

AN UNUSUAL CRANIAL FOSSIL OF THE GIANT LOWER
PLIOCENE SHREW (*PARANOUSOREX GIGAS* RZEBIK-
KOWALSKA, 1975) FROM PODLESICE, POLAND

by

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ABSTRACT

A well-preserved anterior cranium of *Paranourosorex gigas* RZEBIK-KOWALSKA, 1975 from Podlesice, Poland, provides additional knowledge of this rare shrew, including almost complete maxillary dentition. The systematic status of this species as a relative of recent *Anourosorex* MILNE-EDWARDS, 1870 is confirmed.

RESUME

Une partie antérieure bien conservée d'un crâne *Paranourosorex gigas* RZEBIK-KOWALSKA, 1975, du site de Podlesice (Pologne), permet de parfaire notre connaissance sur cette musaraigne rare, en particulier sur la denture supérieure, presque complète sur le spécimen. La parenté avec le genre actuel *Anourosorex* MILNE-EDWARDS, 1870 est confirmée.

INTRODUCTION

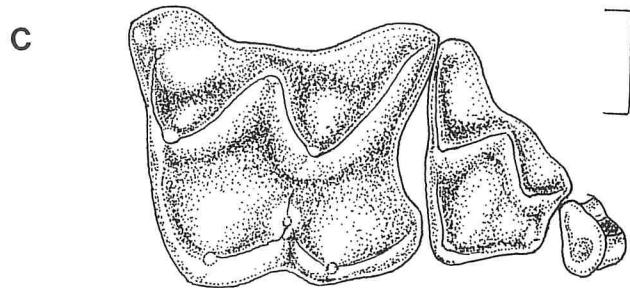
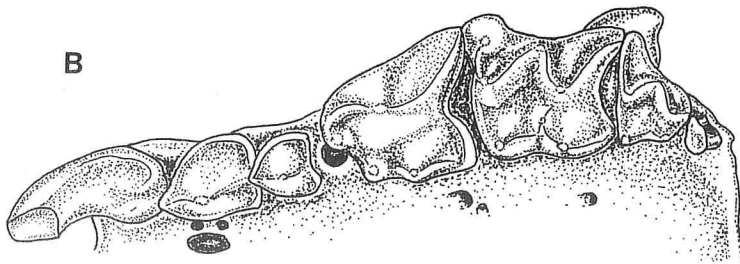
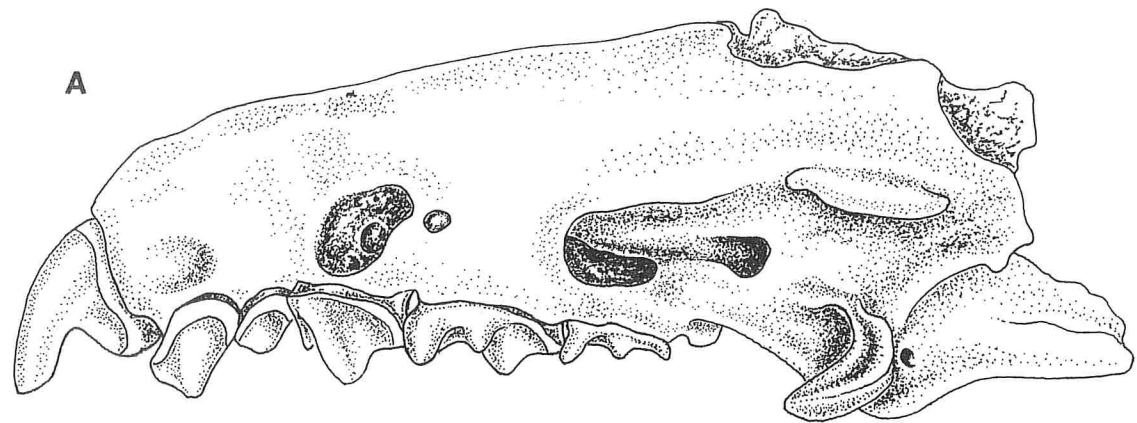
A remarkable specimen of *Paranourosorex gigas* (H.Z.M. 1.20604) was obtained from a piece of cave breccia from Podlesice, Poland (50.34'N, 19.31'E). This is the type locality of the species and it is generally considered to contain a Lower Pliocene fauna (Ruscinian zone MN 14). The specimen consists of the entire anterior cranium with the dentition of both sides intact except for both A³'s, which are missing. Both articular surfaces for the mandible are present on each side of the anterior braincase and the mesopterygoid space and part of the basisphenoid region is intact. The anterior vault of the braincase and roof of the interorbital region has been crushed but the nasal aperture and sides of the maxillae as well as its zygomatic processes are intact (see Plate 1 and Fig. 1).

The principal features are exactly as described by Rzebik-Kowalska (1975) for her new genus and species *Paranourosorex gigas* as below, namely:

- 1 — Large dimensions, exceeding those of all other early Pliocene shrews from Podlesice (see measurements below).
- 2 — Only three unicuspid antemolars present in the upper dentition.
- 3 — Massive parastyle of M¹.
- 4 — M³ reduced to a miniscule size and clearly vestigial (see Plate 1 and Fig. 1).

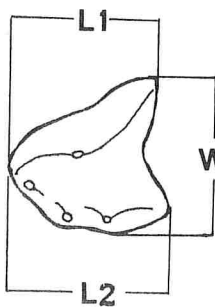
Although the mandible of the species is well known, only fragmentary maxillae have been described and knowledge of the maxillary dentition is incomplete.

Fig. 1.— Anterior cranium of *Paranourosorex gigas*. A: Left lateral view. B: Left maxillary dentition, occlusal view. C: Left M¹–M³. D: Outline diagrams of left upper incisor, P⁴ and M¹ to illustrate measurements employed here. Scale for A and B = 5 mm. Scale for C = 1 mm. H.Z.M.1.20604. Podlesice, Poland. Stereomicroscope drawings by D.L. Harrison.

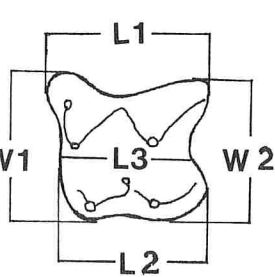


D

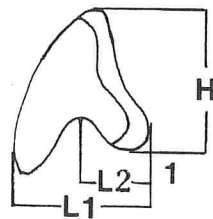
P4



M1



I1



DESCRIPTION

DENTITION

The teeth in this specimen entirely lack pigmentation. It was already noted by Rzebik-Kowalska (1975) that some specimens have the cusps pigmented brick red, others are brownish yellow and some entirely lack pigment. This is most likely due to different conditions of preservation, or possibly to gradual loss in this species, since pigmentation was apparently lost in the related genus *Amblycoptus* KORMOS, 1926 and it is absent in recent *Anourosorex squamipes* MILNE-EDWARDS, 1872 (see Remarks below). I1 is a large non-fissident tooth with a weak cingulum on its lateral aspect. Unicuspid teeth between the upper incisor and fourth premolar are here referred to as antemolars and abbreviated A. Three were present. A¹ is clearly largest, exceeding the combined length of A² + A³ (missing). Its single cusp is situated anteriorly with anterior and posterior cristae. The anterior extremity of the crown is sharply pointed, its posterior outline distinctly squarish. A² is subtriangular, rather more than half the crown area of A¹, which it resembles in form but is less elongated. A³ was clearly minute, its alveolus situated internal to the parastyle of P⁴, which must have largely concealed it. P⁴ is massive and molariform, with a lingually shifted protocone and large parastyle, projecting clearly anterior to the protocone. The crown is trapezoidal, with a distinct cingulum posteriorly and lingually.

M¹ is large, subquadrate, with a massive, projecting rounded parastyle and pronounced metastyle. A minute accessory cusp (metaconule) is developed between the protocone, metacone and hypocone, situated at the end of the inwardly curved postprotocrista. Posterior emargination of the crown is rather less prominent than in P⁴. M² is subtriangular with a very pronounced parastyle. The principal cusps are well developed, but the metacone is weak with its posterior commissure short and posteriorly directed, the metastyle absent. The protocone is subequal with the paracone; the hypocone is very weak. M³ is minute, with no definable cusps, but a shallow cup-shaped depression postero-mesially defines a weak anterior crista extending from the parastyle across the anterior crown in front of which is a weak cingulum. The posterior aspect of the parastyle is concave. Measurements of teeth: see below.

PALATE

Anterior palatine foramina lie between the two A¹'s. They consist of a central oval foramen with two small foramina outside it on each side, the anterior one larger. Asymmetrical small posterior palatine foramina are present between the posterior part of P⁴ and M¹ (3 on the right side and only 2 on the left). The palate is gently concave posteriorly, with a straight elevated posterior margin.

CRANIUM

The mesopterygoid space is flask-shaped, rounded in front and narrowed mesially, with the short hamular processes slightly everted behind. Two separate

glenoid articulations for the mandible are present; the upper one is situated below a ridged projection on the antero-lateral roof of the braincase. It is elongated, with a strongly convex postero-medial surface, its antero-medial margin with a concave emargination. The inferior glenoid process forms a deeply concave articular cup. These articular surfaces (Fig. 1), reflect the mandibular articulations described by Rzebik-Kowalska (1975, Fig. 3), with an upper triangular facet, separated from a lower oblong articular surface by a very narrow inter-articular bridge typical of Neomyine shrews.

The nasal aperture is large, with a squarish posterior margin, penetrating to a point level with the back of A¹. The side of the maxilla is concave above the heel of A¹. A large rounded infraorbital foramen is situated above P⁴ with its posterior margin sloping obliquely so as to attain the level of the parastyle of M¹.

MEASUREMENTS

Median Palatal length = 11.52 mm; transglenoid width = 7.68 mm; posterior maxillary width = 8.88 mm

I¹-M³ = 12.60 mm

M¹-M¹ = 8.52 mm

I¹, L1 = 3.20 mm

L2 = 1.15 mm

H = 2.69 mm

A¹, L = 2.24 mm

W = 1.50 mm

A², L = 1.34 mm

W = 1.28 mm

A³ (tooth missing)

P⁴, L1 = 2.82 mm

L2 = 2.88 mm

W = 2.94 mm

M¹, L1 = 2.94 mm

L2 = 2.62 mm

L3 = 2.37 mm

W1 = 2.88 mm

W2 = 2.56 mm

M², L = 1.47 mm

W = 2.30 mm

M³, L = 0.45 mm

W = 0.77 mm

This individual is slightly smaller than the few specimens listed by Rzebik-Kowalska (1975). The dental measurements are as defined by Rzebik-Kowalska (1975, p. 168 —note that in her Fig. 1, 3 of P⁴ the dimensions L1 and L2 are accidentally transposed) and are illustrated here in Fig. 1d.

Definitions of cranial measurements given above

Median palatal length from anterior extremity of palatal notch between the incisors; transglenoid width across outer margins of glenoid processes; posterior maxillary width across tips of zygomatic processes of maxillae; M^1 - M^1 from the external border of the parastyle of each M^1 .

REMARKS

This specimen adds new information to our limited knowledge of the cranial structure and maxillary dentition of this remarkable Pliocene shrew, which has its nearest living relative in *Anourosorex squamipes* which ranges from China and Taiwan to Assam, Bhutan, Burma, Vietnam and Thailand. Extinct relatives of genus *Amblyoptus* had even more reduced dentition, with complete loss of M^3 and M_3 , and in which dental pigmentation was apparently lost, (Rzebik-Kowalska, 1975). Fossil representatives of *Anourosorex* are known from the Middle Pliocene of China, the early Pliocene of Austria and the Upper Pleistocene of Japan, so that the living species may be regarded as an Oriental relict of a once more diverse and widespread group of rather specialised shrews in which M^3 and M_3 are greatly reduced or absent and M^1 developed a large parastyle. Rzebik-Kowalska (1975) believes that *Anourosorex kormosi* BACHMAYER & WILSON, 1970 (Early Pliocene, Kohfidisch, Austria) is the primitive ancestral form of the group, from which *Paranourosorex*, *Amblyoptus* and modern *Anourosorex* were all derived.

This new specimen fully confirms the systematic status of this rare shrew allotted to it by Rzebik-Kowalska. Its relationship to the living *Anourosorex* and to the extinct *Amblyoptus* is now fully confirmed. It is interesting to note that *Paranourosorex* sp. has recently been recorded from a Pliocene deposit in the Lower Don basin near Novocherkassk, U.S.S.R. (Topachevsky *et al.*, 1988).

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REFERENCES

- BACHMAYER, F. & WILSON, R.W., 1970.— Small mammals (Insectivora, Chiroptera, Lagomorpha, Rodentia) from the Kohfidisch fissures of Burgenland, Austria. *Ann. naturh. Mus. Wien*, 74: 533-587.
- KORMOS, T., 1926.— *Amblyoptus oligodon* n. g. n. sp. eine Spitzmaus aus dem ungarischen Pliozän.

- Ann. Hist. Nat. Mus. Natn. Hung., Budapest*, 24: 352-391.
- MILNE-EDWARDS, A., 1870.— Note sur quelques Mammifères du Thibet oriental. *C.R. Acad. Sci. Paris*, 70: 341.
- MILNE-EDWARDS, A., 1872.— Note sur quelques Mammifères du Thibet. *Rech. Hist. Nat. Mamm.*: 264, pl. 38, fig. 1, pl. 38A, fig. 1-1j.
- RZEBIK-KOWALSKA, B., 1975.— The Pliocene and Pleistocene Insectivores (Mammalia) of Poland. II - Soricidae: *Paranourosorex* and *Amblycoptus*. *Acta Zool. Cracoviensia*, 20(6): 167-182.
- TOPACHEVSKY, V.A., NESIN, Y.A., REKOVETS, L.I., TOPACHEVSKY I.V. & PASHKOV, A.V., 1988.— A new location of small mammalian remains in Pliocene of the northern Azov Sea area. *Dopov. Akad. Nauk. Ukr. RSR. Ser. B Geol. Khim. Biol. Nauky.*, 1988 (11): 18-21.

LEGEND OF PLATE

PLATE 1

Dorsal and ventral views of the anterior cranium of *Paranourosorex gigas* (HZM.1.20604. Podlesice, Poland). Scale in mm.

PLATE 1

