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QUATERNARY BIOSTRATIGRAPHY OF MIDDLE EUROPE ON THE BASIS OF CAVE FOSSILS

By

L. KORDOS

Determining the species number frequency of mammals during the past 4 million years in Hungary results in the division of this period into two well-defined parts. Considering their species number frequency between four and two million years Soricids, Cricetids, Glirids are dominant in Hungarian fauna together with a great number of macromammal species. During the last two million years owing to the sudden acceleration in the development of Arvicolids vole species are bocemint dominant, followed by Soricids and macromammals. The representatives of other families are members of the.fauna approximately in equal proportion. A survey of changes in faunal composition during the last 4 million years suggests that sharp changes which would manifest themselves in the species number composition of different families cannot be demonstrated at all.Therefore we may state that the evolution of our fauna can be considered as to be continuous with a 500 000 years' average.

My investigations comprised also the distributions of the first appearance, range and extinction of species in Middle Pliocene-Quaternary faunas, arranging into groups (Southern)Transdanubian and NE - Hungarian data.

Though our record often is devoid of the name of localitiesit is still conspicuous that a high species number of mammals in Meddle Pliocene (29-35 taxa) shows a dramatic decrease by the Upper Pliocene (3-2,5 million years) in both geographic regions. This must be considered as an indication of the"impoverishment" of the fauna and as the depletion phase of the fauna wave. The species developing process is slow, there are only a few immigrant species which lived only for a shorttime. Some taxa of these faunas, however, had survived for along time. Among them also Sorex minutus, which most probably is the oldest living species of Hungarian mammal fauna.

The increase of the number of species between 2,5 and 2,0 million years together with the synchronous process of the gradual disappearance of earlier fauna must be considered as a real, new faunal event. This event is only partly explained by the accellerated evolutionary processes of Arvicolids because from the 20 newly appeared species only 7-8 vole species were added to the fauna. It is more probable that this faunistical event could be connected with those significant tectonical-paleogeographical-environmental changes which tookplace in the Carpathian Basin at about 2,4 million years ago.Therefore in our region 2,4 million years could be used more than anything to mark Pliocene-Pleistocene boundary.

The third significant faunal change (an increase in the number of species) had started at 1,6-1,5 million years and it had reached its peak (42 mammal species) at about

* Quaternary Biostratigraphy of Midle Europe on the basis of cave fossils.
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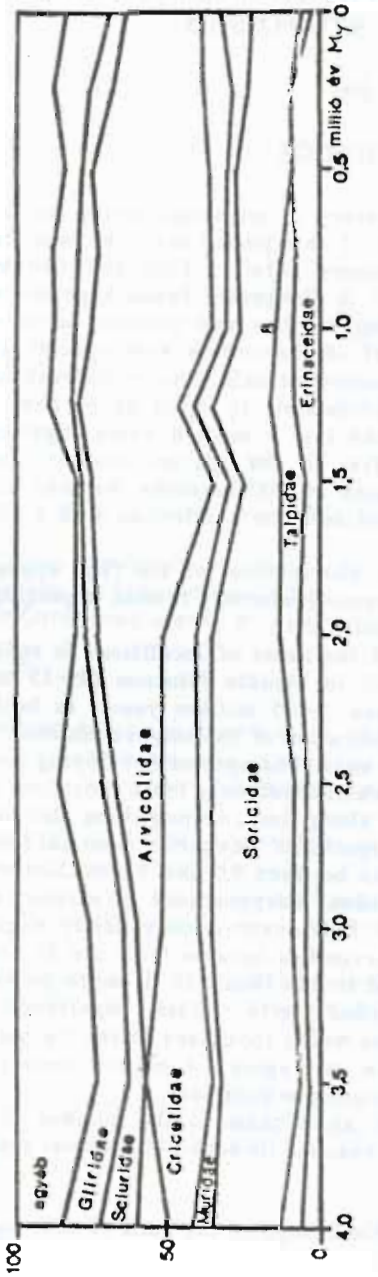
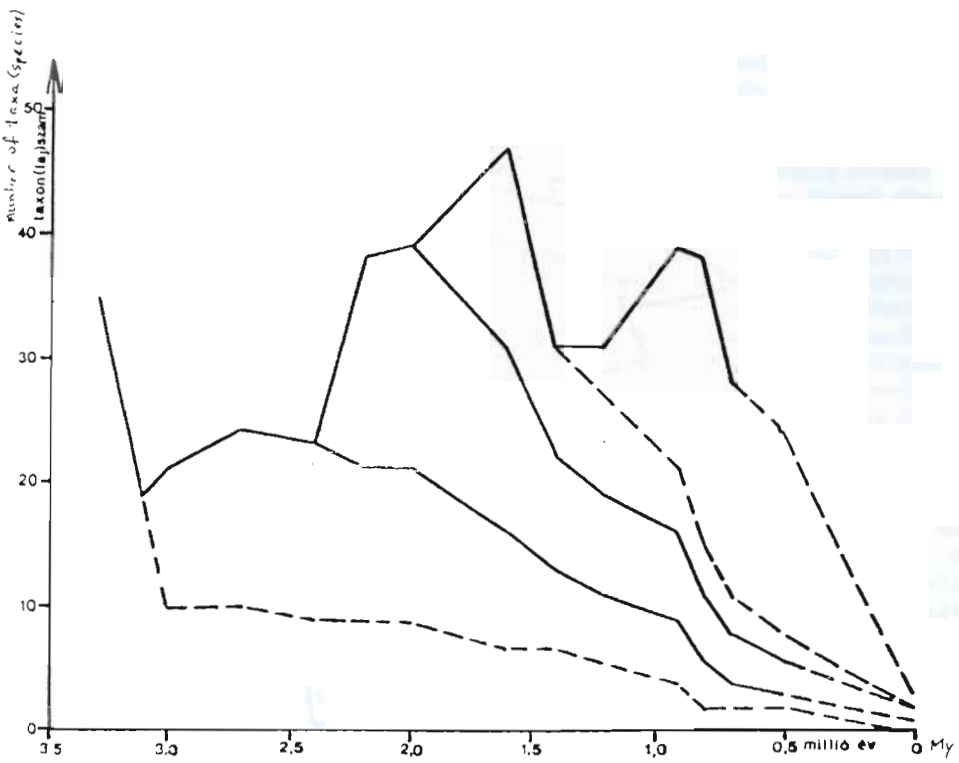
5th INT.CONGRESS, ATHÈNES-CRÈTE, 7-11/11/1994 " CAVE DEVELOPMENT, EVOLUTION AND ENVIRONMENT "

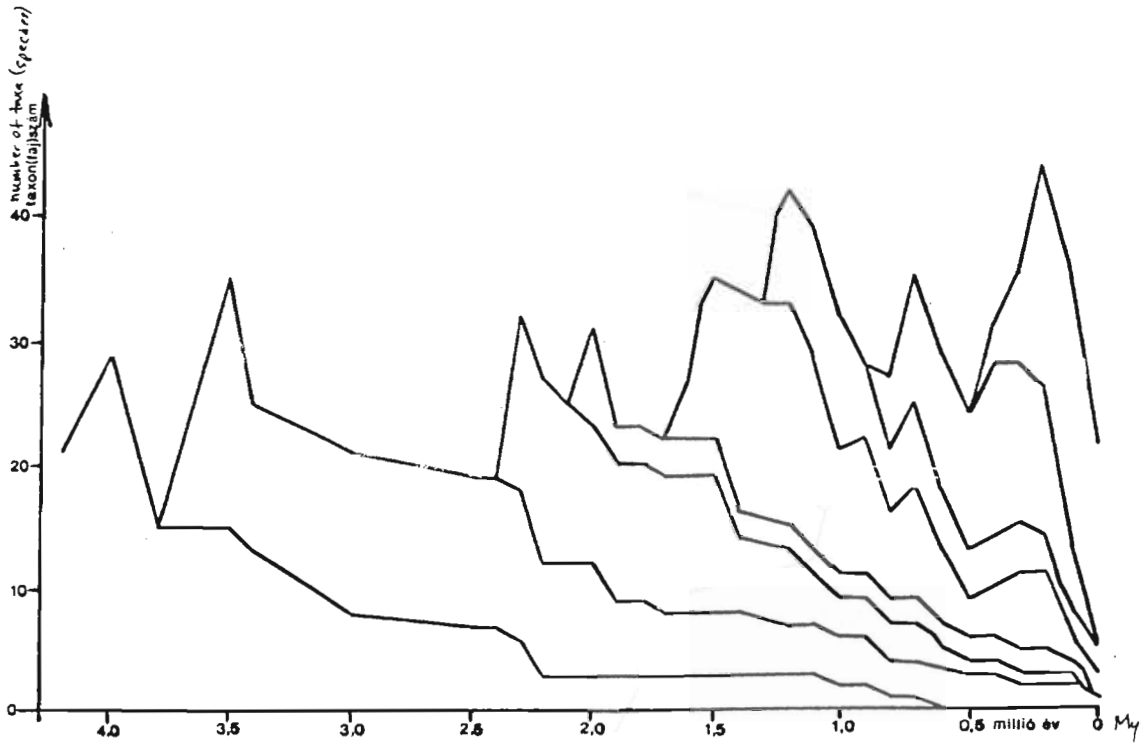


Frequency of small mammals /Late Pliocene and Quaternary/ from Hungary

/Kordos, 1992/



Frequency of mammals in Transdanubia during the Pliocene and Quaternary /Kordos, 1992/



Frequency of mammals in N Hungary and Slovakia during the Pliocene and Quaternary /Kordos, 1992/

1,2million years. Its depletion had taken place within a relatively short time; the number of its original elements had been out in half at about 1 million years ago. A phase shift could beobserved in the course of the latter "faunal waves" between the "southern" and"northern" regions, that is "in the North"it passed off earlier while "in the South" later. Several hypotheses could be enumerated to explain this phenomenon, yet it is highly possible that we have to search for a solution in the stratigraphic correlation between the two regions.

The fourth, and last, faunal event started at about 0,6 million years ago and the decrease of its species quantity to the half of its original one had been completed already at the beginning of the Upper Pleistocene. Our present mammal fauna (considering only the natural species) could be regarded as extremely poor, comparing it with the flourishing faunas of the Pliocene and Pleistocene.

All these faunal events gathered from data collected and chronologically revised by myself support Kretzoi's basic conception, on the basis of which large faunal phases could be established and distinguished from each other. The first wave may correspond to Ruscinium-Montpellierum, the second one to Villanyium, while the third one to the Biharium.The fourth event is also well-known for those who used to study Quaternary vertebrate biostratεgraphy and they give it different names. On the basis of the study presenting here the processes broken down according of 100 000 years we are unable to detect any events which would indicate the formation of several minor "faunal waves" and make clear the whole range of this problem have prepared the East-West-European zoogeographic transect of Arvicolida taxa which the following events can be gathered from.

In Europe the expansion peaks of lemmings expanding from the North southwarda due to climatic reasons (fall in temperature) coincide with the beginnings of an increase of tha number of species within faunal events From the direction of the Russian Plain that is from the East we may reckon with a continuous process of immigration (Lagurus species) since 1,6-1,5 million years. Since this date coincides with the fεrst significant expansion of Lemmings and with the beginning of the third "faunal wave" (Biharium), we can draw the following conclusion: in contradiction to an earlier milder climate in the Carpathian Basin and in its wider environment the cool phase of the Pleistocene had started at this time.

After getting acquinted with further details of these processes this threefold coincidence may suggest that that Plio-Pleistocene boundary event at about 1,6 million years which was determined on the basis of investigations made on marine formations can be demonstrated also in terrestrial biochronology. The fact is that the most significant, stirring and at the same time the most permanent faunal change in the development of the mammal fauna of the Carpathian Basin had started at this very time.