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A short scetch of the evolution and stratigraphy of the Plio-Pleistocene cricetids (Rodentia, Mammalia) in Hungary

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ABSTRACT: The summarization of the results of the detailed investigation on the Hungarian Latest Neogene, Pleistocene and recent hamster materials is given. The elaboration was carried out by the author during the last decade.

Introduction

Cricetids are of general importance in the biostratigraphy of the Neogene but in the Pliocene – Quaternary period, they have a secondary role behind Arvicolids. The author of this article effected the elaboration of the Hungarian Plio-Pleistocene hamsters by metrical and statistical morphological methods. The aim of this paper is the presentation of the summary of the results based on these investigations.

1. The *Cricetinus* species

From the Hungarian Late Pliocene, 3 *Cricetinus* species have been described:
– *Cricetinus europaeus* KRETZOI, 1959
– *Cricetinus beremendensis* HIR, 1994
– *Cricetinus janossyi* HIR, 1996

The most important morphological markers of the *Cricetinus* dentition are the undivided anteroconid on the m1 molars with a smooth and convex oral surface. The mesolophids are missing or short on the m1-m2 molars. The upper M1-M2 toothcrowns are characterized by the missing or weekly developed mesolophes. The posterior metalophule is rare on M2.

The separation of the *Cricetinus beremendensis* from the *Allocricetus* species is possible only on the basis of statistically abundant materials. The determination of the only or few teeth is dangerous or impossible (HIR, 1994). The *Cricetinus* species were the only representatives of the hamsters between the LAD of *Kowalskia* and the FAD of *Allocricetus*. The comparative study of the Hungarian, Ukrainian (TOPACHEVSKIY & SKORIK 1992), Siberian (VANGENGEJM et al, 1990) and Chinese (SHAOHUA, 1984) *Cricetinus* materials will be an important study in the future.

2. The *Allocricetus* species

– *Allocricetus bursae* SCHAUB. 1930
– *Allocricetus ehiki* SCHAUB 1930

The *Allocricetus* species were rather constant elements of the Plio-Pleistocene faunas . *A. ehiki* was found at Villany 3 to layer no.8 in the sequence of Tarkő (HIR, 1989, 1993-95).

TÁBLÁZAT KÜLÖN!!!

A. bursae appeared in the „Allophaiomys faunas" (Betfia IX., Osztramos 8) and died out in the Eemian. The LAD of this species is in the fauna of the Lambrecht Cave (JANOSSY, 1996).

In the earlier Hungarian literature, the exact separation of the two species was not given (JANOSSY, 1996).

During the investigations of the Hungarian *Allocricetus* material by the present author, the metrical differences between the two species corresponded to the results of FAHLBUSCH (1969) and PRADEL (1988) from Polish finds. In the rich Hungarian fossil series, not only biometrical differences were found between *A. bursae* and *A. ehiki*. There seems to be a difference in morphology as well. Among the M1,M2, M3 and m2,m3 of *A. bursae* a simple morphology is more frequent. Accessory elements such as mesolophe (M1-M2), posterior metalophule (M2), antero-lingual cingulum and mesolophid (m2-m3) have a somewhat higher frequency in *A. ehiki*.

In the evolution of the *Allocricetus* species, regional differences are possible. In the Early Pleistocene of the Eastern Mediterranean middle-sized species have been described: e.g. *Allocricetus croaticus* (PAUNOVIC M. & RABEDER G. 1996) *Allocricetus sp*. KOLLIADIMOU K. (1994 personal communication)

In France, CHALINE (1973, 1975) described different chrono-subspecies of *A. bursae* on the basis of metrical differences. Eg. the Middle Pleistocene *A. bursae duranciensis* and the Late Pleistocene *A. bursae correzensis*. The latter one has relatively larger dimensions. In Hungary, these differences are not so characteristic, but a general decrease of the measurements is visible from the older to the younger populations (HIR, 1993 b). This trend is only broken by the material of Somssich-hegy 2, which is unusualy small sized, but significantly larger, than *C. migratorius*.

3. *Cricetulus migratorius* (PALLAS, 1773)

The systematic relation of the *Allocricetus* and the *Cricetulus* genera was disputed in the literature. KURTEN (1968) used the name *Cricetulus bursae* for *Allocricetus bursae*. MAYHEW (1977) questioned the validity of the *Allocricetus* genus as well and underlined the morphological identity of the two genera. After the investigations by the present author (HIR, 1993 b), the recent *Cricetulus migratorius* from the Middle East and the fossil *Allocricetus bursae* from Hungary are distinguishable on the basis of dental measurements and in their morphology as well.

Accordingly, the *Cricetulus migratorius* occured in some Late Pleistocene and Early Holocene faunas in Hungary: Tokod (GASPARIK, 1993), Remete-hegy (JANOSSY, 1986), Vaskapu Cave (HIR, unpublished).

4. *Cricetus nanus* SCHAUB, 1933

In the original description, this hamster was described as a subspecies *(C. c. nanus)*. But on the basis of the metrical and morphological characters and also their stratigraphical range, the present author regards this taxon as a distinct species (HIR, 1994 b).

Cricetus nanus appeared in the Latest Villanyian assemblages containing *Allophaiomys deucalion* (e.g. Kolinany 3. – FEJFAR & HORACEK, 1983). The real flourishing of the species is found in the Early Biharian faunas characterized by *Allophaiomys pliocaenicus*.

During this period *C. nanus* is the dominant cricetid in the materials. E.g. Betfia 2. (SCHAUB, 1933), Betfia IX (HIR J. & VENCZEL M. 1997), Osztramos 8, 2, 14 (JANOSSY, 1986), Deutsch-Altenburg 2C1 (RABEDER G. 1996 personal communication). The regression of *C. nanus* is experienced in the section of Somssich-hegy 2, where the advanced morphotypes are the dominant in the *Microtus* material and the *Allophaiomys* is only a rare archaic morphotype.

Among the different *C. nanus* populations, substantial differences and evolutionary trends were not found.

This species got extinct without any descendants (HÍR, 1994 b). The LAD is in the level no. 13. in the section of Somssich-hegy 2 (HÍR, 1998)

5. *Cricetus praeglacialis* SCHAUB, 1930 – *Cricetus cricetus* (LINNAEUS, 1758) evolutionary line

The ancestor of the recent *Cricetus cricetus* is probably the *C. praeglacialis* from Villany 8. characterized by a bit larger dimensions and a more complicated morphology than the recent species (HIR, 1998 a). This kind of hamster is present in the first layer of the Tarkő sequence and in the Vértesszőlős lower palaeolithic site. Among the Late Pleistocene faunas, it was found in the materials of Várhegy and Süttő. The presence of *C. cricetus* is uninterrupted from the Early Wurmian (Subalyuk) to the Holocene.

6. *Cricetus runtonensis* NEWTON, 1909 evolutionary line

The mean dimensions of this species are between the corresponding mean measurements of *C. praeglacialis* and *C. major*. In the Hungarian Pleistocene, this species was found in the Early Pleistocene fauna of Somssich-hegy 2 and the Late Pleistocene (or Late Middle Pleistocene after the sense of JANOSSY, 1986) material of Solymár. The measurements of the two populations are very close to the *C. runtonensis* from the Polish localities Kozi Grzbiet, Zamkowa Dolna and Zalesiaki 1 (PRADEL, 1988).

The evolutionary trend between Somssich-hegy 2 and Solymar is a slight increase of the measurements and the complication of the morphology (HIR, 1997, 1998 b), which is exactly the reversed tendency than in the *C. praeglacialis-C. cricetus* line. For this reason, the author regards the independent evolution of the two groups.

7. *Cricetus major* WOLDRICH,1880 evolutionary line

This group of hamsters is weekly represented in the Hungarian Pleistocene and the material is inadequate for a statistic analysis but the extra large measurements of the finds are clear. The stratigraphic range of the *Cricetus major* is interrupted – similarly to the representation of the other two „large sized" hamster group.

The presence of the giant hamster was well known in the Early Weichelian faunas (JANOSSY 1963-64, 1986).

The big hamster of the Tarkő sequence between the layers of 2-15 was first published as *„C. runtonensis"* by JANOSSY (1962, 1976, 1986) but the given measurements undoubtedly refer to *C.c. major* after the concept of FAHLBUSCH (1976). Recently, *C. major* was

found in the „*Mimomys savini* fauna" of Subpiatra W-Romania, which seems to be very close to Tarkő (HIR & VENCZEL, 1991).

The specific independence of the *C. major* was criticised by PRADEL, (1985) with a rather theoretical argumentation. („The big form of hamster from Petersbuch 1 constitutes only a slight deviation from that line and it may well be that it was re-united with it, unless the process of its speciation had been completed.")

After the experiences of the studies on Hungarian recent and fossil hamster materials the present author' s opinion is fundamentally different and he has no doubts about the reality of the independent evolutionary line of the giant hamsters.

Discussion

On the basis of detailed investigations, the author tried to give a new interpretation of the systematics and stratigraphy of the Latest Neogene-Pleistocene hamsters in the Carpathian Basin (Fig. 1.). The most imortant results of this activity were the description of two *Cricetinus* species, the distinction of the *Allocricetus ehiki – Allocricetus bursae – Cricetulus migratorius* species and an experiment to the verification of the four independent evolutionary lines of the Pleistocene *Cricetus*. The interrupted range of the „large sized" *Cricetus* groups is probably connected with the climatic and ecological changes during the Pleistocene. This kind of range is not rare among the Pleistocene mammals (e.g. *Hippopotamus, Dama, Bubalis, Ovibos, Dicrostonyx*) KOENIGSWALD, 1992.

But the relation of the paleoclimate and the presence of the hamster taxa is not so simple. E.g. *C. runtonensis* is found in the sequence of Somssich-hegy 2 where mainly continental steppe millieu is presumed and this species exists in Solymar too, where mild climate and forest environment is possible. This problem needs further investigation.

The highest diversity of the hamsters was found in the *Mimomys savini-Mimomys pusillus* zone (it refers to the Nagyharsanyhegy phase in the traditional Hungarian vertebrate biochronology after JANOSSY, 1996), where four hamster species coexisted: *A. bursae, A. ehiki, C. nanus, C. runtonensis.*

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