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PLIOCENE AND PLEISTOCENE MAMMALIAN BIOSTRATIGRAPHY IN SOUTHEASTERN TRANSYLVANIA (ROMANIA)

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The successive mammalian assemblages in southeastern Transylvania (Braşov Depression, Ciuc Basins), ranging from Middle Pliocene to Upper Pleistocene, are presented and their chronological relationship indicated. Chronological confirmation is supplied by palaeomagnetic determinations and radiometric dates.

1. INTRODUCTION

The purpose of this paper is to present the successive mammalian faunas of the Braşov Depression and the Ciuc Basins, southeastern Transylvania, in the light of recent advances in biostratigraphy.

The Braşov Depression is situated in the Carpathian Bend Zone and is constituted of several basins. Some stratigraphic facts concerning this area will be outlined below (Jekelius 1932, Liteanu & al. 1962, Radulesco & al. 1965):

1.1. BARAOLT BASIN (Code BB). To the north, the Cretaceous rocks are overlain by a lacustrine sequence containing coal beds (Horizon I or "coal complex"). At Căpeni and Vîrghiş (a small adjoining basin) the productive coal bed (III) yielded Middle Pliocene mammalian remains. Horizon I is overlain by a rather uniform succession of cineritic clays and marls representing the deep-water facies of Horizon II (or "marly complex"). In the upper part of this horizon a greater participation of silt and sand was observed (Casta 1980). In the Iarăş area, a sand formation, which yielded Middle and Upper Pliocene mammals, is considered to represent a littoral equivalent of the upper part of Horizon II. A new sequence of silty clays and marls ends the sand formation at Iarăş.

In the southern part of the Baraolt Basin (Rotbav-Feldioara area), several mammalian associations, ranging from Lower to Middle Pleistocene ("Cromerian complex"), were recovered from a fluvio-lacustrine succession of sands, clays and gravels representing Horizon III (or "sandy – clay complex") of the local stratigraphy. This horizon marks the final phase in the filling of the lake. Loess deposits overlying Horizon III sediments are developed in the Araci-Ariuşd area and yielded mammalian faunas corresponding to the Mindel and Riss stages.

1.2. SFÎNTU GHEORGHE BASIN (Code SGB). The fluvio-lacustrine sand deposits in the Debren Valley yielded Middle and Upper Pliocene mammalian remains and are considered to be equivalent to the littoral facies of Horizon II in the Baraolt Basin. Upper Pliocene mammals are known from a lignite bed attributable to Horizon II (littoral facies), in the small Ilieni Basin situated on the southwestern border of the Sf. Gheorghe

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Basin. In the axial part of the Sf. Gheorghe Basin an andesitic detrital formation, representing an alluvial fan or "cone" of the Olt River, overlies Pliocene deposits and yielded mammalian faunas of Mindel and Riss ages. In loess deposits from the same area, Riss and Lower Würm faunas are known.

1.3. TÎRGU SECUIESC BASIN (Code TSB). Upper Pliocene mammals were recovered from sand deposits (Horizon II, littoral facies) on the western border of the basin, at Cernatu. A fossiliferous level in andesitic detrital deposits yielded a mammalian association of Mindel-Riss age. Loess deposits supplied mammalian remains of Würm age.

1.4. CIUC BASINS. These basins are situated north of the Braşov Depression. The andesitic detrital deposits in the southern part of the Lower Ciuc Basin (Code LCB) yielded at Tuşnad and Sînmartin mammalian remains of Riss age. The fossiliferous karst deposits at Sîndominic, Upper Ciuc Basin (Code UCB), yielded two distinct rich mammalian assemblages in association with Palaeolithic pieces belonging to the Mindel-Riss and Riss stages respectively.

In the brief description which follows, the characteristics of the fossiliferous sites will be examined and their chronological equivalents indicated. The faunal lists are revised and include the latest results of our investigations.

2. MIDDLE PLIOCENE (ZONE MN 15)

2.1. LOWER PART (HORIZON I, LIGNITE BED III)

2.1.1. **Căpeni** (BB). Fauna (Kretzoi 1954, Radulesco & Samson 1972, Radulesco & al. 1965, Samson & al. 1971): *Zygolophodon borsoni*, *Anancus arvernensis*, *Tapirus arvernensis*, *Diceratorhinus leptorhinus*, *Hipparion* sp., *Macrohippus sylvarum (nomen nudum*, a monodactyle horse in Kretzoi 1938), *Sus minor*, *Metacervocerus* cf. *pardinensis*, *Cervus* sp. (the size of *Capreolus*), "*Parabos*" cf. *athanasiui*, Bovidae indet. (*Bison*-like), *Canis* sp., *Protarctos boeckhi*, *Parailurus anglicus*, Felidae indet. (the size of *Lynx*), Machairodontinae indet., *Castor praefiber*, *Prospalax priscus*, *Romanocastor*(?) *capeniensis*, *Dolichopithecus ruscinensis*, (?) *Mesopithecus monspessulanus*.

2.1.2. **Vîrghiş** (BB). Stratigraphic data: Casta (1980, 2, figs. 27–28). Fauna (Radulesco & al. 1965, Samson & al. 1971): *Z. borsoni*, *A. arvernensis*, *T. arvernensis*, *D. leptorhinus*, *S. minor*, *M.* cf. *pardinensis*, "*P.*" cf. *athanasiui*, Bovidae indet. (*Bison*-like), *D. ruscinensis*.

Correlations: later than Serrat-d'en-Vacquer (France); equivalent to Gödöllö (Hungary) and probably to the lower part of the Kuchurganian horizon of the Moldavian faunal complex (Soviet Union). The Căpeni-Vîrghiş mammalian assemblage seems to be slightly younger than the Mă-

luşteni fauna (southern Moldavia) which includes a larger Suid form (*S.* cf. *provincialis*).

2.2. UPPER PART (HORIZON II, LITTORAL FACIES, BASAL SECTION)

2.2.1. **Debren-2** (SGB), sands with gravel lenses at base (layers 9—10). Stratigraphic and faunal data: Kovács & al. (1980). Fauna: *A. arvernensis*, *D. leptorhinus* (skull fragment without nasal septum), *Muntiacus polonicus*, *Hypolagus brachygnathus*.

Correlations: Weze faunal level (Poland).

2.2.2. **Iarăş-Cariera Nouă** (BB), lower level, ferruginous sands (layer 4 c) = Iarăş-1. Stratigraphic data: Alimen & al. (1969: 551—552, fig. 2). Fauna (Radulesco & al. 1965): *Z. borsoni*, *A. arvernensis*, *T. arvernensis*, *D. leptorhinus* (more hypsodont form), *Hipparion malustenense* ssp. "*P.*" cf. *athanasiui*.

Correlations: the faunal assemblage is very similar to that from Căpeni-Vîrghiş, except the degree of hypsodonty of the rhinoceros; Wölfersheim (F.R.G.).

3. UPPER PLIOCENE (ZONE MN 16)

3.1. LOWER PART (HORIZON II, LITTORAL FACIES, MIDDLE SECTION)

3.1.1. **Debren-1** (SGB), sandy silts with broken shells (layer 7). Stratigraphic and faunal data: Radulesco & Samson (1984). Fauna: *Desmana kormosi*, *Blarinoides mariae*, *Mimomys gracilis transylvanicus*, Leporidae indet. A rich molluscan fauna was studied by Jekelius (1932).

3.1.2. **Araci-Fîntîna Fagului** (BB), lower level, white sands (layer 1, near the base). Stratigraphic data: Casta (1980, 2, figs. 31—32). Fauna (Radulesco & al. 1965): *Z. borsoni*, *A. arvernensis*, *Diceratorhinus* cf. *elatus**) (skull with nasal septum), *M.* cf. *pardinensis*.

Correlations: Subzone MN 16a; the Debren-1 site is later than Weze and Csarnóta-2 (Hungary) where more primitive forms of *M. gracilis* were indicated; the Araci-Fîntîna Fagului fauna is probably equivalent to the Vialette faunal stage (France).

3.2. UPPER PART (HORIZON II, LITTORAL FACIES, UPPER SECTION)

3.2.1. **Iarăş-Cariera Nouă** (BB), middle-upper level, white sands (layer 6) = Iarăş-2. Stratigraphic data: Alimen & al. (1969: 551—552, fig. 2). Fauna (Rădulescu & Kovács 1968): *D.* cf. *elatus*.

Beneath the fossiliferous level, in the middle portion of the sand formation frost phenomena were indicated (Alimen & al. 1969).

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*) Syn. *Rhinoceros etruscus* var. *astensis* = *Diceratorhinus jeanvireti*.

3.2.2. **Iarăș-Cariera Veche** (BB), the same sands as at Cariera Nouă. Fauna (Radulescu & al. 1965) : *Dicerorhinus* cf. *etruscus*, *Arvernoceros* cf. *ardei*.

Correlations : Subzone MN 16b ; Covrigi fauna in the Dacic Basin (Feru & al. 1983), Les Etouaires (France), Moldavian faunal complex, upper part of the Kagulian horizon (Soviet Union).

3.3. LOWER/UPPER PART (UNDIFFERENTIATED)

3.3.1. **Ilieni** (SGB), lignite bed. Stratigraphic data : Jekelius (1932 : 35—36). Fauna (Radulescu & al. 1965, Samson & Kovács 1970, Toula 1911) : *A. arvernensis*, *T. arvernensis*, *D.* cf. *elatus*, Cervidae indet. I+II, *Gazella* sp., *Ursus minimus*, *Hystrix* cf. *refossa*, *Castor praefiber*.

3.3.2. **Cernatu-Cariera Robert** (TSB), coarse sands. Fauna (Samson & Kovács 1972) : *D.* cf. *elatus*, Canidae indet., *A.* cf. *ardei*, *Trogontherium minus*, *Mimomys* sp.

The exact chronological position of the sites above is difficult to determine. The presence of *U. minimus* at Ilieni shows that this fauna might belong to both Vialette and Les Etouaires faunal stages. The Cernatu fauna containing a more progressive *Mimomys* form (Radulescu & Samson 1971) is later than Debren-1. The presence of *Arvernoceros* seems to suggest that Cernatu might be equivalent to Les Etouaires ; at Vialette the occurrence of this cervid is so far uncertain (Heintz 1970).

The MN 16b fauna as a whole is immediately anterior to the first appearance of the elephant (*"Archidiskodon" rumanus*) in Romania, known at Tulucești (southern Moldavia) and Cernătești (Dacic Basin) (Samson & Radulescu 1973).

DISCUSSION

The palynological and palaeomagnetic studies joined to radiometric dates concerning the Pliocene deposits in the Baraolt Basin may provide another means of correlation in connection with the recent investigations in northwestern Mediterranean region (Suc & Zagwijn 1983) and the new absolute datings at Vialette (Bandet & al. 1978) and Les Etouaires (Ly & al. 1982).

Palynological data. The pollen analyses carried out at north-east of Baraolt (boring 15), Racoșul de Sus (lignite pit) and Măieruș (clay pit) (Roman 1978, 1981) showed that Horizon I and part of Horizon II contain a Reuverian flora indicative of a warm-temperate climate interrupted by some negative oscillations. The upper part (more silty) of Horizon II is characterized by a cooling of the climate accompanied by drier conditions as proved by the disappearance of *Engelhardtia* and *Nyssa* and an increase in the frequency of herbaceous plants (Chenopodiaceae especially) and *Pinus* ; the registration of an alternate dominance of A.P. and N.A.P. indicates a sequence of climatic fluctuations. The same climatic depression was also revealed by studies on the littoral sand facies of Horizon II at Iarăș-Cariera Nouă, which corresponds on the basis of palaeomagnetic measurements to the upper silty clays in the sequence at Măieruș.

Palaeomagnetic data. The palaeomagnetic measurements carried out by V. M. Trubikhin (A. L. Chepalyga, pers. comm.) showed that part of Horizon I including the lignite bed III exposed at Iarăș-Vale (where *Z. borsoni* was found), a site near Iarăș-Cariera Nouă (Alimen & al. 1969 : 551, fig. 2), and most of the following Horizon II are characterized by a reversed polarity. The upper portion, more silty, of Horizon II revealed at Măieruș a normal magnetization. At Iarăș-Cariera Nouă, the sand formation is also distinguished by a normal polarity, while the overlying sequence of silty clays and marls pointed out a reversed magnetization.

According to the new chronological interpretation of the classic Pliocene mammalian sites in western Europe (Suc & Zagwijn 1983), it seems possible to locate the sand sequence at Iarăș-Cariera Nouă in the Upper Gauss interval (Iarăș-1 fauna following immediately the Kaena event and Iarăș-2 fauna at about 2.5—2.6 Myr). The lignite bed III of Horizon I and the greatest part of Horizon II were probably deposited during the Kaena event. The upper silty clays and marls at Iarăș-Cariera Nouă are characterized by a reversed polarity. This sequence, which yielded molars of *Anancus arvernensis*, might be situated at the beginning of the Matuyama epoch.

Radiometric dates. Two samples of basaltic rocks associated with clays of Horizon II suggested (Casta 1980) the situation of the lacustrine filling in the Baraolt Basin between approximately 3 and 2.25 Myr. These radiometric dates are in accordance with the palaeomagnetic determinations.

4. LOWER PLEISTOCENE

4.1. UPPER PART (HORIZON III, TOP OF THE MIDDLE PORTION)

4.1.1. Rotbav-Silvestru (BB), ferruginous sands and gravels with frost phenomena. Stratigraphic data : Alimen & al. (1969 : 553—554, fig. 3, I). Fauna (Radulesco & Samson 1967, Radulesco & al. 1965, Samson 1976) : *Mammuthus meridionalis*, "*Allohippus*" cf. *altidens* "*A.* " cf. *marxi*, *Equus aluticus*, *Allocaenelaphus arambourgi* (a primitive megacerine), *Cervus* sp., *Trogontherium boisvilletti boisvilletti*.

The same fossiliferous level was also intercepted at the following sites :

4.1.2. Rotbav-Cariera de sub Brazi (BB). Fauna (Radulesco & al. 1965, Samson 1976) : "*Allohippus*" cf. *suessenbornensis*.

4.1.3. Feldioara-Cetate (BB). Fauna (Radulesco & Kovács 1966) : *Dicerorhinus etruscus* cf. *brachycephalus*.

Correlations : the Rotbav-Silvestru assemblage seems to be intermediate between the Tetoiu-2/Irimești and Tetoiu-3 faunas in the Dacic Basin ; VIIIth terrace (with *Allocaenelaphus*) of the Dniester, Tamanian faunal complex, Kairian horizon (Soviet Union).

5. MIDDLE PLEISTOCENE

5.1. "CROMERIAN COMPLEX" (HORIZON III, UPPER PORTION)

5.1.1. **Rotbav-Dealul Țiganilor** (BB), lower level (= level-1), ferruginous sands and gravels. Stratigraphic data: Radulescu & Kovács (1966: 235). Fauna (Radulescu & al. 1965): *Mammuthus trogontherii, D. etruscus, "A."* cf. *marxi, Praealces latifrons.*

5.1.2. **Feldioara-Carieră** (BB), the same fossiliferous level as above. Stratigraphic data: Alimen & al. (1969: 553—554, fig. 3, II). Fauna (Radulescu & Kovács 1966, 1968; Radulescu & al. 1965, Samson 1976): *M. trogontherii, D. etruscus, "A."* cf. *marxi, "A."* cf. *suessenbornensis, Equus* cf. *mosbachensis, P. latifrons, Cervus claphus acoronatus, Capreolus capreolus suessenbornensis.*

Correlations: Tiraspolian faunal complex, Kolkotovian horizon (Soviet Union) (later than Brunhes/Matuyama boundary).

5.1.3. **Rotbav-Dealul Țiganilor** (BB), upper level-1 (= level 2 = Clay A), dark gray silty clay. Stratigraphic data (see above). Fauna (Radulescu & Samson 1971, Samson & Radulescu 1975): *P. latifrons, C. capreolus suessenbornensis, Desmana moschata* cf. *mosbachensis, Talpa europaea, Sorex subaraneus, Drepanosorex savini* cf. *austriacus, Neomys* sp., *Castor fiber, Trogontherium* cf. *cuvieri, Sicista* cf. *subtilis, Spalax* sp., *Mus musculus* cf. *synanthropus, Parapodemus coronensis, Apodemus* cf. *sylvaticus, Pliomys episcopalis, Clethrionomys* cf. *glareolus, Arvicola cantianus* cf. *mosbachensis, Microtus arvalis-agrestis* group (incl. *Pitymys arvalidens*), *Lepus* cf. *europaeus.*

In the lower part of the level-1, light olive gray silty lenses are intercalated showing a steppe interval: presence of *Lagurus* cf. *transiens* and *Cricetus praeglacialis.*

5.1.4. **Rotbav-Dealul Țiganilor** (BB), upper level-2 (= level 3 = Clay B), light olive gray clay. Stratigraphic data (see above). Fauna: *Equus* cf. *mosbachensis, C. capreolus suessenbornensis, Rangifer* sp.

5.1.5. **Feldioara-Carieră** (BB), the same fossiliferous level as at the previous site. Fauna: *Bison* sp., *S. subaraneus, T.* cf. *cuvieri, C.* cf. *glareolus, A. cantianus* cf. *mosbachensis, M. arvalis-agrestis* group, *M.* cf. *oeconomus, Lepus* sp.

The rich mammalian assemblage from the upper level-1 indicates a cool temperate wetter climate, interrupted at the base by a steppe interval. A polygonal ground indicating periglacial conditions superposed by remnants of a red fossil soil are intercalated between the upper levels 1 and 2. The fauna of the upper level 2 is characterized by the presence of *M.* cf. *oeconomus* and *Rangifer* showing a new deterioration of the climate.

Correlations: both upper levels are broadly equivalent to faunas at Tarkö, layers 10—5 (Hungary), Hundsheim (Austria), Mosbach, main level (F.R.G.), St. Estève-Janson, layers F—G (France), Westbury, "Rodent Earth" (England). The steppe small mammals at the base of the upper level-1 are very probably equivalent to the Brașov (Gesprengberg) fauna in Transylvania.

5.2. MINDEL/ELSTER

5.2.1. **Araci-Carieră** (BB), lower part of a loessic sequence (layers 2—5) overlying a clay bed equivalent to the upper levels at Feldioara-Carieră/Rotbav-Dealul Țiganilor. Stratigraphic data: Alimen & al. (1969: 553—555, fig. 3, III). Fauna (Rădulescu & Kovács 1966, 1968; Radulesco & al. 1965; Samson 1976): *Coelodonta antiquitatis* ssp., *Equus* cf. *mosbachensis*, *Megaceros (Dolichodoryceros) savini* (very large form), *Bison* cf. *priscus* (very large form).

5.2.2. **Araci-Fîntîna Fagului** (BB), upper level, loessic sediments (layers 1 and 3) which eroded the white sands of the lower level (Upper Pliocene). Stratigraphic and faunal data: Radulesco & Kovács (1974: 125—128, fig. 1), Samson (1976). Fauna: *Coelodonta antiquitatis* ssp., *Equus* cf. *missi*, *Bison* cf. *priscus* (very large form).

Both sites yielded similar faunas which are indicative of a severe deterioration of the climate when cold steppe conditions were prevalent.

Correlations: upper faunal levels at Süssenborn (G.D.R.) and Mosbach and probably also layer H at St. Estève-Janson.

5.2.3. **Zoltan** (SGB), middle level A of the andesitic detrital formation. Stratigraphic and faunal data: Samson & Kovács (1970), Samson & al. (1973: 243—251, fig. 2). Fauna: *Mammuthus trogontherii*.

The following sites belong to the same fossiliferous level (stratigraphic and faunal references as above):

5.2.4. **Ghidfalău-1** (SGB). Fauna: *Coelodonta antiquitatis* ssp., *Equus* cf. *mosbachensis*.

5.2.5. **Ghidfalău-2** (SGB). Fauna: *E.* cf. *mosbachensis*.

5.2.6. **Sf. Gheorghe-Cariere Sud** (SGB). Fauna: *C. antiquitatis* ssp., *E.* cf. *mosbachensis*.

At Ghidfalău-1 and 2, the upper part of the middle level A was strongly disturbed by periglacial phenomena (Casta 1971). At Ghidfalău-2 the middle level A is surmounted by a weathering formation ("ferretto") which is well developed towards the northern area of the Sf. Gheorghe Basin (Bicsad) and is considered to be of Mindel-Riss age (Samson 1976).

Correlations: see 5.2.2.

5.3. MINDEL-RISS/HOLSTEIN

5.3.1. **Reci-Comolău** (TSB), andesitic detrital deposit above the middle level A. Fauna (Kovács 1981): *Dicerorhinus kirchbergensis*, *Cervus elaphus*, *Bubalus murrensis*.

Correlations: Steinheim a. d. Murr, "*antiquus*-Schotter" fauna.

5.3.2. **Sîndominic-1** (UCB), karst deposit. Stratigraphic and faunal data: Păunesco & al. (1982), Samson & Rădulescu (1969). Fauna: *Erinaceus europaeus*, *Talpa europaea*, *Sorex araneus macrognathus*, *S. minutus*, *Crocidura leucodon* ssp. (large form), *Sciurus vulgaris*, *Marmota* sp., *Citellus citelloides*, *Castor fiber*, *Glis glis*, *Dryomys nitedula*, *Eliomys* sp., *Muscardinus avellanarius*, *Spalax* sp., *Sicista* sp., *Apodemus sylvaticus*, *Allocricetus bursae*, *Cricetus cricetus*, *Pliomys lenki* cf. *relictus*, *Clethrionomys glareolus*, *Arvicola terrestris dominici*, *Pitymys subterra-*

neus, *Microtus nivalis*, *M. arvalis*, *M. agrestis*, *Ochotona pusilla*. Some Lower Palaeolithic artifacts were also found.

Correlations : upper part of the Mindel-Riss interglacial ; Solymár phase (Hungary).

6. UPPER PLEISTOCENE

6.1. RISS/SAALE

6.1.1. **Bodoc-3** (SGB), middle level B_1 of the andesitic detrital formation. Stratigraphic and faunal data : Samson (1976), Samson & Kovács (1970), Samson & al. (1973 : 243—251, fig. 2). Fauna : *Megaceros giganteus*.

The following sites also belong to the middle level B_1 :

6.1.2. **Malnaș** (SGB). Fauna : *Mammuthus primigenius* (primitive form).

6.1.3. **Ghidfalău-1** (SGB). Fauna : *Coelodonta antiquitatis* ssp., *Equus insulidens*.

6.1.4. **Ghidfalău-2** (SGB). Fauna : *C. antiquitatis* ssp.

6.1.5. **Sf. Gheorghe-La Moară** (SGB). Fauna : *M. primigenius* (primitive form).

6.1.6. **Sf. Gheorghe-Cariere Sud** (SGB). Fauna : *M. primigenius* (primitive form), *C. antiquitatis* ssp., *E. insulidens*.

6.1.7. **Tușnad-Sat** (LCB). Stratigraphic data : Casta (1980, 2, figs. 56—57). Fauna (Samson 1976, Samson & Rădulescu 1969) : *E. insulidens*, *Bison priscus*, *Marmota bobac* ssp.

6.1.8. **Sînmartin** (LCB). Fauna : *M. primigenius* (primitive form).

In the middle level B various periglacial phenomena were registered (Aliman & al. 1969).

A rich assemblage of mammals associated with Palaeolithic implements is known from only one site and is indicated below.

6.1.9. **Sîndominic-2** (UCB), karst deposit overlying the Sindominic-1 sediments. Stratigraphic and faunal data : Paunesco & al. (1982), Samson & Radulesco (1969). Fauna : *C. antiquitatis* ssp., *Equus steinheimensis*, *E. insulidens*, *Cervus elaphus*, *Rangifer tarandus*, *Bison priscus*, *Ursus spelaeus*, *Sorex* sp., *S. minutus*, *Citellus citelloides*, *Sicista subtilis*, *Apodemus sylvaticus*, *Clethrionomys glareolus*, *Lagurus lagurus*, *Arvicola terrestris dominici*, *Microtus nivalis*, *M. oeconomus*, *M. arvalis*, *M. agrestis*, *M. gregalis* cf. *martelensis*, *Ochotona pusilla*.

At the base of the fossiliferous deposit (layer 2a), *Sorex araneus macrognathus* and *Glis glis* were still present but very rare.

Correlations : Lower Riss = Riss I and Riss I—II of French authors ; "La Adam" Cave (layers 1—6), Romania ; "*trogontherii-primigenius* Schotter" fauna at Steinheim a. d. Murr. The Sîndominic-2 fauna may be situated at the beginning of the Riss Glaciation.

6.1.10. **Ariușd-Drum** (BB), loess deposit (layer 10) in a loess and fossil soil sequence. Stratigraphic data : Aliman & al. (1969 : 554—555, fig. 3, IV). Fauna (Radulesco & Samson 1975) : *Sorex* sp., *Neomys* sp., *Citellus* sp., *Clethrionomys* sp., *Arvicola terrestris*, *M. oeconomus*, *M.*

arvalis, *M. gregalis* cf. *martelensis* (dominant), Leporidae indet., *Ochotona pusilla*.

6.1.11. **Bodoc-1** (SGB), fossil soil (layer 21) in a loess sequence. Stratigraphic data: Alimen& al. (1969: 555–557, fig. 4, I). Fauna (Samson& Kovács 1970): *Dicerorhinus hemitoechus*.

Correlations: Middle Riss = Riss II and Riss II–III of French authors; "La Adam" Cave (layers 7–13); Ariușd-Drum with a fauna indicating a very cold time interval is correlative with the Aven I de la Fage, layer 5 (France); the fossil soil at Bodoc-1 is considered to represent the top of the Middle Riss.

6.1.12. **Bodoc-1** (SGB), cryoclastic rock fragments accumulated by solifluxion (layer 23) in a loess sequence. Stratigraphic data: Alimen & al. (1969: 555–557, fig. 4, I). Fauna (Samson & Kovács 1970): *C. antiquitatis* ssp., *Equus* sp. (large form), *E. steinheimensis*.

Correlations: Upper Riss = Riss III of French authors; "La Adam" Cave (layers 14–16).

The middle level B_2 of the andesitic detrital formation, devoid of mammalian remains, covers the Middle and Upper Riss stages on the basis of the stratigraphic relationships (Samson& al. 1973). Periglacial phenomena of Upper Riss age were described (Alimen & al. 1969).

6.2. WÜRM/WEICHSEL

Mammalian remains were recovered from the basal part of the loess sequence which overlains the andesitic detrital formation; this loess sequence represents the upper level in the local stratigraphic scale (Samson&al. 1973). Faunal data: Radulesco (1972), Radulesco& Kovács (1970). Radulesco& Samson (1971), Samson (1976), Samson& Kovács (1967, 1970), Samson&al. (1973).

6.2.1. **Bodoc-3** (SGB). Fauna: *Equus transilvanicus*, *Meles meles*, *Marmota bobac* ssp.

6.2.2. **Ghidfalău-1** (SGB). Fauna: *Mammuthus primigenius*, *E. transilvanicus*, *Megaceros giganteus*, *Felis spelaea*, *M. bobac* ssp.

6.2.3. **Sf. Gheorghe-La Moară** (SGB). Fauna: *E. transilvanicus* (type locality).

6.2.4. **Sf. Gheorghe-Cariere Sud** (SGB). Fauna: *C. antiquitatis*, *E. transilvanicus*, *F. spelaea*, *M. bobac* ssp.

6.2.5. **Coșeni** (SGB). Fauna: *Citellus citelloides*, *M. bobac* ssp., *Cricetus cricetus*, *Lagurus lagurus*, *Microtus arvalis*, *Ochotona pusilla*.

6.2.6. **Turia** (TSB). Fauna: *C. citelloides*, *M. bobac* ssp.

Correlations: upper part of the Lower Würm = Würm II of French authors; "La Adam" Cave (layers 20–38).

The chronological relationship of the fossiliferous localities in southeastern Transylvania and the Dacic Basin is shown in table 1. The Upper Pliocene and Lower Pleistocene successive mammalian associations in the Dacic Basin (Andreescu& al. 1981, Feru& al. 1983) fill the faunal gap which exists between Iarăș-2 and Rotbav-Silvestru faunas in the Brașov Depression. The position of the deposits corresponding to Upper Pliocene-Lower Pleistocene time interval at great depths, as proved by borings in the Rotbav-Feldioara-Bod area, might account for the above-mentioned faunal gap.

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