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NEW FINDING OF *MAMMUT PRAETYPICUM* (PROBOSCIDEA, MAMMALIA), A ZYGODONT MASTODON FROM PĂGAIA (NW ROMANIA)

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Abstract. In NW Romania at Păgaia (Bihor district), some teeth (complete or fragments) assigned to *Mammut praetypicum* have been recently unearthed. These fossils are additional to the older findings form the same locality mentioned by Schlesinger at the beginning of the 20th century. The species is rare and poor known one, either in our county, or in the whole Central and Eastern Europe. Inside this area, only few localities yielded such mastodon fossils. The presence of this mastodon at Păgaia could be considered as an argument for a Pliocene age for the deposits exposed there.
Key words : Pliocene, zygodont mastodon, Pannonian Depression, NW Romania.

INTRODUCTION

In Romania, the region located westward from Apuseni M-ts between Satu-Mare and Arad, is an outstanding one due to the numerous findings of fossil Proboscideans (Jurcsák, 1983). Among them, mastodons are not rare: several discoveries date back even earlier to the last decades of the 18th century, but the number of findings increased towards the end of 19th and mainly in the 20th, when mainly the paleontologists working with different local museums unearthed such fossils. From this area, Schlesinger (1922) reported several localities in his monograph on the mastodons from the Hungarian collections.

Among the most interesting formations for mastodon findings, one can mention the Uppermost Miocene-Lowermost Pliocene successions. Such a mastodon-bearing site is located at Păgaia, a small village situated on the road linking the town of Marghita and the township Tăşnad, just close to the border between Bihor and Satu Mare districts. This area belongs to the Barcău Hills, where Uppermost Miocene and Pliocene deposits are exposed. As a whole, the area Păgaia belongs to locates on the eastern border of the Pannonian Depression.

Schlesinger mentioned from Păgaia several mastodon teeth (un upper tusk fragment, m1 and M1 fragments, left M2, right M3, left M3 – all these teeth, found apart, and a mandible fragment with m2-m3, as well as the m2 and m3 apart) assigned by him to "*Mastodon (Zygolophodon) tapiroides / (Mammut) americanus"* (Taf. XIII, Fig. 6-7; Taf. XIV, Figs. 1-3). These teeth had been found in P. Ungur's courtyard, a forester from the village. However, after this finding for several decades no other discovery had been reported from Păgaia.

In the village neighborhood, immediately after the outgo to Tăşnad, on the right side of the highroad, existed before 2003 a small quarry where the locals exploited sand. Now, this quarry disappeared, canalized into a cesspool. From this site, Florin Roman, a Păgaia home-born, collected some teeth belonging to a mastodon whether he donated to the Ţării Crişurilor Museum in Oradea (abbreviated: TCM), where these fossils are curate. Judge from these teeth, one can presume that all belonged to same individual, probably a mature animal, with both last molars in function. Unfortunately, no data on taphonomy have been collected.

Soon after, one of us (E.P.) tried to make a digging, in order to collect more fossils and to add taphonomic data. Unfortunately, this demarche dispatched, lacking financial and logistic support. However, during this short field mission, additional bones issued, but their extremely damaged status embarrassed the extraction.

The aim of this paper is to point out the fossils curate in Oradea museum as the species this mastodon is assigned to is rare for our country, but also for all this side of the Europe.

PALAEONTOLOGY

Family *Mammutidae* HAY 1922
Genus *Mammut* BLUMENBACH 1799

Mammut praetypicum (SCHLESINGER, 1919)
(Pl. I, figs. 1-4)

Material. Four cheek teeth found isolated: m3 left (TCM 19255/A) and right (TCM 19255/B); two M3 distal fragments (TCM 19255/C and 19255/D); a m2 distal fragment (TCM 19255/E). It is possibly that all the teeth belong to the same individual, as the wear facets of the upper molars fit in with the lower ones.

Description

The dentition nomenclature follows Tobien (1996).

The **left m3** preserves enough elements allowing a good identification, revealing clear zygodont characters. The mid-area of the first

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lophid as well as the antero-labial part of the second one are damaged.

This tooth consists on four transverse lophids and a cingulum. Its outline is oval elongated. A strong pressure mark can be observed on the anterior margin, due to the contact with m2. It practically destroyed the mesial cingulum, and a part of the anterior crescentoid. Some remains of them can be however, observed. The maximum width is in the anterior half of the tooth: the second lophid is widest compared with the first or the following ones.

Reported to the longitudinal axis, the molar is sensibly bent, exposing a concavity on the labial side of the tooth outline. The almost straight transverse lophids are acute oblique, postero-external to antero-internal. As a whole, the tooth is twisted along the mesio-distal axis. In this manner, the posttrite halflophids of the first three ridges are considerably higher compared to the pretrite ones, whereas the whole distal part beginning with the fourth ridge has an inverse tendency.

The transverse sections of the molar show an acute difference between the breadth of the crown base and the one of each ridge that is considerably smaller, a character pointed out also by Kubiak (1972). The slopes descending from the top crests toward the labial side are gently. On the lingual one, the slopes are boldly.

The attrition is moderate, affecting mainly the first three pretrite half-ridges. In the fourth one is only incipient. Anyhow, all the lophids are wear-marked; only the distal cingulum is pristine. All the preserved wear-marks affecting the lophids have posterior obliquity. The maximum wear affected the protoconid and the hypoconid. In the unworn halphlophids from the posttrite row, the cuspids form unique, sharp crests. On this crest, the cuspids lost their individuality, by coalescence, showing a simplified crest pattern. This character seems to be peculiar to *M. praetypicum*, singularizing this species from *M. borsoni* (HAYS, 1834). The median sulcus is well expressed in the first two ridges only, and faint on the other ones.

All the synclines separating the lophids are completely open, devoid of conulus on their tracks. The mesial slopes of the first three lophids are steeper compared with the distal ones. This pattern disappears to the last lophid, and even more at the distal extremity, where the relationship between the slopes is inversed compared to the first ones.

The anterior part of the **right m3** is broken, only the last two ridges and the cingulum are preserved. All preserved characters are similar to the tooth already described.

Both **M3** are broken, approximately in the same proportion. Only fragments of the last three ridges can be observed. The wear-marks affect the mesial walls of the ridges, both on pretrite and the posttrite areas. The attrition worn in a similar degree these molars as the corresponding lower ones. The crests are almost similar to m3. The outlines of the transverse sections are boldly on the labial sides and gently on the palatal ones, conversely to m3. The synclines are completely open, showing a curved path, with a convexity bear towards the anterior side. The median sulcus is distinct, but faint. The talon is more distally crowned compared with the m3.

Only a small fragment of the **left m2** in preserved, concerning its last ridge. The post-cingulum bears a strong pressure mark, fitting well with the corresponding one of the m3. In spite of the rupture, it is enough clear that the syncline was open, without any conulus blocking its tract. On its lingual opening, small cingulum exists. Posttrite half-ridge is narrower, crest-like, while the pretrite one is larger, heavy worn. The median sulcus is weak.

In all molars, no cement can be seen into the synclines.

Tab. 1 - Measurements (Tab. 1, according to Kubiak, 1972; mm).

	Left m3 TCM 19255/A	***Right m3 TCM 19255/B***	***Left M3 TCM 19255/C***	***Right M3 TCM 19255/D***	***Left m2 TCM 19255/E***
Length	174.5	-	-	-	-
Breadth – maximum	86.7 (2)	cc 85.0 (3)	-	84.5 (3)	88.0 (1)
- minimum	77.5 (4)	77.3 (4)	75.6 (4)	72.3(4)	-
Breadth of ridge	68.0 (2) 54.5 (4)	51.5 (4)	47.0 (4)	55.0 (3) 45.0 (4)	-
Height (maximum)	51.6 (3)	49 (3)	47.0 (4)	44.0 (4)	43.5(1)
Breadth/length index	0.50	-	-	-	-
Length/breadth index	2.01	-	-	-	-

Tab. 2 - Measurements on old findings from Păgaia
(„*Usztataó bei Tasnád*" according to Schlesinger, 1922 and Jurcsák, 1973)

	m3 sin	m2 sin	M3 dext	M3 sin
Length	180.0	118.0	146.0	-
Breadth – maximum - minimum	96.0 (2) -	88.0 (2) -	96.0 (2) 51.0 (talon)	97.0 (2) 59.0 (talon)
Height	cc. 60.0 (2)	-	48.0 (2)	51.0 (2)
Breadth/length index	0.53	0.75	0.65	-
Length/breadth index	1.86	1.34	1.52	-

DISCUSSION

M. praetypicum is a disputed mastodon species. Some paleontologists consider it nothing else but *Mammut borsoni*. Kubiak (1972), refining the study of this mastodon, pointed out several peculiar characters, arguing for a distinct species. Some other authors like Göhlich (1999) or Lungu & Obada (2001) shared his opinion. This contribution do not intends to clarify this species problem, as far as the sample we had at our disposal is too poor for allowing extended discussions. However, a revision of this mastodon species would be advisable in the forthcoming years.

Schlesinger (1922) and subsequently Jurcsák (1973) described several *M. praetypicum* teeth from Păgaia. For instance, Păgaia is the richest locality where this mastodon occurs in our country. According to Kubiak (1972), in Romania besides Păgaia, some other localities mentioned long time ago by Athanasiu (1907) from outer Carpathian regions (Budeşti – Argeş, Bărbăteşti – Gorj, Amaradia – Gorj) provided fossils assigned to *M. praetypicum*.

It seems that the M2 described by Toula (1911) as "*Mastodon americanus* PENNANT", originating from the Arad neighborhoods (unfortunately, the exact location remain unknown) belongs to *M. praetypicum* too.

It is obvious that both morphology and sizes of the new collected fossils are according well with the previous discoveries, as well as with the fossils described by Kubiak (1972), originating from an unknown locality (probably from Balta, in Podolia).

This proboscidean is rarely reported, exlusively from the Central and Oriental Europe (Slovenia, Serbia, Albania, Bulgaria, Greece, Hungary, Moldova, Romania; Bakalov & Nikolov, 1962; Mitzopoulos, 1967; Kubiak, 1972; Dodona & Kotsakis, 1985; Rădulescu & Samson, 1985; Göhlich, 1999; Lungu & Obadă, 2001). It seems that it never reached Western Europe. Eastward, in Moldova Republic, Lungu & Obadă (2001) reported the same species at Balta and Fărlădeni.

For our country, several detail concerning this species' both stratigraphic range and paleoenvironment remain still unclear. For instance, all localities within this species is reported lack clear stratigraphy. Athanasiu (1907) referred to fortuitous findings that he described only on fossils he got from others. Toula (1911) just studied a fossil from a collection in Braşov, devoid of any clear location. In this manner, Păgaia remains the only site where one dispose of some more details concerning the findings. However, apart the mastodon remains, no other elements (vertebrate, invertebrate, flora fossils) are known from the same site. In these circumstances, one can only presume the Pliocene, without enough evidence.

Not far from Păgaia there is another locality bearing a fauna including mastodons, with a disputed stratigraphy, Derşida (Sălaj district) (Fig. 1). The age of Derşida faunal assemblage was related by the former authors either to Pontian (Macarovici & Jurcsák, 1968) or to the Dacian (Terzea, 1983). Other contributors, as Paucă (1954) or Maxim & Ghiurcă (1960, 1963, 1964) were less precise, indicating only a Pliocene age for the molluscs they described from. There, Jurcsák (1973, 1983) mentioned two mastodons besides a large-sized *Deinotherium*, but without *M. praetypicum*. Codrea et al. (2002) mentioned from the same locality the beaver *Dipoides*, presuming that Derşida belongs to MN 13. In these circumstances, related to Derşida, Păgaia is probably younger.

It is obvious enough that the depletion of the Pliocene Pannonian lake begun on the Romanian territory in the Late Miocene (Pontian), affecting first the easternmost areas of the Pannonian Depression and its connected Miocene basins, as the Şimleu Depression. There, the existence of a fluvial environment is extremely clear in the Uppermost Pontian (Codrea et al., 2002). On westward areas, as the one Păgaia belongs to, this process was probably somewhat belated.

Lungu & Obadă (2001) indicate the *M. praetypicum* occurrence towards the end of MN 14 and the extinction at the base of MN 17. It would be however extremely useful if the authors would indicate more details on the stratigraphy of each locality they mentioned. Their chart accentuates a co-existence between *M. praetypicum* and *M. borsoni*, pointing out for the last species the occurrence at the base of MN 12 and extinction towards the base of MN 17.

On the other hand, Göhlich (1999) accentuates that in the European Miocene, *M.* cf. *borsoni* is extremely rare, mentioned only once at Pikermi

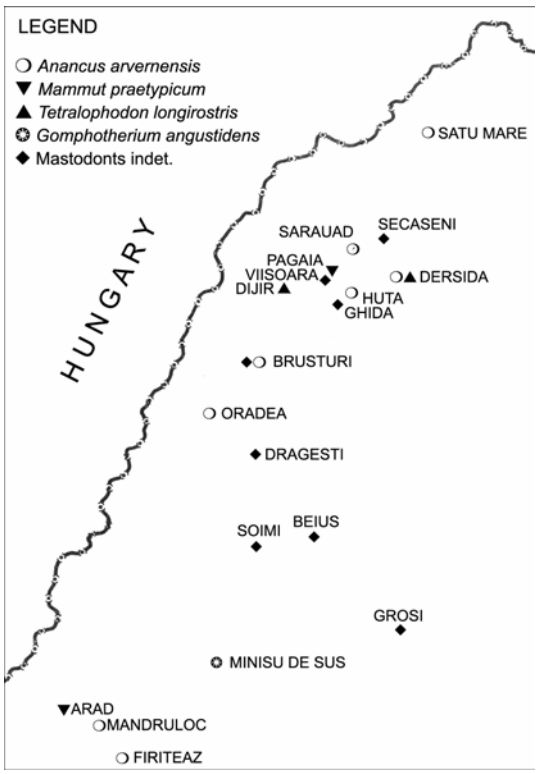

Fig. 1 Mastodons distribution in NW Romania

(MN 12), suggesting instead an evolution of *M. borsoni* from *M. praetypicum*. This evolutionary lineage is an appealing one, but it still needs more data for consistency. For instance, one can only remark the scarcity of data and the lack of clear demarcate species' evolutionary stages.

As a conclusion, the presence of this mastodon at Păgaia could be an argument for a Pliocene age of the deposits exposed there. A better knowledge of this locality could result only trough more extensive digging on the site, which could evidence additional elements of this fauna, probably among the more interesting ones from our country.

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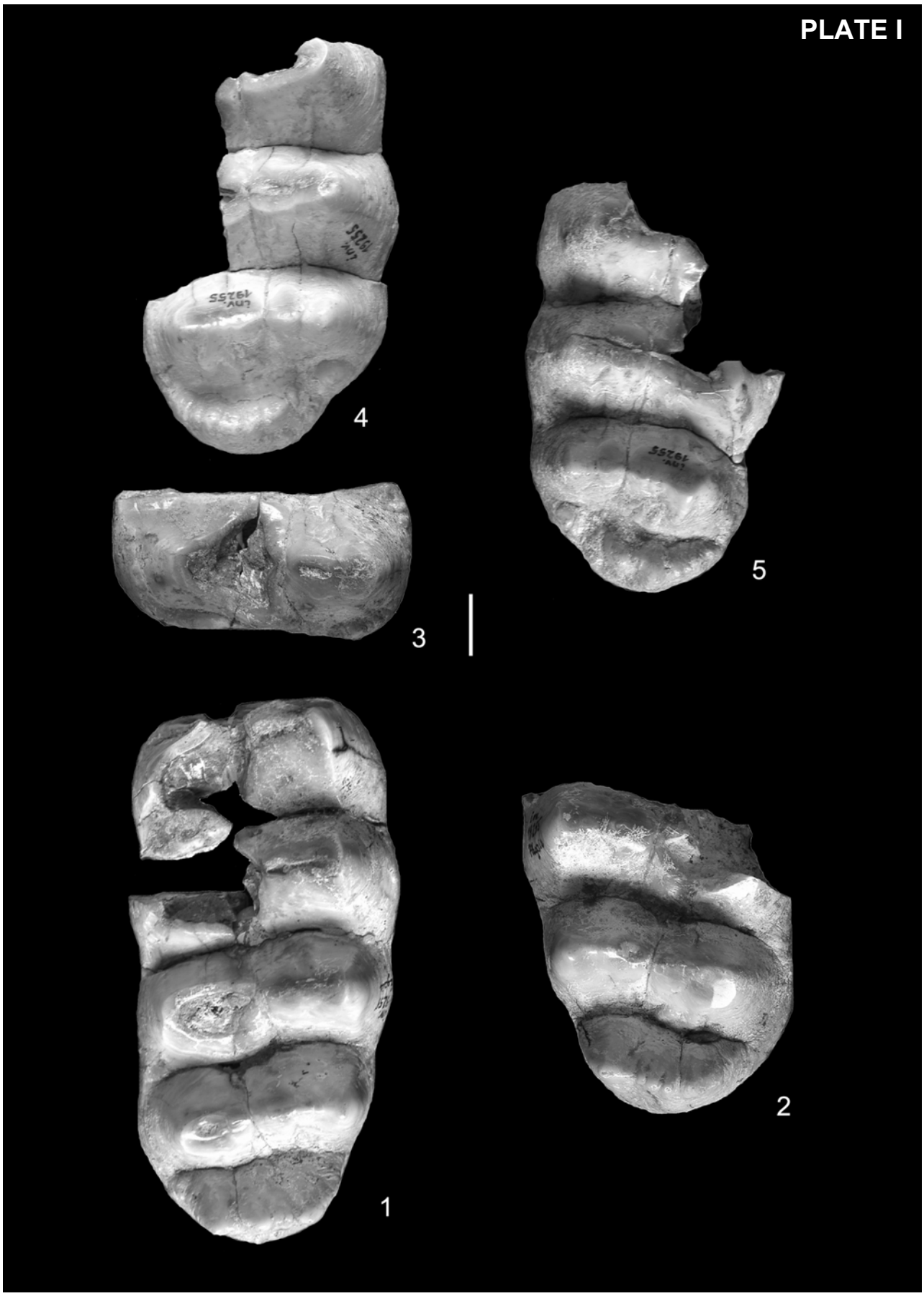

PLATE I *Mammut praetypicum* (SCHLESINGER, 1919). Păgaia, Bihor district, ? Pliocene. Molars, crown views. Fig. 1: left m3; Fig. 2: right m3, fragment; Fig. 3: left m2, distal fragment; Fig. 4: left M3, fragment; Fig. 5: right M3, fragment.
Scale bar: 20 mm.