

Two *Crusafontina* (Mammalia, Insectivora) fossils from the Miocene of the Transdanubian Central Range (Hungary)

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(with 2 figures)

Abstract

Two isolated teeth of Anourosoricini shrews, *Crusafontina* (Mammalia, Insectivora, Soricidae) are present in this paper. A complete left maxillary molar was found in the Sarmatian (Middle Miocene) locality of Várpalota Lignite Mine, Pit III. The species is different from all known *Crusafontina* species in its smaller size and less reduced talone of this tooth, so we described it as *Crusafontina* sp. On the basis of its less evolved morphology, the here described form seems the most ancient known species of the genus. A fragmented upper molar of *Crusafontina kormosi* (Bachmayer & Wilson 1970) came from the Late Miocene locality of Tihany, Fehér-part. The most probable age of the remain is Early Turolian. It might have been transported by flowing water to the Late Miocene lacustrine basin and indicates well watered, wooded environment in the surroundings.

Introduction

Crusafontina were very common shrews in the Late Miocene of Hungary. Many rich and well-preserved samples are reported by MÉSZÁROS (1998 b). Only two teeth, as new findings are described here, but they are palaeoecologically and stratigraphically very important for knowing the Middle and Late Miocene history of the Carpathian Basin. The Várpalota form gives new information about the evolution of genus *Crusafontina*.

Both findings are stored in the collection of the Geological Museum of Hungary (in the Hungarian Geological Institute), Budapest. The morphological terms and the measurements are used after REUMER (1984). The measurements are given in millimetres.

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Localities and material

Tihany

The Tihany Peninsula of Lake Balaton is one of the most popular Hungarian fossil localities. The first report on its "goat-hoof" (*Congeria ungulacprae*) remains came from 1782. The Fehér-part (White Coast) locality, discussed here, is the type section of the Upper Pannonian Tihany Formation. The site is a 30 m high wall, situated 1600 m SSE of the port of Tihany. Well- and poorly sorted aleurite and sand layers, accumulated in open lakes and in intermittent lagoons, alternate in the sequence (MÜLLER & SZÓNOKY 1988). There are three interbedded dark huminitic layers marked by terrestrial gastropods in the section. These formations, from which the terrestrial mammal remains came, could have been deposited in lagoons without water movements and with close vegetation. According to KORDOS (1987) the layers bearing vertebrate fossils are correlative with the Early Turolian age.

The National Geographic Society supported a project for the review of the classical paleovertebrate localities in Hungary ("Evolution of Central Paratethys (Hungary) Miocene Vertebrate Communities" (# 6210-98) project). One of the collecting works of this project in the summer of 1998 by R. BERNOR and L. KORDOS produced three micromammal teeth. One of them was an insectivore, which was given for determination for the author. This remain is only a fragmented upper molar of a relatively big shrew, but, because of its uncommon morphology, is easily classifiable and gives particular additions for the stratigraphy and ecology of the locality. It came from the layer marked as No. 19 in the section of MÜLLER & SZÓNOKY (1988).

Várpalota

The town of Várpalota is situated in Western Hungary, about 70 km W-SW from Budapest. The here described shrew tooth was collected by József KÓKAY, from the Várpalota Lignite Mine, Pit III, in a depth of 133.5 m, in the upper part of the Sarmatian (Upper Miocene) formation of the mine.

The studied shrew was systematically surely ranged in the genus *Crusafontina* by the especially structured second upper molar. Because of its small size and less reduced talone than that of the other known forms of the genus, we suppose that the Várpalota shrew is an unknown species. However, the material is too fragmentary for a detailed taxonomical description of a new species.

Systematic description

Classis Mammalia LINNAEUS, 1735
 Order Insectivora BOWDICH, 1821
 Family Soricidae GRAY, 1821
 Subfamily Soricinae FISCHER VON WALDHEIM, 1817
 Tribe Anourosoricini ANDERSON, 1879
 Genus *Crusafontina* GIBERT, 1974

Type species. Crusafontina endemica GIBERT, 1974

Crusafontina kormosi (BACHMAYER & WILSON, 1970)

- 1954 *Amblycoptus vicinus* n. sp. – KRETZOI, p. 49 (Csákvár)
 1970 *Anourosorex kormosi* nov. spec. – BACHMAYER & WILSON p. 551, figs 3, 4, 4a, 20, 20a, 21, 22, 23, 23a, 24, 25 (Kohfidisch)
 1978 *Anourosorex kormosi* BACHMAYER & WILSON 1970 – BACHMAYER & WILSON, p. 141 pl. 2, figs, 5, 5a (Kohfidisch)
 1978 "*Anourosorex*" *kormosi* BACHMAYER & WILSON 1970 – STORCH, p. 424, pl. 4, figs 29–39 (Dorn-Dürkheim)
 1980 *Anourosorex kormosi* BACHMAYER & WILSON 1970 – BACHMAYER & WILSON, p. 361 (Kohfidisch)
 1996 *Crusafontina vicina* (KRETZOI, 1954) – MÉSZÁROS, p. 9, pl. 12, figs 5 a–b (Csákvár)
 1998a *Crusafontina kormosi* (BACHMAYER & WILSON, 1970) – MÉSZÁROS, p. 106, pl. 1, figs 5–11 (Tardosbánya)
 1998b *Crusafontina kormosi* (BACHMAYER & WILSON, 1970) – MÉSZÁROS, p. 147, pl. 1, figs. 2–5, pl. 3, figs 16–23 (Csákvár, Tardosbánya, Polgárdi 4)

Material. 1 M² sin. fragment

Measurements. LL = 1.08, PW = 1.11.

Description.

The parastyle is broken down. The metastyle is short, it is strongly shorter than the mesostyle. The hypocone is small, the hypoconal flange is missing. The PW must have been significantly less than the AW. The metacone is higher than the protocone and the paracone. The occlusal surface of the molar is strongly eroded.

Systematic position.

Genus *Crusafontina* is easily identifiable by the especially structured second upper molar with reduced talone. MÉSZÁROS (1998b) included two species in the genus from Hungary and listed the differential characters between them. However, the main specific details are not available in the specimen under description, the length of the metastyle is useful in the determination. It is more reduced, as that of *Crusafontina endemica* GIBERT 1972. Thus, we can classify the studied tooth as *Crusafontina kormosi* (BACHMAYER & WILSON 1970).

Crusafontina sp.
(Fig. 1)

Material. Complete left M^2 .

Measurements. LL = 1.20, BL = 1.38, AW = 1.90, PW = 1.65.

Description.

The parastyle is well-developed. The metastyle is hardly shorter than the parastyle. The mesostyle is strongly shorter than the other ones. The hypocone is low, but well visible, the hypoconal flange is present. The PW is hardly less than the AW. The protocone and the metacone are higher than the paracone.

Systematic position.

The here described shrew is a small sized *Crusafontina* with less reduced talone, with well-developed, protruding metastyle on M^2 , and present hypoconal flange behind the hypocone. It differs from *C. endemica* and *C. kormosi* in its smaller size, shorter M^2 metastyle and larger AW/PW ratio on M^2 (Fig 2).

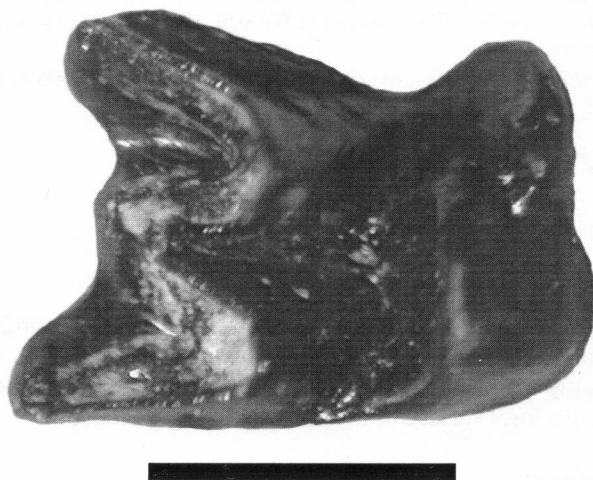


Fig. 1. *Crusafontina* sp., M^2 , occlusal view, Várpalota Lignite Cave, Pit III, Geological Museum of Hungary, Inv. Nr.: V. 25628., scale bar = 1 mm

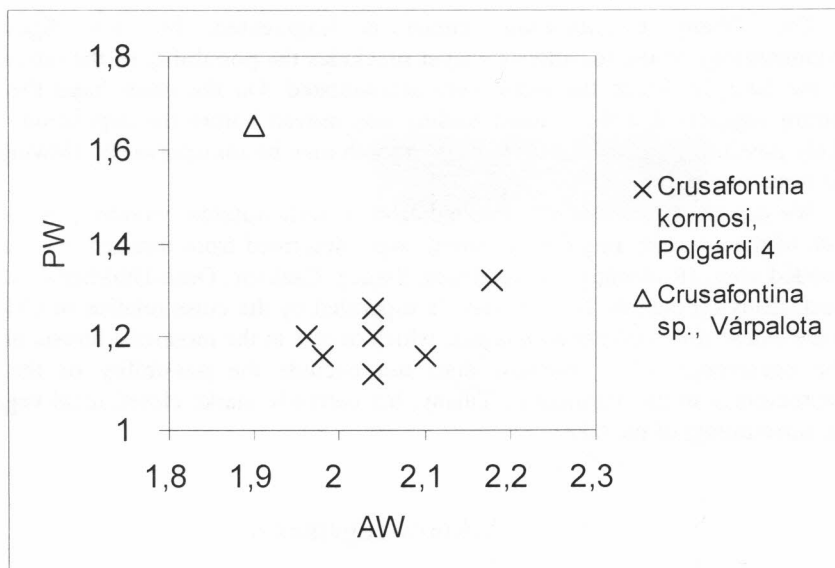


Fig. 2. Scatter diagram of M^2 AW and PW of *Crusafontina* sp from Várpalota.

Conclusions

The Várpalota shrew was surely identifiable as *Crusafontina* by the especially structured second upper molar with reduced talone. According to MÉSZÁROS (1998 b), one of the main evolutionary development in the genus from the earliest *C. endemica* specimens to the latest *C. kormosi* ones is the general size growth, with the parallel shortening of M^2 and the reduction of its talone (the metastyle becomes shorter relatively to the parastyle).

However, the specimen under description is only one tooth, therefore many characters are not available on it, we can surely see the less degree of the reduction of the talone. The differential characters between the Várpalota finding and the other forms suggest that the studied one is the most ancient species of the genus

By this time, genus *Crusafontina* was known only in the Late Miocene Vallesian and Turolian ages of Europe. (BACHMAYER & WILSON 1970, 1978, 1980, GIBERT 1975, KRETZOI et al. 1976, MÉSZÁROS 1996, 1998 a, b, c, STORCH 1978, BERNOR et al. 2002). *C. endemica* occurs from the Vallesian MN 9 Zone to the older part of MN 10 Zone, while *C. kormosi* from the latest part of the Vallesian MN 10 Zone to the beginning of the Late Turolian MN 13 Zone.

By the new form discovered in Várpalota sample we can emend the stratigraphic range of the genus to the upper part of the Middle Miocene Sarmatian stage (Astaracian mammal faunal unit, MN 7/8 zone) in the Carpathian Basin.

The occurrence of *Crusafontina kormosi* indicates that the age of Tihany is MN 10–13. By the measurements this species would be between the Sümeg (MN 10) and Tardosbánya (MN 12) forms (MÉSZÁROS, 1998 b).

The Tihany *Crusafontina* remain is fragmented, but not digested. The sedimentology of the fossiliferous layer precludes the possibility of the intensive surge of the lake, in which the teeth were accumulated. On the other hand the breakage pattern suggests that the studied finding was moved before the deposition. The most likely possibility is that the *Crusafontina* tooth may be transported by flowing water to the lacustrine basin.

We can see *Crusafontina* as an indicator of well-watered, wooded environments in both of the sites. By this time its fossils were described from forested or at least partly wooded areas (Rudabánya, Alsótelekes, Sümeg, Csákvár, Dorn-Dürkheim, Kohfidisch, Tardosbánya, Polgárdi 4). This view is supported by the close relation of *Crusafontina* to the extant *Anourosorex squamipes*, which occurs in the mountain forests of SE Asia. The occurrence of *C. kormosi* does not exclude the possibility of the semiarid macroclimate in the Turolian of Tihany, but certainly marks closed local vegetation in the surrounding of the lake.

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