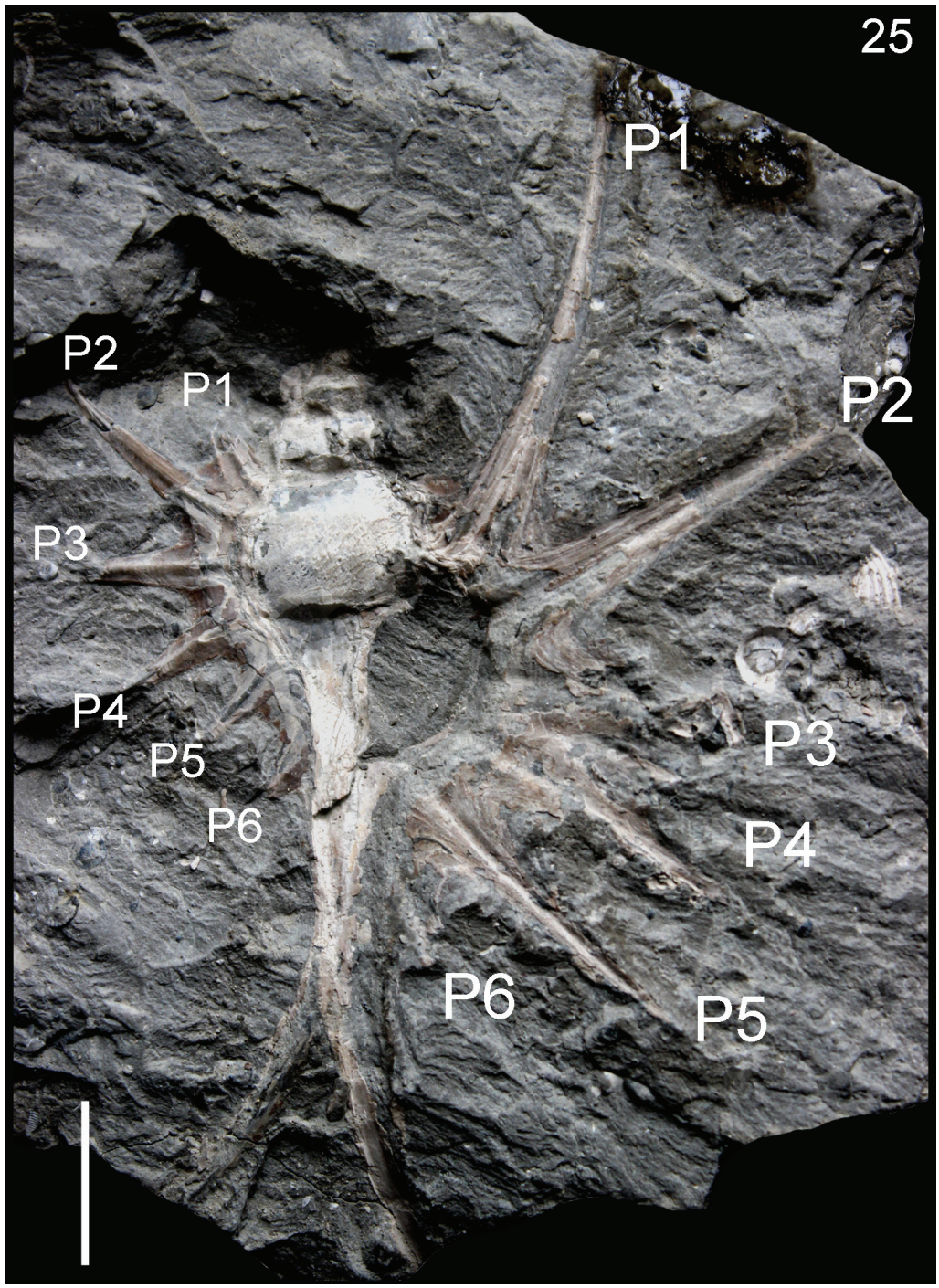


Fig. 25. *Harmatia tokodensis* n. sp., HNHM M.62.7135., holotype, Tokod, SL 72, apertural view (Photo: M. Szabó). Scale bar: 10 mm

Genus *Ponderia* Houart, 1986
Type species: *Typhis zealandicus* (Hutton, 1873)

Ponderia bispinosa (J. de C. Sowerby, 1823)
(Figs 26–27)

1823 *Murex bispinosus* – J. de C. Sowerby, p. 15, pl. 416, fig. 2.
1865 *Murex Caillati* – Deshayes, p. 316, pl. 87, figs 24–26.
1910–1913 *Murex* (*Alipurpura*) *bispinosus* (Sowerby) – Cossmann & Pissarro, pl. 35, fig. 169/6.
2011 *Ponderia bispinosa* (J. de C. Sowerby) – Merle *et al.*, textfig. 52/D–E, p. 484, pl. 120, figs 4–7, pl. 121, figs 1–5.

Material – IFSM: 62756 (1).

Remarks – A fragmentary specimen is illustrated on the website of the International Fossil Shell Museum as *Ponderia caillati* (www.fossilshells.nl/hungeo40.html; download: 02.10.2019), it was collected by Rudi Hessel on the mine dump of the old brown coal mine of Dudar. The size (SL 31) and the general morphology agree well with that of the *P. bispinosa* material presented by Merle *et al.* (2001). *Murex caillati* Deshayes is a junior synonym of *M. bispinosus* J. de C. Sowerby.

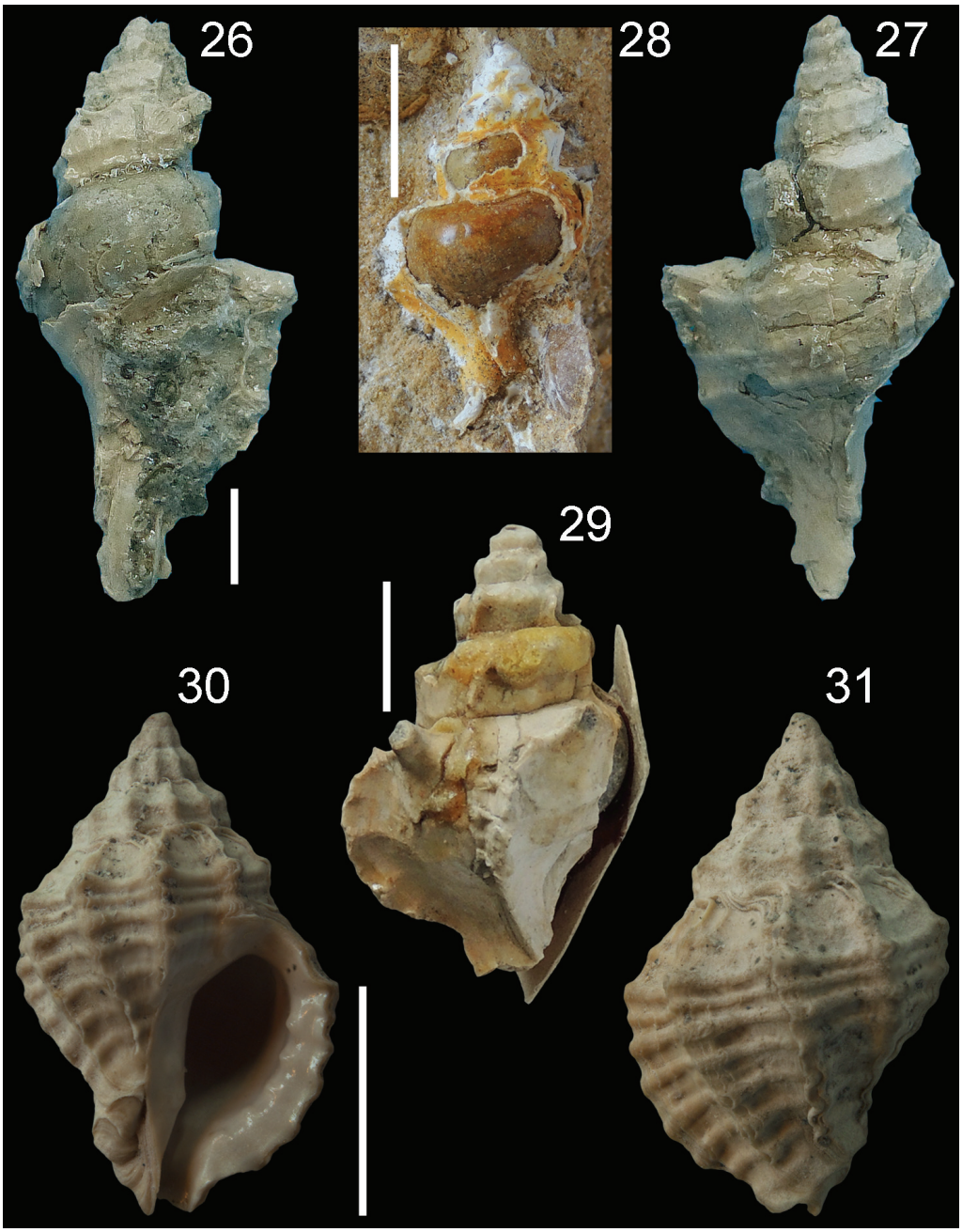
Distribution – Lutetian–Priabonian, NE Atlantic: Paris Basin (France), Hampshire Basin (England), North Sea Basin (Germany), Alpine Tethys: Hungarian Paleogene Basin: Dudar.

Genus *Typhina* Jousseaume, 1880
Type species: *Typhis belcheri* Broderip, 1833

Typhina sp.
(Fig. 29)

Material – HNHM: M.62.1218.

Remarks – Two fragmentary specimens in the gastropod assemblage of Dudar belong to the subfamily Typhinae. The very poor preservation of the specimen on Figure 28 does not allow generic assignment, the other one represents genus *Typhina* (Fig. 29). The poor preservation, however, prevents the species level determination, as the investigation of the protoconch is necessary to the identification of typhinine species (Merle & Pacaud 2019). The genus is widespread in the Eocene NE Atlantic province; it is recorded for the first time in the HPB.



Figs 26–27. *Ponderia bispinosa* (Sowerby), IFSM INV 62756, Dudar, SL 31. **Fig. 26.** Apertural view. – **Fig. 27.** Abapertural view (Photo: R. Hessel). – **Fig. 28.** Typhinae sp. indet., Coll. Vicián, Dudar, SL 12, abapertural view. – **Fig. 29.** *Typhina* sp., HNHM M.62.1218., Dudar, SL 18, abapertural view. – **Figs 30–31.** *Nucellopsis dudariensis* (Strausz), MGSH E.467, holotype of *Cantharus* (*Pollia*) *dudariensis* Strausz, Dudar, SL 11. – **Fig. 30.** Apertural view. – **Fig. 31.** Abapertural view. Scale bar: 5 mm

Genus *Nucellopsis* Merle, 2005
Type species: *Murex plicatilis* Deshayes, 1835

Nucellopsis dudariensis (Strausz, 1966)
(Figs 30–31)

v 1966 *Cantharus* (*Pollia*) *dudariensis* n. sp. – Strausz, p. 130, pl. 15, figs 6–7.
2005*b* *Nucellopsis dudariensis* (Strausz) nov. comb. – Merle, 183.

Material – MGSH: E.467 (Holotype).

Remarks – *Cantharus* (*Pollia*) *dudariensis* Strausz was revised and reinterpreted as a representative of genus *Nucellopsis* by Merle (2005*b*). The genus is typical of coastal or lagoon environments. *N. dudariensis* is an endemic species in the HPB and very rare, only the holotype is known from the type locality, Dudar. The Bartonian specimens in the Paris Basin described by Merle (2005*b*) as *N. dudariensis* differ in morphology; they probably represent a new *Nucellopsis* species (D. Merle's personal communication). Concerning another appearance of *Nucellopsis* in the Alpine Tethys, a specimen was recorded by Lorenc (1950: 308, pl. 5, fig. 13) as *Muricopsis plicatilis* (Deshayes) from the Lutetian–Bartonian of the Vyškov Depression (Czechia). However, the fragmentary specimen differs from *N. plicatilis* by more slender shell, its determination needs to be revised.

Distribution – Late Lutetian, Alpine Tethys: Hungarian Paleogene Basin: Dudar.

CONCLUSIONS

Based on new field works and revisions of museum collections eight muricid species and genus *Typhina* are described in this paper from the Middle Eocene Hungarian Paleogene Basin system. The most abundant and widely distributed species is ?*Pterochelus contabulatus gantensis* (Szőts), it occurs from the Bakony to the Gerecse Mts with more than 100 specimens. Among the fossiliferous sites of the HPB Dudar (Bakony Mts) is characterized by the highest muricid diversity, six species and genus *Typhina* appear in the gastropod assemblage. *Paziella* (*Flexopteron*) *zsoldosi* n. sp. extends the palaeogeographic distribution, while *Harmatia tokodensis* n. sp. extends the stratigraphic range of these genera. The relatively low alpha diversity of the Muricidae in the HPB is typical of the Alpine Tethys (see Boussac 1911; Dainelli 1915, 1919; De Gregorio 1880, 1895; Fabiani 1908, 1915; Oppenheim 1894; Vinassa de Regny 1896, 1897).

Concerning the faunal composition, from the assemblage presented herein three species (*Timbellus barattus*, *T. micropterus*, *Ponderia bispinosa*) and

genus *Typhina* are known in the NE Atlantic, two species (*Timbellus barattus*, *T. micropterus*) were recorded from W Alpine Tethys localities, and one species (*Timbellus priabonicus*) occurs in the North Sea Basin and the Ukrainian Archipelago. ?*Pterochelus contabulatus gantensis*, *Paziella* (*Flexopteron*) *zsoldosi* n. sp., *Harmatia tokodensis* n. sp., and *Nucellopsis dudariensis* seem to be endemic species in the Hungarian Paleogene Basin.

*

Acknowledgements – We thank Alfréd Dulai (HNHM), Attila Ősi (Eötvös University, Budapest), Csilla Galambos, László Makádi and Bálint Péterdi (MGSH), Jean-Michel Pacaud (France), Ortwin Schultz (Austria), Sonja Löffler (Germany), A. A. Berezovsky (Ukraine), and Mikhail Rogov (Russia) for their professional help. Special thanks to Didier Merle (Muséum National d'Histoire Naturelle, Paris) whose critical comments helped significantly to improve the manuscript. Fossil collectors (Tibor Berta, Zoltán Evanics, István Gurdon, Rudi Hessel, and Márton Zsoldos) kindly offered their materials for study. Figure 1 was produced by Domonkos Verestói-Kovács.

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