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## Recent Advances on Multidisciplinary Research at Rudabánya, Late Miocene (MN9), Hungary: a compendium

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**KEY WORDS** – Mammal Faunas, Biogeography, Palaeoecology, Late Vallesian, Late Miocene, Rudabánya, Hungary

**ABSTRACT** – Rudabánya is a rich late Miocene fossil locality first exploited for its vertebrate remains by Pethő in 1902. The first fossil primate was discovered by the local Chief Mining Geologist, Gabor Hernyák. Professor Miklos Kretzoi made Rudabánya famous in 1969 by publishing a manuscript on the new hominoid primate, *Rudapithecus hungaricus*, recognized herein as *Dryopithecus brancoi*. In 1991 L. Kordos and R.L. Bernor initiated a project to undertake new excavations and a detailed systematic study of the vertebrate fauna. This 37 author contribution represents a compendium initial report on these studies. A detailed edited volume will follow this publication. We find that there are 112 vertebrate taxa recorded from Rudabánya, 69 of which are fossil mammals. The Rudabánya fauna outcrops at no less than seven different localities, all believed to be essentially synchronous in age. There are no direct radioisotopic dates from Rudabánya, the lower age is constrained by a single crystal argon date of 11.4 m.y. ± 0.1 m.y., and biochronologic correlations support a latest MN 9 age of ca. 10-9.7 Ma. Paleogeographically, the Rudabánya fauna developed on the edge of the extensive Pannonian lake, which supported a warm, equable subtropical climate. Zoogeographically, Rudabánya is most closely allied with the late Astaracian (MN8)-early Vallesian (MN9) Spanish vertebrate localities, and particularly *Can Llobateres* (straddling the MN9/MN10 boundary). These central and western European localities contrast strikingly with correlative eastern Mediterranean-Southwest Asian localities in their community structure. In particular, Rudabánya and

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and Polgárdi owl faunas are completely different from one another: *Strix* at Rudabánya versus *Tyto* at Polgárdi.

#### INSECTIVORA (R. Ziegler and L. Meszaros)

The Rudabánya insectivore fauna includes species belonging to the families Erinaceidae, Metacodontidae, Soricidae, Dimylidae and Talpidae.

The erinaceids include three species: *Lanthanותרium sanmigueli*, *Galerix* sp. and *Postpalerinaceus* sp. The remains referred to *L. sanmigueli* compare closely in their morphology to the type mandible of Viladecaballs and the more informative specimen of Can Llobateres, the reference locality of MN 9, with which the Rudabánya fauna correlates. They also are of the same size as the teeth from Montredon, referred to *L. sanmigueli*. The remains of *L. cf. sanmigueli* from Dorn-Dürkheim and Eichkogel roughly fit the present ones in their size. A small *Galerix* species is represented by an M<sup>3</sup> trigonid. The referral of this specimen to *Schizogalerix* cannot be excluded. Medium-sized erinaceine dental remains can be referred to a new species of *Postpalerinaceus*, somewhat smaller and differing in some morphological details from the type species *Postpalerinaceus vireti*.

Family Metacodontidae is represented by dental remains referred to *Plesiosorex*. These compare most closely to *Plesiosorex styriacus*. Given the metric deviation from the type material it will be referred to *Plesiosorex aff. styriacus*. The Rudabánya *Plesiosorex* is the latest occurrence of the genus known to date.

Including four taxa, the soricids are the most diverse insectivore family in the Rudabánya fauna. The *Dinosorex* remains are, in overall size, robustness of the mandibular corpus, and in some other features, indicative of a close relationship to *Dinosorex pachygnathus*, the youngest known species of the genus. Some conspicuous morphological differences make the description of a new species necessary. Most of the Rudabánya soricids are referable to *Crusafontina*. They are closely related to *Crusafontina endemica* from Can Llobateres, representing an early member of the evolutionary lineage Rudabánya - Can Llobateres - Kohfidisch. The specimens are referred to *Crusafontina aff. endemica*. They are the biostratigraphically most important soricid from Rudabánya. One tiny mandibular fragment with three molars in situ is referred to *Paenelimoecus aff. repenningi*, in large part because of its biostratigraphic and geographic proximity to the type locality of Kohfidisch, Austria. *Paenelimoecus crouzeli* from Sansan is markedly earlier in time and smaller in size but would fit well morphologically. One lower jaw fragment bearing M<sub>1</sub> can only be allocated to Soricinae gen. et sp. indet. due to the lack of a sufficient number of diagnostic characters.

There are also some fossil remains of the family Dimylidae. There are dental remains referable to *Metacordylodon schlosseri* from Opole that compare well in their degree of amblyodonty and

exoedaenodonty, in the strong fusion of the trigonid cusps of M<sub>1</sub>, and in the reduction of the M<sub>2</sub> talonid. However, because of some differences with the type specimen, we refer the Rudabánya remains to *Metacordylodon aff. schlosseri*. They represent the latest occurrence of this species currently known. The teeth and mandibular fragments referred to *Plesiodimylus chantrei* compare closely with *Pl. chantrei* from the type locality La Grive. This species is known for its long biostratigraphic range (MN 3/4 to MN 11). A mandibular fragment with an open symphysis is referred to Dimylidae gen. et sp. indet. Perhaps it represents an atavistic element in the *Metacordylodon* sample. Together with *Crusafontina*, the talpid remains referred to a new species of "*Archaeodesmana*", represent the dominant insectivores in the Rudabánya fauna. However, the most diagnostic element, the I1 with a bifid apex, is not preserved, allowing no more precise referral than genus *Archaeodesmana*. *Talpa* sp. is represented by some humeri and a jaw fragment. The humeri differ in size and/or morphology from known *Talpa* species that are either slightly older or younger than the Rudabánya sample.

The diverse insectivore fauna indicates a paleoenvironment that had abundant water and forests. The galericines, represented by numerous *Lanthanותרium* and by one specimen of *Galerix*, compare with extant S.E. Asian faunas that have humid forest biotopes with thick undergrowth, often close to water bodies. *Crusafontina aff. endemica* is morphologically comparable to the extant species *Anourosorex squamipes*, living in the mountainous forests of SE-Asia. The extremely specialized dentition of the extinct dimylids, especially of *Metacordylodon*, suggests a conchivorous diet. Some dimylids are believed to have been semiaquatic in their behavior. The desman *Archaeodesmana*, like extant desmans, certainly had a semiaquatic mode of life.

#### CHIROPTERA (G. Topal)

The Rudabánya bat assemblage includes the following species: *Eptesicus campanensis*; *Eptesicus* sp. nov.; cf. *Miostrellus risgoviensis*.

Up to now, all of the Rudabánya localities sample open-air habitats where bats occur occasionally. Rudabánya's bats are indicative of tropical marshy woods where they lived under tree bark, in the holes of trees, or in the cracks of mountain walls. Their occurrence in the pond and marsh environments would have been the coincidence of their falling into those habitats. It is worthwhile noting that Rudabánya's bat fauna lacks "true" tropical forms such as hipposiderids. However, bones of a few species of the generally distributed vespertilionids have been found. Some of them have been found to be related to the North American fauna. Engesser (1979) has established this same biogeographic connection for Miocene insectivores and rodents, while Topál (1989a, b) has demonstrated it for pleocene bats.