A LARGE DEINOTHERE (*MAMMALIA: PROBOSCIDEA*) IN THE LATE MIOCENE OF THE MOLDAVIAN PLATFORM AT HUȘI (VASLUI COUNTY)

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Abstract. Large deinotheres are known from only a few Late Miocene localities in Romania. Herein the new locality Huși is reported in the Moldavian Platform (northeastern Romania). On Dobrina Creek, a metatarsal bone was found *ex situ*, in the alluvium. However, based on the local geology one presumes that the bone originated either from the Khersonian (MN9) or the Meotian (MN9-MN12) deposits - rather from the last ones -, the only ones exposed in the area. Therefore, the Huși deinothere is considered to be a Vallesian or Turolian representative. The bone is assigned to *Deinotherium proavum* (= *D. gigantissimum*). This find reinforces the knowledge of the stratigraphical range of large deinotheres in Romania, all assigned to a single species, *D. proavum*. They were present since the lower Late Miocene until the uppermost Miocene and went extinct in the country before the Pliocene. The Huși deinothere is considered to be a Turolian representative.

Keywords: vertebrate palaeontology, regional geology, proboscideans, deinotheres, Late Miocene, Romania.

Rezumat. Un deinother (*Mammalia: Proboscidea*) de talie mare din Miocenul Superior al Platformei Moldovenești la Huși (Județul Vaslui). Deinotheri de talie mare sunt semnalați în mai multe localități românești, toate din Miocenul superior. Această lucrare semnalează o nouă astfel de localitate din Platforma Moldovenească (nord-estul României), Huși. Pe ogașul Dobrina a fost descoperit *ex situ* un metatarsian, în aluviuni. Totuși, privind contextul geologic local se poate presupune că acest os provine fie din depozitele Khersoniene (MN9), fie din cele Meoțiene (MN9-MN12) – mai degrabă din cele din urmă -, acestea fiind singurele care apar expuse la zi în această zonă. În consecință, deinotheriul de la Huși este considerat ca reprezentant al faunelor vallesiene sau turoliene. Osul a fost atribuit speciei *Deinotherium proavum* (= *D. gigantissimum*). Această descoperire consolidează cunoașterea distribuției stratigrafice a deinotherilor de talie mare din România, atribuiți unei singure specii, *D. proavum*. Aceștia au fost prezenți între baza și partea terminală a Miocenului superior, dispărând ante-Pliocen.

Cuvinte cheie: paleontologia vertebratelor, geologie regională, proboscidieni, deinotheri, Miocen superior, România.

INTRODUCTION

In Romania, Middle and Late Miocene terrestrial vertebrates are recorded in a lot of localities in both the Inner and Outer Carpathian regions. A different situation concerns the Lower Miocene deposits, where such fossils are almost absent. This situation could easily be explained by the specific palaeogeographic evolution of the region, where large areas were covered by the marine waters of the Paratethys Sea.

In the Middle and Upper Miocene deposits, terrestrial mammal communities of large herbivores are usual. Among other large mammals, proboscideans are present, both mastodons (e.g. NICORICI, 1976; CODREA & CIOBANU, 2008; ȚIBULEAC et al., 2015) and deinotheres (CODREA, 1994; CODREA & CIOBANU, 2008) being reported. However, they are not common: the vast majority of the finds concerns only a single fossil at each locality, usually an isolated tooth or bone. Deinotheres are reported from a few localities, but they still remain poorly known in our country. Even if their remains are rather scarce, it is clear that over this time span the deinothere lineage increased in dimensions, starting from medium sized and ending up much larger. In the latest Miocene (Pontian *s.s.*), the last largest representatives are recorded, but after the Miocene/Pliocene boundary there were no survivors, the only Pliocene proboscideans reported from Romania being the mastodon species: *Anancus arvernensis* (Croizet & Jobert, 1828), *Mammut borsoni* (Hays, 1834) and *M. praetypicum* (Schlesinger, 1919), (FERU et al. 1983; RĂDULESCU & SAMSON, 1985; CODREA et al., 2005).

This paper deals with a large deinothere limb bone found in the region of Moldova (Eastern Romania), in the Upper Miocene deposits of the Moldavian Platform (a local name for the southwestern sector of the larger Oriental European Platform; SĂNDULESCU, 1984). The hind leg bone was found *ex situ*, reworked from its original rock into the alluvium of the Dobrina Creek in the neighbourhood of Huși town, not far from its confluence with the Lohan Valley (near the location so-called "La Făzănărie"). The discoverer was Mr. Grigore Apostol, a native of Huși (MERLAN, 2010). He donated this fossil to the Huși Municipal Museum (abbreviated: HMM).

GEOLOGICAL SETTING

In Romania, the Moldavian Platform is exposed in the northeastern region of the country, bounded either by non-geologic limits such as the national borders to the north and east (with Ukraine and Republic of Moldova), or by geological ones, *i.e.* faults to the west and south; but the latter remain controversial (SĂNDULESCU, 1984; IONESI, 1994; BALINTONI, 1997). The main controversies concern the geological age and lithology of Rădăuți-Pașcani block, bounded by the faults Siretului (continuing in Ukraine under the name Ustilug-Rogatin) and Solca (=Rava Ruska).

According to some geologists the basement of this block could be at least Middle Proterozoic or even older (Karelian), while others estimate that it is much younger, Neoproterozoic (epi-Cadomian). This uncertainty is a result of the lack of drilling data, as no borehole has intercepted this basement. The nature of the platform basement is not important for this study although its tectonics could have played a role in the overlapping sediment distribution and thicknesses, mainly the Palaeozoic ones. Apart from this still poorly known block, the remaining areas of the platform have a metamorphic Proterozoic basement intruded by magmatic rocks (details in IONESI, 1994**;** BALINTONI, 1997).

This old basement of the Moldavian Platform is covered by three sedimentary megasequences ('sedimentary cycles', in IONESI, 1994). The first two megasequences involve Neoproterozoic-Palaeozoic and Mesozoic-Early Cenozoic sediments. The sedimentation of the last one started in the Middle Miocene (Late Badenian) and ended in the Late Miocene (in Meotian, according IONESI, 1994), although one cannot exclude the possibility that deposits younger than the Meotian could once have existed (mainly on the southern platform margin), but were subsequently removed by erosion.

In Huși area, the last sedimentary megasequence is of interest due to the presence of Khersonian and Meotian terrestrial deposits. These continental environments occurred due to the regression of the waters in the Dacian Basin during the Late Miocene (SAULEA et al., 1967, 1969; JIPA & OLARIU, 2009). Although the sedimentary deposit which yielded the deinothere fossil is unknown, the geology of the Dobrina Creek is indicative enough to support presumptions: the bone was reworked either from the Meotian or Khersonian deposits, the only ones exposed in this area (Fig. 1). Both are of continental origin and comprise sedimentary rocks (mudstones, sand channel fillings, etc.) which accumulated in fluvial palaeoenvironments.

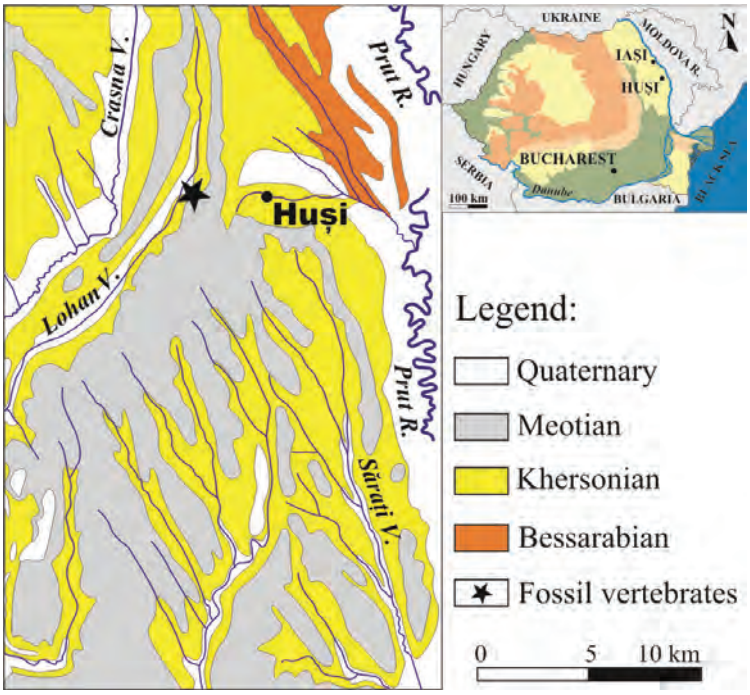

Figure 1. Geological map of the Huși area (modified after JEANRENAUD, 1971)**.**

The oldest sedimentary unit is named the 'Huși Formation' (in IONESI et al., 2005). It is Khersonian ('Hersonian' in IONESI et al., 2005), but in the absence of a type section ('we grouped the deposits from this area under the name the 'Huși Formation', *being unable to mention a type-section*' - our translation and underlining; IONESI et al., 2005, p. 422) in our opinion this makes the name invalid and this formation needs a reassessment of its definition. The authors underlined the dominance of brackish facies in these deposits, but such environments completely miss in some outcrops near Huși, as is that of Crețești-Dobrina 1 (URSACHI et al., 2015). This is not surprising because the same authors reported that south of Huși the brackish facies is specific just for the basal part of the Khersonian succession, the upper part having accumulated in freshwater environments with *Unio wetzleri* (p. 423). But for instance, we should notice that at Crețești-Dobrina 1 deinotheres miss, the only proboscidean being the mastodon *Choerolophodon pentelici* (Gaudry & Lartet, 1856).

The younger formation overlying the previous one comprises Meotian clay interleaved with sandy and sandstone deposits. According to JEANRENAUD (1971), the Khersonian/Meotian boundary would be marked by the Nuțasca-Ruseni andesitic tuff. However, this tuff was never dated and sometimes - mainly in eastern and southeastern areas of the platform - it can be difficult to locate in several outcrops. For instance, there is not a Meotian lithostratigraphic unit correctly defined in the area. It can be noticed that MARINESCU et al. (1998) published correlation charts for the Neogene deposits of Romania, including the Moldavian Platform. For the Meotian (included in the age they named "Malvensian") eventually one could notice the so-called "Murgeni Formation", but following the rules of the International Stratigraphic Guide (http://www.stratigraphy.org/index.php/ics-stratigraphicguide) there lacks a clear definition of this 'formation' and we cannot take it into consideration. Moreover as a whole, their paper concerns strictly regional stratigraphic charts, without any description and reference. Even the platforms are poorly defined (*e.g.* the Scythian Platform visibly is included into the Moldavian one!).

Concerning the topic of this study, we presume that the deinothere bone more likely originated from the Meotian deposits than from the Khersonian ones. Because most of the outcrops expose the basal section of the Meotian deposits, the deinothere could eventually belong to MN10-MN11 units or eventually even to uppermost MN9. This time span comprises the mammal ages Vallesian-Turolian.

MATERIAL AND METHODS

The single fossil from Huşi documenting the presence of deinotheres is a right metatarsal III (HMM 6694). The bone did not need special preparation because the fossilization is fair and no matrix remained on the bone surface. It was measured with professional calipers, then photographed with Nikon Coolpix P520 (18.1 megapixels). The photos were processed in Adobe Photoshop CS2. Measurements are following GÖHLICH (1998).

RESULTS

SYSTEMATIC PALAEONTOLOGY

Order Proboscidea Illiger, 1811
Suborder Deinotheriidae Bonaparte, 1845
Genus *Deinotherium* Kaup, 1829
Deinotherium proavum Eichwald, 1831, 1835 (= *D. gigantissimum*, Ştefănescu, 1895)
(Fig. 2a-d)

Although the fossilization is fair, some damage should be mentioned, with broken parts in the following sectors of the bone: *facies articularis cuneiforme lateralis* (*tarsalis tertium*), the anterior-lateral and postero-medial areas and on the lateral surface and trochlea (lateral and postero-medial).

The bone is unevenly tetragonal-prism shaped, broader in the cranial direction and narrower in the plantar one. The articular surface for the tarsal *cuneiforme lateralis* is plain-concave. The proximal anterior margin is convex; the lateral one is sinuous, due to the alternation of the prominences of the articular facets with MtIV; their linking portion, is concave. The articular facets with MtIV are distinctly outlined and well preserved. The dorsal one has a half-ellipsoidal contour, and the smaller plantar one is ellipsoidal elongate, sub-parallel to the lateral margin of the proximal articular surface.

Figure 2. *Deinotherium proavum* right MtIII:
a - view of proximal articulation surface; b - medial view; c - cranial view; d - plantar view.

The medial surface is acute concave, sharply limited by a prominent vertical ridge, while the posterior limit is much more gradual and diffuse. *Facies articularis medialis* with MtII exposes in its anterior portion an obvious concavity, oriented front to rear. The trochlea is asymmetric, laterally lowered.

Measurements (mm): maximal length (physiologic) – 216.0; proximal width – 98.0; maximal proximal depth – 122.5; depth of *facies articularis proximalis* with Mt.III - ca. 117.0; length of *facies articularis medialis* with MtII - ca. 62.0; depth of same facet – 33.0; length of the plantar *facies articularis lateralis* with MtIV – 14.0; depth of same facet – 29.0; length of *facies articularis lateralis* – 31.0; depth of same facet – 34.0; maximal width of the diaphysis – 92.0; maximal depth of diaphysis – 92.0; maximal depth of trochlea – 117.0.

COMPARISONS AND DISCUSSIONS

When we compare the Huși deinothere metatarsal with other similar finds, the first thing that emerges is the scarcity of data related to the post-cranial bones of the large deinotheres, not only from Romania, but also from the neighbouring countries. For instance, the only deinothere metatarsals ever reported in our country are those of the notorious Mânzați deinothere (ȘTEFĂNESCU, 1899; pp. 136-138). ȘTEFĂNESCU reported smaller dimensions for Mt.III: length – 15.2; proximal width – 87.0. The cranial view of the bone reflects a pronounced arched line of the lateral margin of the MtIII ("Tabla" IV, A).

In the vicinity of Romania, in Bulgaria, KOVACHEV & NIKOLOV (2006) named a distinct large deinothere species, *D. thraceiensis* documented by a nearly complete skeleton unearthed from the Meotian deposits at Ezerovo. But, the arguments for a distinct species are much too meagre to defend such an assignation. There is no evidence to disassociate Ștefănescu's specimen from Mânzați from the one from Ezerovo, an opinion also defended by MARKOV (2008). The Ezerovo deinothere is indeed a big one (MtIII length – 225), but the difference is not large enough to document a distinct species. The differences in size may be interpreted as intraspecific variation. Therefore, the Huși deinothere bone is intermediate in dimensions between Mânzați and Ezerovo specimens. It doubtlessly belongs to a large deinothere, probably also sharing the same geological age with the ones from Mânzați and Ezerevo (MN11) or is perhaps, a bit older.

Deinothere systematics is a controversial topic. In Romania, already at the end of the 19th and beginning of the 20th centuries, there were two viewpoints: while Ștefănescu (see references in Tab. 1) agreed with the distinct species *D. gigantissimum*, ATHANASIU (1907) considered that the large deinothere should be only a variety, i.e. *D. giganteum* var. *gigantissimum*.

Over a half century ago, GRÄF (1957) proposed an evolutionary lineage of the European deinotheres, involving (from oldest to younger ones) the species "*D. bavaricum* - *D. levius* - *D. giganteum* - *D. gigantissimum*", showing a size increase over geological time, the last representatives in the latest Miocene being the biggest ones. Actually, there are various opinions arguing either for a larger species' diversity (e.g. GASPARIK, 1993, 2001; MARKOV, 2008, 2008a; PICKFORD & POURABRISHAMI, 2013) or an opposite one, keeping in Europe a couple of genera (*Prodeinotherium* Ehik, 1930 and *Deinotherium* Kaup, 1829) with fewer species (HUTUNNEN, 2002). Hutunnen placed into synonymy the middle-sized *Deinotherim giganteum* Kaup, 1829 and the large-sized *D. proavum* Eichwald 1831, 1835 (= *D. gigantissimum* Ștefănescu, 1891; a discussion on this synonymy in CODREA, 1994 and PICKFORD & POURABRISHAMI, 2013 with references hitherto), keeping valid only the first species. Although Hutunnen's viewpoint was accepted by some palaeontologists that studied this group (e.g. ATHANASSIOU, 2004), there are others such as CODREA (1994), MARKOV (2008, 2008a), GASPARIK (2001), VERGIEV & MARKOV (2010), PICKFORD & POURABRISHAMI (2013) and ourselves herein, who argue for the retention of the large deinotheres as distinct species. Concerning the largest deinothere species, there are also different viewpoints, several palaeontologists accepting the validity of Ștefănescu's name *D. gigantissimum* (MARKOV 2008, 2008a; VERGIEV & MARKOV, 2010; GAREVSKI & MARKOV, 2011), while others such as GASPARIK (2001), TÓTH (2010), PICKFORD & POURABRISHAMI (2013) and ourselves, concur on Eichwald's priority with *D. proavum*, as one of us pointed out more than two decades ago (CODREA, 1994).

Alternatively, VAN DER MADE & MAZO (2003) considered that all deinotheres should be classified in a single genus, *Deinotherium*, excluding *Prodeinotherium*. We will not discuss herein the problems related to the latter genus because this problem has already been debated for rather a long time (ANTUNES & GINSBURG, 2003) and because this genus is much older than the one that is of interest for us.

Although the genus *Prodeinotherium* has occurred in Europe since the Early Miocene (MN4a, GÖHLICH, 1999**;** VAN DER MADE & MAZO, 2003), in Romania the oldest deinotheres are documented rather late, in Middle Miocene deposits (Early Sarmatian, i.e. Astaracian, MN7+8, CODREA et al. 1991, 2007**;** CODREA & CIOBANU, 2008; Fig. 3, Table 1), these and all the younger ones belonging to the genus *Deinotherium.*

Nowhere in Romania has *D. proavum* been reliably reported from deposits older than the Meotian (Table 1). However, one can presume its presence even in the latest Sarmatian, but until now no such locality has been clearly documented in our country. Concerning deinothere extinction, in this area the latest ones went extinct in the Late Miocene (Turolian, MN13, CODREA et al., 2002), since there is no evidence about any Pliocene survivor, either in the Lower Pliocene (Dacian), or in the Upper Pliocene (Romanian, FERU et al., 1983; RĂDULESCU & SAMSON, 1985; ANDREESCU et al., 2011, 2013). It is obvious that the last Miocene representatives were the largest recorded in our country, following a rule confirmed elsewhere in Europe.

In eastern and southeastern Europe, palaeontologists such as VISLOBOKOVA et al., (2001) and VISLOBOKOVA (2005) reported a longer deinothere time span, persisting until MN15 (Late Pliocene). If we accept a wide distribution of large deinotheres in Central-Eastern Europe in the Late Miocene, without physiographic barriers to prevent dispersal, as was pointed out some decades ago by RÖGL & STEININGER (1984), in such a specific palaeogeography of this region, the extinction of deinotheres probably occurred gradually from west to east. This eventually could explain the survival of deinotheres in the above mentioned areas, in Ukraina and Russia, into the Pliocene, just as they persisted in Africa, where they survived even in the Pleistocene represented by *D. bozasi* ARAMBOURG, 1934 (ARAMBOURG, 1934; HARRIS, 1983**;** HARRIS et al., 2003**)**, a smaller sized deinothere compared to *D. proavum* (PICKFORD & POURABRISHAMI, 2013). However, in our opinion the stratigraphy of at least some of these Pliocene Eurasian localities should be carefully reassessed.

Table 1**.** Regional and stratigraphic distribution of deinotheres in Romania.

Species	**Locality**	**Geological age**	**References**
1. *D. giganteum*	Minișu de Sus Arad County	Early Sarmatian MN7+8	CODREA et al., 1991, 2007
2. *D. giganteum*	Deleni-Hârlău Iași County	Middle Sarmatian MN7+8 or MN9	MACAROVICI & ZAHARIA, 1967
3. *D. giganteum*	Vurpăr Sibiu County	?Pannonian *s.s.* ?MN9-MN12	CODREA & CIOBANU, 2008
4. ?*Deinotherium* sp. (« *Tapirus giganteus* »)	Gușterița Sibiu County	?Pannonian *s.s.* ?MN9-MN12	ANONYMOUS, 1850
5. *D. giganteum*	Drăgești Bacău County	Khersonian or Meotian ?MN7+8 – MN12	ȘOVA, 1963
6. *D. giganteum*	Derna Bihor County	Late Pannonian *s.s.*- Early Pontian *s.s.* (?MN12)	JURCSAK, 1973, 1973a CODREA, 1989
7. *D. giganteum*	Brusturi Bihor County	?Pontian or Pannonian *s.s.* ?MN11 or ?MN12	CODREA, 1989
8. *D. giganteum*	Găiceana	?Meotian	ȘTEFĂNESCU, 1879, 1895
9. D. proavum	Bacău County	?Meotian	ȘTEFĂNESCU, 1891, 1895
10. *D. giganteum*	Supuru de Sus Satu Mare County	Pannonian *s.l.*	CODREA & ANDREICA, 1988
11. *D. giganteum*	Vernești Argeș County	?Meotian	ATHANASIU, 1907
12. *D. proavum*	Mânzați Vaslui County	Meotian MN9-MN12	ȘTEFĂNESCU, 1895, 1899, 1910 CODREA, 1994
13. *D. proavum*	Ghergheşti Vaslui County	Meotian MN9-MN12	RĂȚOI et al., 2015 CODREA et al., 2015
14. *D. proavum*	Rediu Vaslui County	Uncertain ?Khersonian	Unpublished data
15. *D. proavum*	Huși Vaslui County	Probably Meotian ?MN10	MERLAN, 2010; this paper
16. *D. proavum*	Derșida Sălaj County	Pontian *s.s.* MN13	JURCSÁK, 1973, 1983 CODREA et al., 2002 CODREA & MARGIN, 2009
17. ?*Deinotherium* sp.	Neamț Monastry Neamț County	Unknown	ȘTEFĂNESCU, 1905 ATHANASIU, 1907**;** MOROȘAN, 1936
18. *Deinotherium* sp.	Elanului Valley Vaslui County	Probably Meotian	JURCSÁK T. (*personal communication*)
19. *Deinotherium* sp.	Ghida Bihor County	Pannonian *s.l.*	KRETZOI, 1982
20. ??*Deinotherium* sp.	Comănești Galați County	?Pontian *s.s.*-Dacian	MOROȘAN, 1936

An interesting different viewpoint was raised by LUNGU & OBADĂ (2001, 2011). In their first paper (2001), they indicate in Table 1 a stratigraphic range for *D. gigantissimum* exclusively in the basal part of the stratigraphic unit that they named 'Pliocene' (Pontian = MN13-MN14). However in the text, commenting the MN10 unit, they affirm (p. 120): 'It is to be mentioned that *D. giganteum* Kaup reaches gigantic sizes similar with those of *D. gigantissimum* Stefănescu is a synonym of *D. giganteum* Kaup'. In this manner, a contradiction between the table and text occurs, because the table mentions the large deinothere as a distinct species. A decade later (2011) they expose a different stratigraphic range, where the largest deinothere species *D. gigantissimum* occurred in southeastern Europe in the Vallesian (latest Bessarabian-Khersonian), afterwards disappearing in the Khersonian (we notice that in their chronology, the Khersonian would represents the MN10 unit, although this unit in the majority of stratigraphic mammalian charts is not Khersonian, but Meotian; *e.g.* STEININGER, 1999). Anyhow, this stratigraphic range fits not at all with the situation recorded either in Romania (for example in Transylvania, where *D. proavum* is reported in the latest Pontian *s.s.* at Sărmășag, in the Șimleu Basin; JURCSÁK, 1983**;** CODREA et al., 2002**;** CODREA & MARGIN, 2009), or Hungary, where *D. proavum* finds are in a huge majority in the Late Miocene (KRETZOI, 1982), except the problematic Pliocene locality Zalaegerszeg (Dacian, MN14, GASPARIK, 2001). Therefore, such finds document a longer existence of the large sized deinotheres in this region, at least until the MN13 unit, much longer than the one presumed by the Moldavian palaeontologists.

Figure 3. Regional distribution of deinotheres in Romania: 1 – Minișu de Sus; 2 – Deleni-Hârlău; 3 – Vurpăr; 4 – Gușterița; 5 – Drăgești; 6 – Derna; 7 – Brusturi; 8 – Găiceana; 9 – Supuru de Sus; 10 – Vernești; 11 – Mânzați; 12 – Ghergheşti; 13 – Rediu; 14 – Huși; 15 – Derșida; 16 – Neamț Monastery; 17 – Elanului Valley; 18 – Ghida; 19 – Comănești.

Concerning the coexistence of *D. giganteum* and *D. proavum* in Europe, the opinions are also divided. Some palaeontologists agree with a long coexistence (*e.g.* MATHISHOV & KALMYKOV, 2012; in their Fig. 3, at least some Romanian deinothere localities are strangely placed in Brașov Depression, where no deinothere has ever been recorded, as well at west of the Olt River where the same situation occurs), while others are rather sceptical (a recent discussion on this subject, in PICKFORD & POURABRISHAMI, 2013 and references herein). We underline here, based on the Romanian deinothere localities that evidence of the coexistence between the medium and large deinotheres is rather meager (Table 1) based on the current evidence. In our opinion if such coexistence existed, it should be not too long-lasting around the transition to one species to another (a pattern defended by palaeontologists such as GASPARIK (2001) or PICKFORD & POURABRISHAMI (2013). This rule can be checked in Hungary, where in the *Hipparion* faunas, there is no coexistence between these deinothere species (KRETZOI, 1982). For other areas such as the Republic of Moldova (LUNGU & RZEBIK-KOWALSKA, 2011), we consider that either the stratigraphy of some localities or the species identification of the deinotheres should be revised, because the occurrence of the large forms since the Middle Sarmatian (in "Bessarabian", MN9; *e.g* at Breila and Malye Mileshty = Milești Mici in Romanian) is worth at least a discussion.

CONCLUSIONS

Herein, we consider once again that *D. proavum* is a valid species and *D. gigantissimum* is only a junior synonym of it.

The Huși deinothere find is important as it enlarges the list of deinothere localities in Romania. It can support the research of the palaeontologists interested in these proboscideans, in particular because the deinothere locality lists from our country are sometimes based only on old references (*e.g.* HUTUNEN, 2002). It also supports the frequency of these proboscideans in Moldova throughout the Late Miocene. A recent similar Meotian deinothere find at Ghergheşti (Vaslui County), not very far from Mânzați, reinforces this aspect (CODREA et al., 2015; RĂȚOI et al., 2015). Before the Meotian, *D. proavum* was reported neither from Moldova, nor from any other locality in Romania.

The deinotheres are present in our country in the Astaracian, Vallesian and Turolian vertebrate communities, the oldest representative of *D. giganteum* being reported from the inner Carpathians, in Transylvania, at Minișu de Sus (MN7+8). The youngest known deinothere in Romania is the one from Derşida (MN13), assigned to *D. proavum*. Everywhere, they document either fluvial or riparian environments.

Excepting the old find from Găiceana (Bacău County; Table 1), a locality with poorly documented stratigraphy, there is no other locality where the coexistence of the two deinothere species could be proved. The last occurrence of these proboscideans in Romania is older than the Pliocene.

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