

PLIO-PLEISTOCENE LARGE HERBIVORES FROM HUSNICIOARA (MEHEDIŢI DISTRICT)

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Abstract. Husnicioara open pit is one of the most important exploiting areas for Pliocene coal in Oltenia (SW Romania). There, a fair succession of the Pliocene deposits can be followed, exposing mainly siliciclastic rocks, with interbedded coal layers. After the deposition of the Layer VII, a disconformity occurred. Several fossil vertebrates were collected from Husnicioara in the last decades. In this paper, a mastodon (cf. *Anancus arvernensis*) and a rhino (cf. *Stephanorhinus jeanvireti*) are described. If for the mastodon the exact stratigraphic level remains uncertain, the rhino originated from the deposits located above the coal Layer VII. The presence of this rhino, argues the existence of a disconformity above the coal Layer VII and is an evidence for the existence of the Romanian (Late Pliocene) deposits. After the deposition of the Pliocene sediments, the whole area was eroded during the Quaternary. A hydrographic system occurred, with creeks and valleys incised the Pliocene succession. In one of these creeks, cut by the exploitation works carried on at Husnicioara, a large amount of bones belonging to Quaternary large herbivores accumulated. The presence of the woolly rhino (*Coelodonta antiquitatis*), besides an indeterminate proboscidean (probably a mammoth), evidences there the Late Quaternary.

Key words: SW Romania, Dacic Basin, Vertebrate paleontology, large herbivores, Pliocene, Late Quaternary.

INTRODUCTION

Compared with several other regions from Oltenia (e.g. Gorj or Dolj districts) as well as the whole of our country, the Mehedinți department is still poor in fossil vertebrate discoveries. There are only few data concerning this topic, mainly referred to some Pleistocene large mammals.

The first such mention originates from Turnu Severin and belongs to Hantken (1866), reporting some woolly rhino - *Coelodonta antiquitatis* (BLUMENBACH, 1807) - remains.

Athanasiu (1907, 1908) described in a monograph concerned to *Anancus arvernensis* (CROIZET & JOBERT, 1828) several discoveries from

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the former Romania (Transylvania, not included), like a M2 originating from Strehaia or a M3 from Șipote. He also mentioned another upper molar from Strehaia and a m3 from Ghelmeșioaia (on Ușnița Valley). *Mammut borsoni* (HAYS, 1834) was reported from Balota.

In a repertory of the fossil vertebrates from our country, Barbu (1930) reiterated the same sites, as well as some subsequent other paleontologists or geologists did too (e.g. Eufrosin, 1942; Ghenea et al., 1963).

Nicolaescu (1933) described a caudal vertebra assigned to *Cetotherium priscum* BRANDT, 1873 from the (?) Miocene at Orșova. From the same site, some other bones were related to *Cetotherium* sp.: a proximal humerus fragment, a lumbar and a caudal vertebra.

A repertory of the proboscidean discoveries from Romania, belongs to Apostol (1968). For the mastodons from Mehedinți district, in this list, he included the sites already known, without adding anything new. Even for the common *Mammuthus primigenius* (BLUMENBACH, 1799) it was a unique mentioned site, at Enghevița.

Just one year later, from Turnu Severin area, Ghenea (1969) mentioned a list including *Mammuthus meridionalis* (NESTI, 1825), *Anancus arvernensis*, *Stephanorhinus etruscus* (FALCONER, 1859), *Ursus etruscus* CUVIER, 1823, *Praealces gallicus* (AZZAROLI, 1952) and "other typical Villafranchian fauna" (Markovic-Marjanovic, 1970). Unfortunately, little is known about the site where the fossils were discovered and the collection where these were curate (Codrea, 2000).

Several remains belonging to a proboscidean were discovered in 1969 in Batoți, assigned by T. Jurcsák to *Parelephas trogontherii* (POHLIG, 1885). Paveloiu (1985) reported both teeth (tusk fragments, cheek teeth) and post-cranial bones (humerus, cubitus, radius, femoris fragments), all originating from a creek incised on the third (Băilești) Danube terrace (27-35 m). The fossils are preserved in the Drobeta-Turnu Severin Natural History Section, „Porților de Fier” Museum's collections (abbreviated: DTSPFM): upper left molar (nb. 1 P.C.N.), right M3 (nb. 2 P.C.N.), left cubitus fragment (3 P.C.N.), distal cubitus epiphysis (nb. 4), upper left tusk (5 P.C.N.), distal radius epiphysis (nb. 8 P.C.N.), distal femur epiphysis fragment (nb. 9 P.C.N.), ribs fragments (nb. 10-12), femur diaphysis fragment (nb. 13 P.C.N.), thoracic vertebrae (nb. 14-15, humerus fragment (nb. 16), cubitus fragment (nb. 17), m fragment (nb. 18), molar fragment (nb. 19).

Another discovery related to *Mammuthus primigenius* is signaled by Căpitănescu (1998) in „Putinei” area, northern from the road Drobeta-Turnu Severin - Târgu Jiu, between Topolnița and Pleșuva rivers: molars (DTSPFM

1155-1157), molar fragment (DTSPFM 1158), various bone fragments (DTSPFM 1159-1161).

Some other discoveries remained unpublished, but the fossils are still available for study in the DTSPFM collections. The list includes the following taxa:

- Anancus arvernensis*: Oprișor: M2 fragments, M3 (5 ex.), tusk fragment (DTSPFM 32-39)
- Mammuth borsoni*: Oprișor: molar fragment (DTSPFM 31)
- Mammuthus meridionalis*: molar (DTSPFM 40)
- Parelephas trogontherii*: Salcia open pit: 3 molars and 2 molar fragments (DTSPFM 20-24)
Smadovița: tusk fragment: (DTSPFM 26)
Covrigi: tusk fragment: (DTSPFM 27)
- Mammuthus primigenius*: Oprișor: tusk fragment (DTSPFM 29), bone fragment (DTSPFM 28)
Batoți: femur fragment (DTSPFM 1506)
- Capra ibex* LINNAEUS, 1758: Oprișor: left horn fragment (DTSPFM 30 P.C.N.)
- Bison* sp.: Batoți: horn fragment (DTSPFM 41)
Salcia: horn (DTSPFM 850 P.C.N.)

As a conclusion, one can say that in Mehedinți department, a number of sites have a fair potential for future discoveries of large fossil mammals. But it will be essential to develop the monitoring of such discoveries and the fossils unearthed should be studied and preserved in museum collections. If not, the scientific information will be lost, as it happened with several finds (e.g. Rogova, Sisești, a.s.o.).

GEOLOGICAL SETTING

The Husnicioara area is located eastward from Drobeta Turnu-Severin, in SW Romania.

From a geological point of view, this area belongs to the Carpathian Foredeep, in the Getic Mio-Pliocene Basin's sector. The Mio-Pliocene deposits are cropping out on large surfaces on the left side of Topolnița Valley. In the thick pile of siliciclasts' succession (arenites, microconglomerate, lens-shaped sandstone), several coal (lignite) levels are interbedded. These coals were exploited in the last decades, in order to be combusted in the thermoelectric power plants.

Among the most important coal open pits, a main one is located not

very far from Husnicioara, eastward from Cerneti village. The works carried on, allowed the study of a wide section revealing a Pliocene (Dacian and Romanian) succession. The most significant is the Layer IV, still exploited in Husnicioara open pit. At the same site, the coal-layers V, VI, VII are clearly visible.

The limit Early Dacian (Getian)/Late Dacian (Parscovian), falls between the layers IV and V. It corresponds to the boundary between the Berbești and Motru formations (Codrea, 1997).

The Dacian/Romanian boundary is still a subject of debate. The opinions of different authors are not converging on the same stratigraphical pattern. These differences occur due to the different investigation means. A large number of geologists focused their study on mollusk assemblages, but in the Dacian Basin Pliocene, such assemblages are dominated by a lot of endemic taxa, useless for biostratigraphy. In these circumstances, it worth to be mentioned that Petrescu et al. (1987), put this limit between the coal layers VII and VIII, based on palynology, as well as Țicleanu & Pătruțoiu (1987) or Rădulescu et al. (1989). This boundary fit well with the magnetostratigraphy done by Andreescu et al. (1986) in Lupoia Quarry (Gorj district). However, other students (for details, see Codrea, 1997) placed this limit earlier, even above the Layer IV. A still open problem concerns the correlation of the coal beds from Oltenia: it is not obvious that the beds marked with same numbers, are really identical in all exploiting areas.

At present, in Husnicioara open pit, one can be observed a geological section comprised between the coal layers IV and VII (Fig. 1), showing a transition from the medium shoreface to a coastal plain. The coal indicates the paralic facies. The siliciclasts indicate both fluvial and eolian inputs.

Above the Layer VII, a discontinuity can be noticed. A *Pristinunio pristinus* (BIELZ, 1864) lumachelle occur immediately above this discontinuity, where some bone fragments were collected by one of us (C.V.). It is rather obvious that at Husnicioara, the Romanian succession is not continuous above the Layer VII.

In these siliciclasts, fragments of teeth and bones belonging to large mammals occur. Sometimes, geologists or qualified workers recover these fossils, but their exact position in the succession remain usually, rather unclear.

The top of the succession indicates that the Pliocene sediments were eroded after the end of the Pliocene. During the Quaternary, a number of creeks and valleys incised this area, and probably a part of the Pliocene deposits had been moved away. In such an infilling deposit accumulated in an ancient valley, a number of fossil bones belonging to Quaternary large mammals, forming a

kind of bone-breccias, were accumulated. A number of these bones were retrieved due the exploiting activities. Unfortunately, a large number were severely damaged because digging machines, without the presence of a qualified supervisor, had moved out the sediment.

PALEONTOLOGY

Order Proboscidea ILLINGER, 1911

Family Gomphotheriidae HAY, 1922

cf. *Anancus arvernensis* (CROIZET & JOBERT, 1828)

(Pl. I, fig. 3)

Material: right M3, distal fragment (DTSPFM 1836).

Level: unknown; the tooth was found removed from its level, due to the exploitation works.

Measurements (mm):

Width of the 5-th ridge:	77.0
Width of the talon	: 62.0

Description. The fragment preserves only the talon, composed by five big conules and another smaller one, the whole fifth ridge, and a posttrite fragment of the fourth one. The intermediary conule is well expressed. The posterior margin is fairly rounded, very well resembling with the M3 figured by Schlesinger (1922, Taf. X, Fig. 5) from the Rákoskeresztúr (Hungary) Pliocene ("Levantin").

Discussion. Mastodon remains are not rare in the Pliocene from Oltenia. The most frequent species is *A. arvernensis*, well known from several sites in this area (Athanasiu, 1908; Barbu, 1930; Apostol, 1968). Usually, only isolated teeth have been found. However, an almost complete skeleton originated from Stoina (Dolj dept.), partly described by Demetrescu & Nicolaescu-Plopșor (1929). *Mammuth borsoni*, the only Mammutidae representative in the Pliocene of Romania is more rare, but also present in some sites, in association with *A. arvernensis* (e.g. Groșerea - MN 16 a subzone; Feru et al., 1983; Rădulescu et al., 1998). Later, in MN 16 a/b subzone, the two mastodons are in association with "*Mammuthus*" *rumanus* (STEFĂNESCU, 1924).

The specimens unearthed at Derșida, Sălaj district (Latest Pontian, MN 13) are among the most ancient ever found in our country (Codrea et al., 2002).

A. arvernensis is a species described from several Turolian and Ruscinian localities from Europe (Van Essen & Mol, 1997; G hlich, 1999). In Romania's neighborhood, one of the most amazing discoveries of an *A.*

arvernensis taphocenosis is the one from Dorkovo, Bulgaria (MN 14; Thomas et al., 1986).

Unfortunately, the paleontological material from Husnicioara is too scarce for allowing evaluating the degree of evolution of the animal.

Proboscidea indet., cf. *Mammuthus primigenius* (BLUMENBACH, 1799)
(Pl 2, fig. 2)

Material: a calcaneum distal fragment (DTSPFM 1837).

Level: from the filling sediment accumulated on a former creek or valley, cut by the exploiting works above the coal Bed VII. Its age it is Late Quaternary.

Description. Only the distal part of the bone is preserved, exposing the *tuberositatis calcanei*. The bone is broken in the *sustentaculum tali* area.

Discussion. By its morphology and dimension, this bone could be related to a young mammoth.

Order Perissodactyla OWEN, 1848

Family Rhinocerotidae OWEN, 1845

Genus *Stephanorhinus* KRETZOI, 1942

cf. *Stephanorhinus jeanvireti* (GUÉRIN, 1972)

(Pl. I, figs. 1a, 1b, 2)

Material: left radius, proximal fragment (DTSPFM 1838).

Level: above the coal Layer VII, Husnicioara open pit.

Measurement (mm):

Proximal transverse diameter:	104.0
Transverse diameter of the diaphysis:	55.0
Antero-posterior diameter of the diaphysis:	37.0

Description. The bone preserves the proximal epiphysis and approximately the proximal half of the diaphysis. The posterior side is damaged, due to a recent break. In this manner, the medial articular surface is incomplete. The transverse diameters of the articular facets with the humeri are almost equals. The external articular surface is more concave, compared with the medial one. The medial surface anterior border is some more advanced, compared to the external one that is more retired. However, this retirement is not very ample. The posterior border of the external articular surface is straight and oblique if reported to the transversal diameter axis. The lateral tuberosity is strong and clearly exceeds the lateral limit of the external articular surface. The brachial biceps insertion is located toward the medial side. Its position is very similar with the ones figured for the species by Guérin (1972, 1980).

Discussion. *S. jeanvireti* is a species with a stratigraphical range restricted to the Late Pliocene (Guérin, 1980).

In Romania, it is known from the Dacic Basin, where it occurred in MN 16 a subzone, above the coal Layer XII (Rădulescu et al., 1998). Above the Layer XIII another rhino occurred, *S. etruscus* (FALCONER, 1859). The two rhinos were coeval during the Late Pliocene.

Another area where this species was reported is the Southeastern Transylvania, in several Late Pliocene sites as Araci-Fântâna Fagului, Iarăși-Cariera Nouă and Cariera Veche, Ilieni, Cernatu-Cariera Robert (Rădulescu & Samson, 1985). There, the association of this rhino with *S. etruscus* remains unknown.

At Husnicioara, the last coal bed observed in the section is the Layer VII. In these circumstances, we suppose a discontinuity after the deposition of the coal belonging to Layer VII. The sedimentation continued after a gap, corresponding to a wide timespan (MN 15 and even a part of the MN 16 units, *i.e.* Siensian-Pelendavian). This situation could be simply explained if considering the location of Husnicioara area in the Carpathian Foredeep, very close to the margin of the Dacic Basin, near the Carpathes. It was a realm where the sedimentation begun capricious, when the Romanian fluvio-lacustrine facies installed.

Genus *Coelodonta* BRONN, 1831 (= *Tichorhinus*)

Coelodonta antiquitatis (BLUMENBACH, 1807)

(Pl. II, figs. 1, 3)

Material: left radius, without the distal epiphysis (DTSPFM 1839).

Level: Husnicioara open pit, in the filling of a palaeo-valley.

Measurements (mm):	Transverse proximal diameter:	116.0
	Antero-posterior proximal diameter	73.0
	Transverse diameter of the diaphysis:	62.0
	Antero-posterior diameter of the diaphysis:	38.0

Description. The high value of the transverse diameter, the relationship between the inner and the outer proximal articular surfaces, the cranial and caudal outlines of the bone, as well as the location of the brachial biceps insertion, allow the assignment of the radius to the woolly rhino, excluding other Middle or Upper Pleistocene species as *Stephanorhinus kirchbergensis* (JAEGER, KAUP, 1839, 1841) or *Stephanorhinus hemitoechus* (FALCONER, 1868).

Discussion. Woolly rhino's radius are not rare in the Upper Pleistocene deposits from Romania. Codrea & Gherdan (1990) or Codrea & Botoș (1995) described such bones from Avram Iancu (Bihor department) or Cristești (Mureș department). Compared with these two items, one can outline higher dimensions for

the proximal epiphysis if compared with the Avram Iancu rhino, but smaller like those from Cristești.

The damaged status of the bone makes impossible an evaluation of the evolving stage of the animal.

CONCLUSIONS

In Husnicioara open pit area, a wide Pliocene succession can be followed, starting with the so-named coal Layer IV. The last coal layer exposed in the open pit is the Layer VII. Above this level, an important discontinuity can be observed. At least the Pelendavian (Middle Romanian) lye in a disconformity's relationship with the Dacian. Pană et al. (1981) underlined over two decades ago this detail.

Vertebrate fossil were practically unknown from Husnicioara until our research. A mastodon, assigned to *A. arvernensis* originated from an uncertain level. It could originate from the Dacian deposits, but as well as the Romanian ones, because the stratigraphic range of this species fit well with the whole Pliocene, and even with the Latest Miocene.

S. jeanvireti is a rhino specific to the Romanian. At Husnicioara, its radius originates from the deposits cropping out above the coal Layer VII. Such a position fit extremely well with the stratigraphical pattern outlined at Husnicioara by several geologists. It is clear that the depositional environments evolved at Husnicioara from coastal plain facies toward lacustrine and fluvio-lacustrine facies, with swampy episodes, during the whole Dacian (Getian + Parscovian). The last ones, continued to evolve during the Romanian too.

After the deposition of the Pliocene deposits, this marginal area of the Carpathian Foredeep emerged, and a long erosion process took place. During the Late Quaternary, a hydrographic system, with creeks and valleys, incised the Pliocene deposits. In such traps, sediments containing large mammal bones accumulated. Such bones were collected on the top of the Husnicioara open pit succession. The bones recovered represent mainly long bones fragments and vertebrae, belonging to Quaternary large herbivores. Unfortunately, these bones were broken when unearthed, and now we have to deal with a real puzzle-like game, with a lot of missing elements. In these circumstances, only the presence of the woolly rhino and a proboscidean, probably a mammoth, remain obvious. Even so, it is enough to suppose the assignment of these deposits to the last Quaternary glacial.

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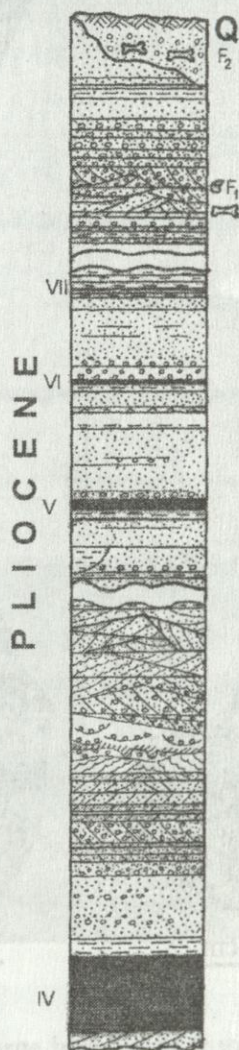
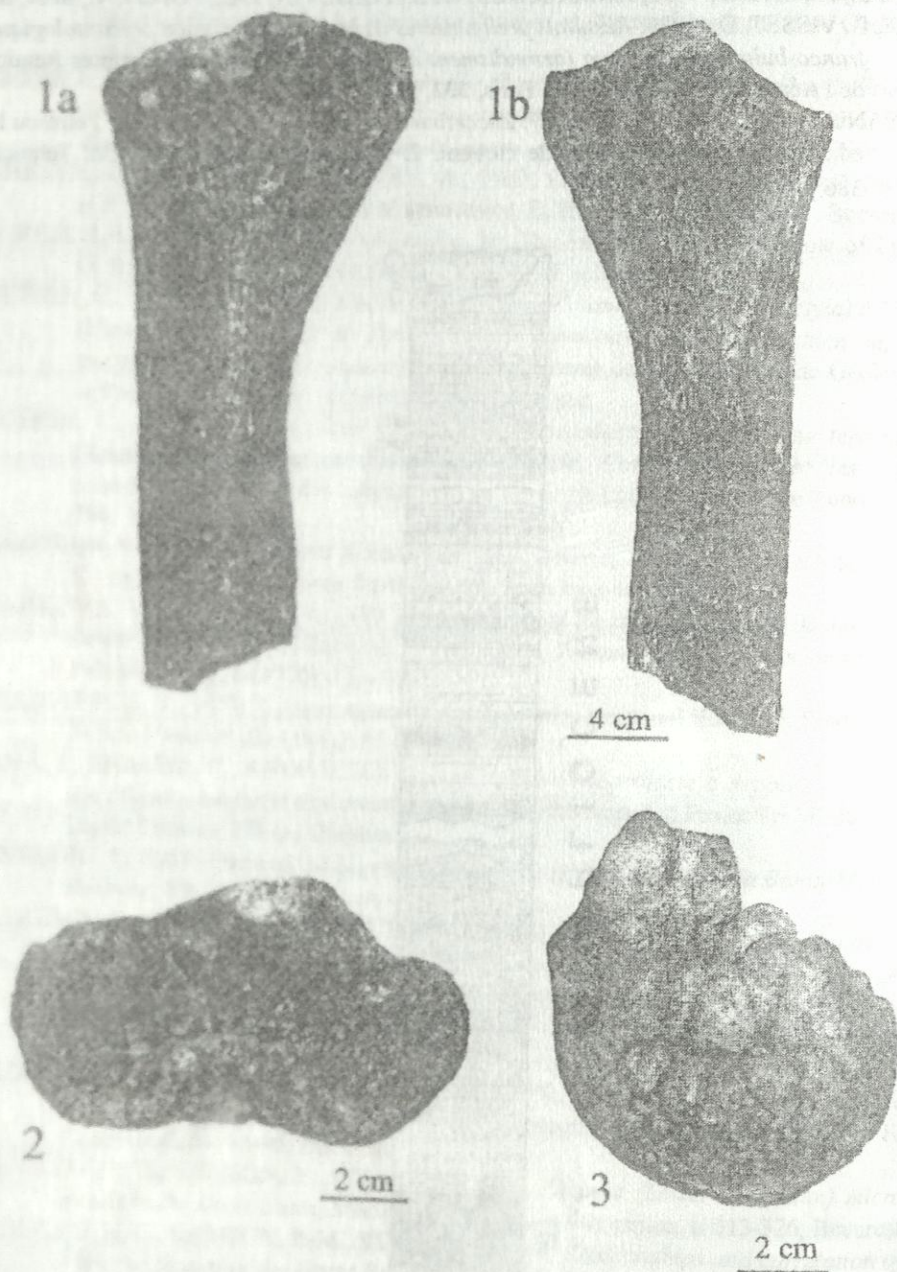
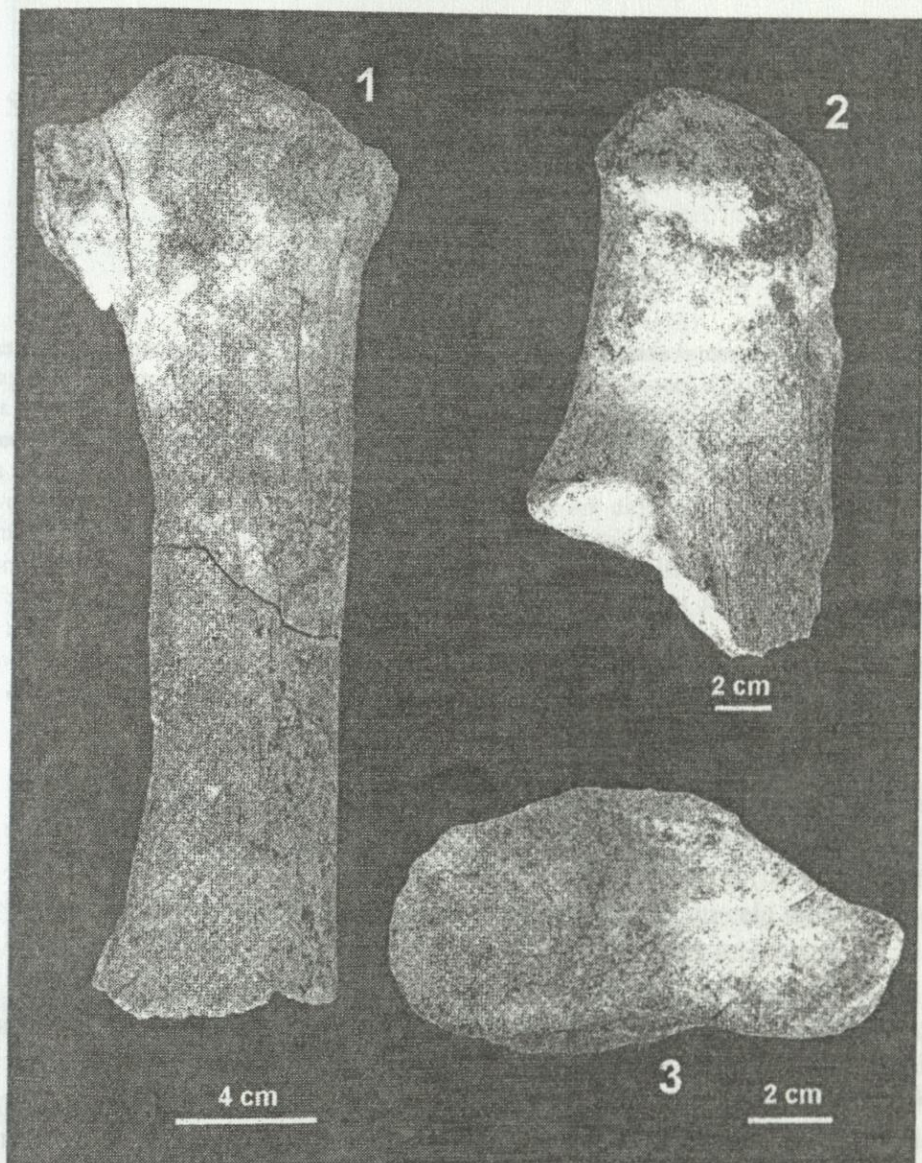


Fig. 1 - Geological log on the Pliocene deposits from Husnicioara open pit. F1 = Pliocene (Romanian) fossiliferous site ; F2 = Quaternary fossiliferous site.



Pl. 1: Pliocene large herbivores from Husnicioara:
 cf. *Stephanorhinus jeanvireti*: radius, proximal fragment, anterior view
 (Fig. 1a), posterior view (Fig. 1b) and articular surface view (Fig. 2)
 cf. *Anancus arvernensis*: M3 distal fragment (Fig. 3)



Pl. II: Quaternary large herbivores from Husnicioara:

Coelodonta antiquitatis: radius fragment, posterior view (Fig. 1) and proximal articular surface view (Fig. 3)

Proboscidea indet., cf. *Mammuthus primigenius*: calcaneum fragment (Fig. 2)

