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Pliocene and Pleistocene *Insectivora* (Mammalia) of Poland. VII. *Soricidae*: *Mafia* REUMER, 1984, *Sulimskia* REUMER, 1984 and *Paenelimnoecus* BAUDELOT, 1972

[With 5 text-figs.]

Pliocenijskie i plejstocenijskie owadożerne (*Insectivora*, *Mammalia*) Polski. VII. *Soricidae*: *Mafia* REUMER, 1984, *Sulimskia* REUMER, 1984 i *Paenelimnoecus* BAUDELOT, 1972

Abstract. Description of the holotype of *Mafia dehneli* (KOWALSKI, 1956) is given. This species is known from the Lower Pliocene (MN 14) of Podlesice. Another Polish representative of this genus is probably *Mafia* cf. *csarnotensis* REUMER, 1984 described here from Pliocene (MN14—MN16) localities: Podlesice, Weże 1, Rębielice Królewskie 1A and 2. *Sulimskia kretzovi* (SULIMSKI, 1962) was stated in six fossil localities dated from the Lower Pliocene to the Pliocene-Pleistocene boundary (MN14—MN17/Q₁): Podlesice, Weże 1, Rębielice Królewskie 1A, 2, 4 and Kadzielnia. *Paenelimnoecus pannonicus* (KORMOS, 1934) was found in four fossil localities dated from the Lower to the Upper Pliocene: Podlesice, Zalesiaki 1B, Weże 1 and Rębielice Królewskie 1A. A discussion of the systematic position of the above-mentioned forms belonging to the tribe *Blarinini* (*Mafia* and *Sulimskia*) and *Allosoricini* (*Paenelimnoecus*), their measurements and illustrations are also given.

I. INTRODUCTION

The present paper is the seventh part in the series of studies concerning the remains of insectivores from the Neogene and the Pleistocene of Poland. The previous papers (RZEBIK-KOWALSKA 1971, 1975, 1976, 1981, 1989, 1990) dealt with the *Erinaceidae*, *Desmaninae* and *Soricidae* (*Paranourosorex*, *Amblycoptus*, *Beremendia*, *Blarinoides*, *Neomysorex*, *Episoriculus*, *Petenya*, *Blarinella*, *Deinsdorfia* and *Zelceina*). The present study is devoted to three genera of the family *Soricidae*: *Mafia* REUMER, 1984, *Sulimskia* REUMER, 1984 and *Paenelimnoecus* BAUDELOT, 1972.

A short description of the localities from which the material for this study has been obtained is given in the previous papers of this cycle. The measurements were taken according to the pattern presented in my papers of 1976 and 1988.

The specimens described are housed in the collections of the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Cracow. I am indebted to Mr Marek KAPTURKIEWICZ for the illustrations.

II. MATERIAL

Family *Soricidae* FISCHER von WALDHEIM, 1817*
 Subfamily *Soricinae* FISCHER von WALDHEIM, 1817
 Tribe *Blarinini* KRETZOI, 1965
 Genus *Mafia* REUMER, 1984

Mafia dehneli (KOWALSKI, 1956)

- 1956 — *Sorex dehneli* n.sp., K. KOWALSKI, Insectivores, bats and rodents..., pp. 347—350, Pl. I. fig. 5—6, Text-fig. 1c.
 1964 — *Sorex dehneli* KOWALSKI, 1956, K. KOWALSKI, Paleocology of mammals..., p. 77.
 1967 — „*Sorex*” *dehneli* KOWALSKI, 1956, A. REPENNING, Subfamilies and genera..., p. 42.
 1979 — „*Sorex*” cf. *dehneli* KOWALSKI, 1956, A. SULIMSKI et al., The Middle Pliocene micromammals..., pp. 382—384, Fig. 3: 5—6, Pl. 20: 5.
 1984 — *Mafia dehneli* (KOWALSKI, 1956), J. W. F. REUMER, Ruscian and Early Pleistocene *Soricidae*..., p. 80.

The above list only contains the names used for material from Poland. Referred material. The list of the material is given in Table I. It con-

Table I

Mafia dehneli (KOWALSKI, 1956)

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/4/60	73	121	194	44

tains the remains of maxillae and mandibles with all types of teeth and processes, with the exception of the angular process. The minimum number of individuals has been calculated as the highest number of identical elements (e.g., right M_1).

* Priority according to International Code of Zoological Nomenclature (1985).

Description of the material. In KOWALSKI'S work of 1956, description of the holotype (fragment of the mandible with complete teeth, without processes — no. MF/4/1) is lacking and unfortunately this specimen is partially destroyed now. Its A_1 completely disappeared. I_1 , P_4 are separated from the mandible. M_1 , originally damaged, is now not only separated but broken in two. Only M_2 and M_3 are still in the mandible.

Nevertheless, a description of these elements (except for M_1) is possible and it will be useful to make it here.

Description of the holotype. The horizontal ramus of the mandible is stout. The mental foramen is situated below M_1 , between its trigonid and talonid (as can be seen in KOWALSKI'S drawing, and not below P_4 , as he writes in his work of 1956).

Long I_1 is tricuspluate. The middle cuspule is the biggest, the third the smallest (a little damaged). The apex is worn. Weak and flat cingulum is present along a small part of the posterior upper edge. The symphysial cingulum has no corner.

P_4 is also long, its postero-lingual basin is well developed. It is two-cusped in side-view, and its cingula are broad, especially in the buccal side.

M_2 is big and massive. Its trigonid basin is narrow and V-shaped in lingual side. The entoconid crest is absent, the entoconid big and conical. The valley between the entoconid and the hypolophid is relatively broad. The buccal cingulum is broad, especially below the protoconid. The lingual one is weak but distinct.

M_3 is also relatively big, not reduced. It is characterized by five cusps. Its entoconid is very distinct and conical as in second molar.

Description of the remaining material. Rostrum has a depression on its external side which extends above A^1 — A^4 . The infraorbital foramen is more or less oval and situated between the metastyle of P^4 and mesostyle of M^1 . The lacrimal aperture is small, round and lies above the metastyle of M^1 . The base of the zygomatic process is broad, but its tip is narrow. It is curved a little downwards and backwards. In palatal view the area between mesostyle and metastyle and metastyle of M^2 and M^3 are visible in its background.

Dental formula is: $\frac{1-6-3}{1-2-3} = 32$. The posterior emargination of P^4 and upper molars is rather small, the pigmentation of teeth is dark red to nearly black in tips.

I^1 is not fissident. Its dorsal edge is almost perpendicular to the undulated posterior buccal edge, provided with a cingulum. This cingulum is rather flat, increasing in width from ventral to dorsal part. It runs almost to the upper edge. The talon is big and separated from the apex by a shallow groove. It has a lower margin rather deeply concave from below, and that is why it seems to be two-cusped. The anterior cusp is pointed.

There are five antemolars in the upper jaw, but unfortunately all preserved teeth in the material are very worn and broken off. They have broad and

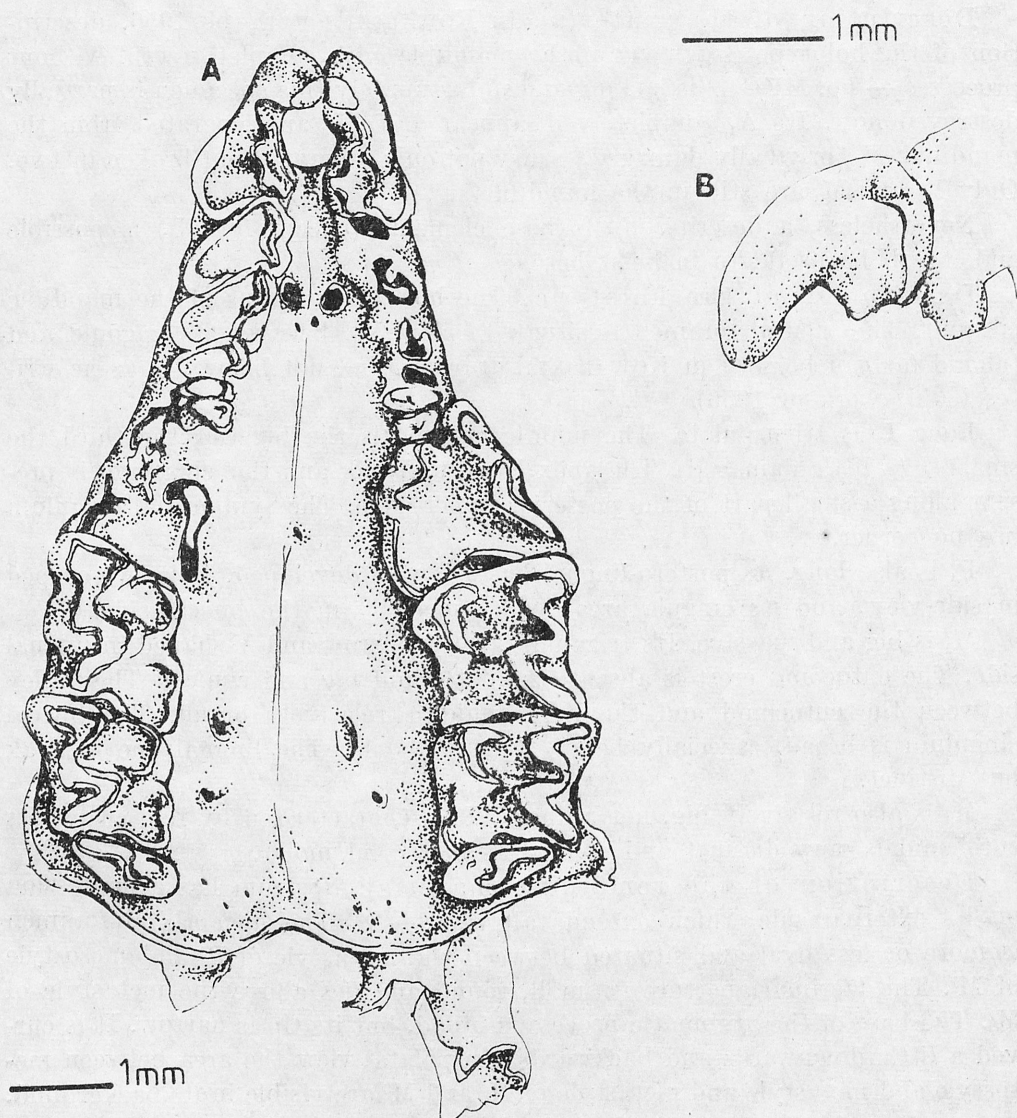


Fig. 1. *Mafia dehneli*, Podlesice: A — fragment of skull with I¹—M³, B — left I¹, both specimen no. MF/4/5

flat cingula on both sides, and they are characterized by a shallow antero-buccal and deeper postero-lingual basins, so they appear to be two-cusped from the lingual side. A¹ is big and only a little bigger than A². It is also characterized by a small cingular cusp situated as usual in postero-lingual part of the tooth, but in the following antemolars those cusps are hardly visible.

A³ is twice smaller than A¹; A⁴ and A⁵ are also twice smaller than A³. All these three teeth are broader in relation to their length. A⁵ is equal to A⁴ or a little bigger. It is totally hidden behind the parastyle of P⁴. In one specimen

(no. MF/4/33) the parastyle is so big that it obscured (from the buccal side) both A^4 and A^5 .

P^4 is very characteristic because of its huge hypocone. Apart from the big parastyle and huge hypocone, it has also a high parastylar crest and a distinct protocone. The protocone in the shape of a cusp or L-shaped is placed at the middle of the anterior side of the tooth, or even more exteriorly (very near to the parastyle). It is separated from the hypocone by a deep valley. The hypocone, in the shape of a cusp, is more distinct than the protocone. It lies at the antero-lingual corner of the tooth. The hypoconal flange is large, slightly concave, surrounded by a ridge. This ridge is separated from the hypocone by a small valley. It is broad on the lingual side, on posterior one very narrow. In some specimens a very small cingular cusp can be seen in the beginning of this ridge.

M^1 is more or less quadrate in outline in occlusal view. Its protocone is U-shaped and its metaloph rather high. A relatively big hypocone in the shape of a cusp is separated from the protocone by a valley. The hypoconal flange is broad, concave, with a ridge in the lingual and lower parts of the posterior side.

M^2 is smaller and more trapezoidal in outline. Its morphology is similar to that of M^1 .

M^3 has a big parastyle, paracone and protocone.

The specimen no. MF/4/10 is a mandible better preserved than the holotype. Its horizontal ramus is similar to that of the holotype, although the mental foramen is placed more backwards, under the posterior root of M_1 . The anterior margin of the high coronoid process is concave, with a small spicule situated just below its middle. The posterior margin is almost straight. The tip of the coronoid process is broad and its outline undulating. The coronoid spicule is very large, strongly pronounced, and placed at about two-thirds of the height of the external temporal fossa. This fossa is deep in its upper part and rather short. It reaches to slightly underneath the upper sigmoid notch.

The internal temporal fossa is small, but it continues upwards as a very shallow furrow.

The condyle is very large. It has a broad interarticular area, a long cylindrical upper facet, which is obliquely placed to the lower one. The latter is high and short and its upper edge is undulated. Superior pterygoid spicule is distinct.

One-cusped A_1 is long and narrow. Its buccal cingulum is rather weak, the lingual one more convex.

The first lower molar is similar to M_2 , but bigger. The remaining teeth are identical with those of the holotype, and only the third cuspule of I_1 is smaller.

The morphology of the mandible and lower dentition of the remaining material does not differ from that of the holotype and the specimen no. MF/4/10, with the exception of the internal temporal fossa which in some individuals

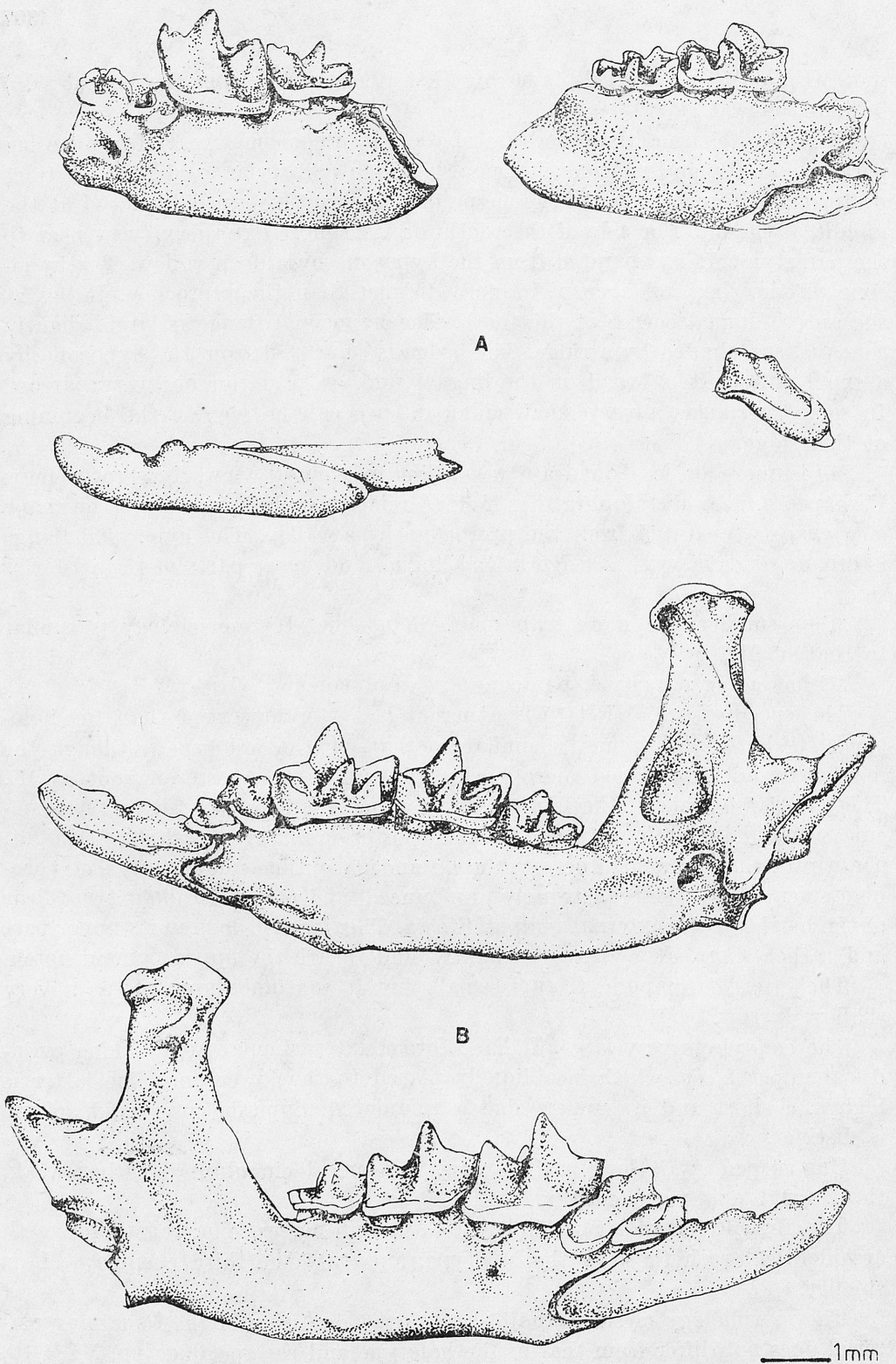


Fig. 2. *Mafia dehneli*, Podlesice: A — holotype, left fragment of mandible with M₂—M₃, isolated I₁ and P₄, spec. no. MF/4/1; B — right mandible with I₁—M₃, spec. no. MF/4/10

might be provided with a weak horizontal bar. In some specimens, also I_1 has its third cusp so vestigial that the tooth appears to be bicuspluate.

Measurements. See Tables II and III.

Systematic position and distribution. The generic attribution of "*Sorex*" *dehneli* to *Sorex* by KOWALSKI (1956) was based on the presence of teeth pigmentation, tricuspluate I_1 , non-reduced M_3 and the form of the articular (condyloid) process. Indeed, the first three characters are typical for this genus, but the condyloid process is not identical with that in *Sorex*. As can be seen from the drawings of *Mafia dehneli* (see fig. 2), the lower facet of its condyle is placed far more anteriorly and lingually when compared to *Sorex*, and its interarticular area is much broader. Besides, its lower molars (M_1 and M_2) lack the entoconid crests, its internal temporal fossa is low and its mental foramen is situated more backwards than in the genus *Sorex*.

Table II

Mafia dehneli (KOWALSKI, 1956)
Dimensions of skull and upper dentition (in mm)

		Podlesice			
		min.	\bar{x}	max.	n
L of palate		—	7.10	—	1
W on zygom. proc.		—	8.98	—	1
I^1	L	2.06	2.14	2.19	3
	L of talon	0.98	1.05	1.15	4
	H of talon	1.64	1.74	1.83	4
A^1 — A^5 L		—	2.75	—	1
A^1	L	1.30	1.32	1.34	3
	W	0.93	0.96	0.98	3
A^2	L	1.12	1.14	1.16	2
	W	0.87	0.87	0.87	2
A^3	L	0.64	0.67	0.69	3
	W	0.75	0.78	0.81	2
A^4	L	0.30	0.32	0.34	2
	W	0.55	0.58	0.61	2
A^5	L	0.38	0.39	0.41	4
	W	0.47	0.53	0.59	4
P^4	L (bucc.)	1.98	2.12	2.24	25
M^1	L (max.)	1.80	1.91	2.05	26
	L (med.)	1.53	1.65	1.78	26
	W (max.)	1.94	2.09	2.25	25
	W (post.)	1.59	1.73	1.86	21
M^2	L (max.)	1.58	1.65	1.71	22
	L (med.)	1.31	1.42	1.50	23
	W (ant.)	1.83	1.98	2.08	23
	W (post.)	1.59	1.73	1.86	21
M^3	L	0.69	0.70	0.72	4
	W	1.30	1.34	1.37	3

Mafia dehneli (KOWALSKI, 1956)
Dimensions of mandible and lower dentition (in mm)

		Podlesice			
		min.	\bar{x}	max.	n
I ₁	L	4.50	4.81	5.15	10
	H	1.03	1.10	1.17	12
A ₁	L (bucc.)	1.11	1.18	1.25	4
P ₁	L (bucc.)	1.57	1.68	1.78	14
	W of talonid (bucc.)	0.64	0.75	0.84	15
	W (occl.)	0.96	1.01	1.09	14
M ₁	L (occl.)	1.81	1.96	2.07	29
	W (occl.)	1.16	1.23	1.30	29
M ₂	L (occl.)	1.58	1.69	1.80	27
	W (occl.)	1.02	1.08	1.15	27
M ₃	L (occl.)	1.26	1.33	1.48	16
	W (occl.)	0.70	0.78	0.84	16
M ₁ —M ₃ L (occl.)		4.61	4.90	5.16	14
I ₁ —M ₃ L (occl.)		—	8.46	—	1
L of mandible without I ₁		10.44	10.66	10.93	4
H of mandible below M ₂		1.78	1.91	2.10	30
H of ascending ramus		4.86	5.13	5.37	16
W of coronoid process		1.25	1.43	1.69	16
H of condyloid process		2.55	2.74	2.96	18
W of interarticular area		1.05	1.14	1.32	18

These features, especially the lack of the entoconid crest and the structure of the condyle suggest the attribution of "*Sorex*" *dehneli* to the tribe *Blarinini*. The necessity of this transfer has been suggested by KOWALSKI himself (1960) and it was made by REPENNING in 1967, but without clear indication of any particular genus. In his thesis of 1977, JAMMOT placed it (after KOWALSKI's suggestion, 1960) in *Blarinoides*, in order to avoid (as he writes) the creation of one more monospecific genus. JÁNOSSY and KORDOS (1977) listed it in the genus *Petenya*.

As the tribe *Blarinini* contained in Europe so far only one specialized genus, *Blarinoides* SULIMSKI, 1959, and remains from Csarnota 2 and Podlesice did not fit into it, REUMER (1984) decided to establish a new genus *Mafia*, for *M. csarnotensis* from Csarnota 2. He included "*Sorex*" *dehneli* to it as *Mafia dehneli* without, however, studying personally this last form. So, his diagnosis of the genus *Mafia* as well as his differential diagnosis concerning the relations *Mafia*—*Blarinoides* and *M. csarnotensis*—*M. dehneli* are based on the remains from Csarnota 2, on the inaccurate description of "*Sorex*" *dehneli* by KOWALSKI (1956) and on rather inexact drawings made by SULIMSKI (in KOWALSKI 1956), and are not quite correct.

A new, detailed description of *M. dehneli* shows that its P^4 and M^1-M^2 have very strong hypocones and rather high metalophs, and its mandible has a large, strongly pronounced coronoid spicule. So, from the original diagnosis of genus *Mafia* (REUMER 1984), the fragment „... upper molars without hypocones...” must be excluded. As the main features of the genus are to be found in the remains from Podlesice, they can be placed in the genus *Mafia*, as proposed by REUMER in his work of 1984. The differential diagnosis for *M. csarnotensis* and *M. dehneli* requires, however, some changes.

M. csarnotensis REUMER, 1984 differs from *M. dehneli* (KOWALSKI, 1956) by its smaller dimensions (see Tables II—III and REUMER 1984, Table 32), the lack of the metalophs and of big hypocones in upper teeth, its weak cingula in lower molars, its internal temporal fossa which does not continue upwards as a furrow and has no bar, its more pointed coronoid process and its nearly parallel condylar facets.

Judging from REUMER's drawings (1984, Pl. 25, fig. 2—3) A^4-A^5 seem to be also different in size and shape.

The attribution of “*Sorex*” cf. *dehneli* from Mała Cave (SULIMSKI et al. 1979) to the genus *Mafia* and to *M. dehneli* is rather doubtful. This big species (although not as big as *M. dehneli*) has shorter I_1 with a clear cingulum in the buccal side, its mental foramen is placed more anteriorly, the trigonid valley of the lower molars is more open and their cingula are weaker, its internal temporal fossa is higher and M_3 is devoid of entoconid. More material is needed to determine the systematic position of this material.

Outside Poland, this form was mentioned by JÁNOSSY and KORDOS (1977) from Hungary at Osztramos 1 and 9 as *Petenya* cf. *dehneli* (KOWALSKI).

Mafia cf. *csarnotensis* REUMER, 1984

Referred material. The list of the material of the particular localities can be found in Table IV. It contains one fragment of maxilla with P^4 and remains of mandibles with one broken I_1 , one P_4 , 28 M_1 , 23 M_2 , 7 M_3 , 3 coronoid and 4 condyloid processes. The minimum number of individuals has been calculated as in *M. dehneli* (see p. 304).

Description of the material. Original description of the genus and species is to be found in REUMER (1984). As in Polish material upper teeth (except for one P^4) and many mandible elements are lacking, only a description of M_3 (absent in REUMER's material from Csarnota 2) can be added.

The remains of *M. cf. csarnotensis* from Polish localities do not practically differ between themselves neither in size nor in morphology, but they diverge a little from those from Hungary. They are smaller (see Table V), and their P^4 (identical with P^4 of *M. dehneli* but smaller) has a small but distinct hypocone. The external length of this unique $P^4 = 1.80$, its height = 1.65. The Polish remains also have a little bigger, more triangular internal temporal

Mafia cf. *csarnotensis* REUMER, 1984

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/1963/89	1	8	9	5
Weże 1 MF/1864/89	0	15	15	9
Rębielice Królewskie 1A MF/1865/89	0	6	6	4
Rębielice Królewskie 2 MF/1866/89	0	1	1	1

fossa, cingulum of M_1 more undulated, the lingual cingulum of lower molars weaker or nearly absent, and the trigonid valley broader. Both facets of its condylar process are also less parallel and interarticular area is not as broad.

If, however, the attribution of Polish material to *M. csarnotensis* is correct, the third lower molars in this species have only four cusps, as seen in specimens from Podlesice, Weże 1, Rębielice Królewskie 1A and 2. They are relatively big and their talonid is reduced to a comma-shaped hypoconid (in five specimens). In two cases it is a little broader.

Measurements. See Table V.

Systematic position. Pigmented teeth, M_1 with conical entoconid devoid of entoconid crest and relatively broad valley between entoconid and hypolophid, as well as a relatively posteriorly placed condyle point to the attribution of Polish remains to the tribe *Blarinini*.

The small size of these remains, their lower molars with strong buccal and weak lingual cingula, a normal soricine P_4 , a non-spatulated coronoid process with a moderately developed coronoid spicule indicate a rather unspecialized representative of this tribe. Since the Polish materials are scarce and of limited value for systematic analysis (lack of many important elements — see p. 311), it would not be right to create a new species, especially as the differences between Polish and Hungarian material of *M. csarnotensis* are not big. They may be due to geographical variation. More complete materials would confirm or change this attribution. If the determination is correct, the discovery of *M. cf. csarnotensis* in Poland extends the range of this species northwards, and downwards in geological time to the zone MN14 (in Podlesice it appears together with *M. dehneli*).

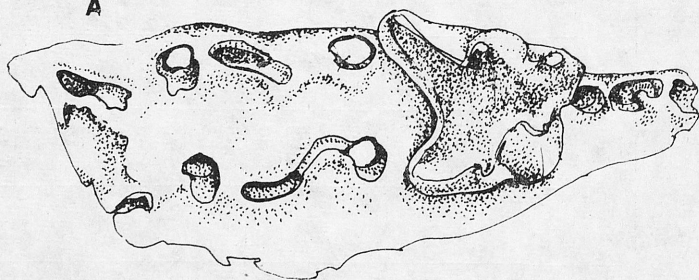
Table V

Mafia cf. *csarnotensis* REUMER, 1984
Dimensions of mandible and lower dentition (in mm)

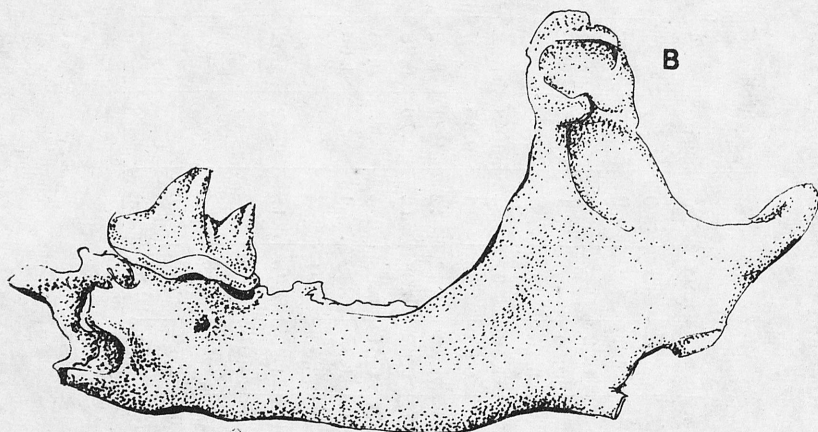
	Podlesie				Weże 1				Rebiełice Królewskie 1A				Rebiełice Królewskie 2			
	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n
I ₁	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
	—	0.99	—	1	—	—	—	0	—	—	—	0	—	—	—	0
P ₄	—	—	—	0	—	1.33	—	1	—	—	—	0	—	—	—	0
	—	—	—	0	—	0.60	—	1	—	—	—	0	—	—	—	0
	—	—	—	0	—	0.70	—	1	—	—	—	0	—	—	—	0
M ₁	1.51	1.55	1.60	7	1.50	1.59	1.67	14	1.48	1.52	1.57	5	—	—	—	0
	0.97	1.01	1.05	7	0.91	0.96	1.03	14	0.85	0.89	0.91	6	—	—	—	0
M ₂	1.33	1.40	1.48	6	1.28	1.35	1.42	12	1.21	1.22	1.24	4	—	1.26	—	1
	0.83	0.87	0.90	5	0.77	0.85	0.88	12	0.76	0.78	0.80	4	—	0.80	—	1
M ₃	—	0.59	—	1	0.57	0.61	0.68	4	—	0.55	—	1	—	0.56	—	1
	—	1.06	—	1	1.01	1.06	1.12	4	—	1.06	—	1	—	0.99	—	1
M ₁ —M ₃	—	3.91	—	1	3.72	3.83	3.91	4	—	—	—	0	—	3.70	—	1
H of mandible below M ₂	1.47	1.59	1.65	5	1.47	1.59	1.76	13	1.42	1.52	1.60	5	—	1.58	—	1
H of ascending ramus	—	—	—	0	4.58	4.61	4.65	2	—	—	—	0	—	4.15	—	1
W of coronoid process	—	—	—	0	1.11	1.14	1.18	2	—	—	—	0	—	1.13	—	1
H of condyloid process	—	—	—	0	2.63	2.70	2.80	3	—	—	—	0	—	2.33	—	1
W of interarticular area	—	—	—	0	0.73	0.78	0.86	3	—	—	—	0	—	0.79	—	1

1mm

A



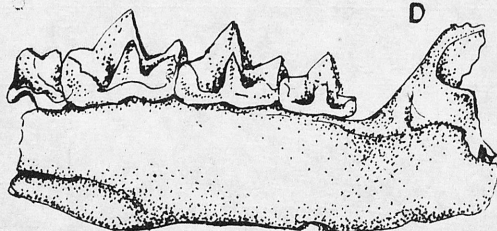
B



C



D



1mm

Genus *Sulimskia* REUMER, 1984*Sulimskia kretzoi* (SULIMSKI, 1962)

- 1962 — *Sorex kretzoi* n.sp., A. SULIMSKI, Supplementary studies..., pp. 469—472, Pl. II, fig. 9—10, Text-pl. II, fig. 9a—b, 10a—b.
- 1967 — "*Sorex*" *kretzoi* SULIMSKI, 1962, A. REPENNING, Subfamilies and genera..., pp. 44—45.
- 1984 — *Sulimskia kretzoi* (SULIMSKI, 1962), J. W. F. REUMER, Ruscinian and early Pleistocene..., pp. 88—89.

The above list only contains the names used for material from Poland.

Referred material. The list of the material is given in Table VI. It contains the remains of maxillae and mandibles with all types of teeth and processes, with the exception of the angular process. The minimum number of individuals has been calculated as in *M. dehnelti* (see p. 304).

Emended diagnosis see p. 319.

Table VI

Sulimskia kretzoi (SULIMSKI, 1962)

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/1867/89	2	4	6	2
Weże 1 MF/1868/89	32	110	142	39
Rębielice Królewskie 1A MF/1869/89	1	6	7	3
Rębielice Królewskie 2 MF/1870/89	1	5	6	4
Rębielice Królewskie 4 MF/1871/89	0	1	1	1
Kadzielnia MF/1872/89	0	1	1	1

Fig. 3. *Mafia* cf. *csarnotensis*, Podlesice: A — fragment of right maxilla with P⁴, spec. no. MF/1863/1; Weże 1: B — left mandible with M₁, spec. no. MF/1864/1; C — processus condyloideus of the same specimen; D — right fragment of mandible with P₄—M₁, spec. no. MF/1864/6

Description of the material. Description given by SULIMSKI (1962) and REUMER (1984) requires some additions, especially because SULIMSKI's illustrations are indistinct and REUMER's material is very scarce (five lower teeth only).

The rostral depression is rather shallow, its deepest part lies above A^3 . The infraorbital foramen is more or less oval and it is placed between the top of the paracone of P^4 or a little backwards and ends at the beginning or the top of the mesostyle of M^1 . The lacrimal aperture is round and it can be placed above the metastyle of M^1 or sometimes a little forward between its mesostyle and metastyle. The zygomatic process is not broad, curved downwards and a little inwards. In palatal view, the metastyles of M^2 and M^3 are visible in its background.

Dental formula: $\frac{1-6-3}{1-2-3} = 32$. The posterior emarginations of P^4 and upper molars are moderate. The pigmentation of teeth in specimens which are not secondarily decolorised is dark red to nearly black.

All upper and lower teeth are massive, the talon of P^1 , antemolars, P^4 and M_1 are a little bulbous. The upper antemolars are unicuspid, but in the lingual side of A^1 — A^4 , the small cingular cuspules are visible.

A^1 — A^5 successively decrease in size. A^2 is a little smaller than A^1 , A^3 is twice smaller than A^1 and A^2 , A^4 is a little smaller than A^3 , A^5 is the smallest, partially or totally hidden behind the parastyle of P^4 . A^3 — A^5 are broader than long.

P^4 has a very big parastyle and a long, but low parastylar crest. Its paracone is also very big, bulbous and, similarly to the parastyle, U-shaped in occlusal view (especially when worn). The protocone is very well developed, L-shaped. The hypoconal flange is broad, shallow, surrounded by a low ridge, mainly on the buccal side. The beginning of this ridge forms a vestigial hypocone, separated from the protocone by a wide furrow.

M^1 is square. It is characterized by a broad, massive, U-shaped paracone and protocone and by an extremely high metaloph. In relation to P^4 its hypoconal flange is slightly flatter and narrower, but the hypocone is more distinct. M^2 is smaller than M^1 and of more trapezoidal shape. M^3 is quadrate in its buccal part with the well-developed protocone.

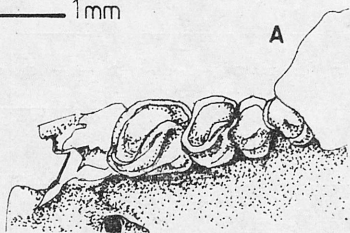
Mandible and lower dentition. The lower margin of the mandible is slightly concave under M_2 . The mental foramen is situated a little forward in relation to the protoconid/hypoconid valley of M_1 . The coronoid spicule is strong, in the shape of a semicircle. It is situated in $2/3$ of height of the external temporal fossa, which is deepest directly above and below the coronoid spicule. There are two mandibular foramina, one hidden below the condyloid process, another situated below the posterior corner of internal temporal fossa. Below the anterior corner of this fossa, a rather small but deep depression is visible.

The internal temporal fossa is triangular and high, in most specimens provided with a weak, horizontal bar. A moderate superior pterygoid spicule is also present.

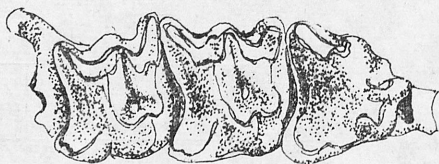
Sulimshia kretzovi (SULIMSKI, 1962)
Dimensions of skull and upper dentition (in mm)

	Podlesice				Weże 1				Rebiełice Królewskie 1A				Rebiełice Królewskie 2			
	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n
L of palate	—	—	—	0	7.92	7.94	7.97	2	—	—	—	0	—	—	—	0
W on zygom. proc.	—	—	—	0	—	6.38	—	1	—	—	—	0	—	—	—	0
L	—	—	—	0	2.08	2.23	2.43	3	—	—	—	0	—	—	—	0
I ¹ L of talon	—	—	—	0	1.14	1.20	1.34	4	—	—	—	0	—	—	—	0
H of talon	—	—	—	0	1.31	1.42	1.53	3	—	—	—	0	—	—	—	0
L	—	—	—	0	0.99	1.02	1.06	3	—	—	—	0	—	—	—	0
A ¹ W	—	—	—	0	0.74	0.77	0.80	3	—	—	—	0	—	—	—	0
L	—	—	—	0	0.83	0.88	0.91	3	—	—	—	0	—	—	—	0
A ² W	—	—	—	0	0.64	0.70	0.75	3	—	—	—	0	—	—	—	0
L	—	—	—	0	0.53	0.54	0.55	2	—	—	—	0	—	—	—	0
A ³ W	—	—	—	0	0.57	0.60	0.63	2	—	—	—	0	—	—	—	0
L	—	—	—	0	—	0.41	—	1	—	—	—	0	—	—	—	0
A ⁴ W	—	—	—	0	—	0.56	—	1	—	—	—	0	—	—	—	0
L	—	—	—	0	—	0.30	—	1	—	—	—	0	—	—	—	0
A ⁵ W	—	—	—	0	—	0.51	—	1	—	—	—	0	—	—	—	0
P ⁴ L (bucc.)	—	1.70	—	1	1.58	1.67	1.78	21	—	1.87	—	1	—	—	—	0
L (max.)	—	—	—	0	1.58	1.65	1.76	26	—	—	—	0	—	1.72	—	1
M ¹ L (med.)	—	—	—	0	1.33	1.43	1.55	27	—	—	—	0	—	1.40	—	1
W (max.)	—	—	—	0	1.75	1.82	1.90	26	—	—	—	0	—	1.77	—	1
L (max.)	—	1.53	—	1	1.37	1.49	1.65	17	—	—	—	0	—	—	—	0
L (med.)	—	1.25	—	1	1.18	1.27	1.45	19	—	—	—	0	—	1.21	—	1
M ² W (ant.)	—	1.82	—	1	1.68	1.74	1.78	18	—	—	—	0	—	1.67	—	1
W (post.)	—	1.61	—	1	1.51	1.57	1.68	16	—	—	—	0	—	—	—	0
L	—	—	—	0	0.69	0.74	0.79	5	—	—	—	0	—	—	—	0
M ³ W	—	—	—	0	1.35	1.38	1.43	5	—	—	—	0	—	—	—	0

1mm

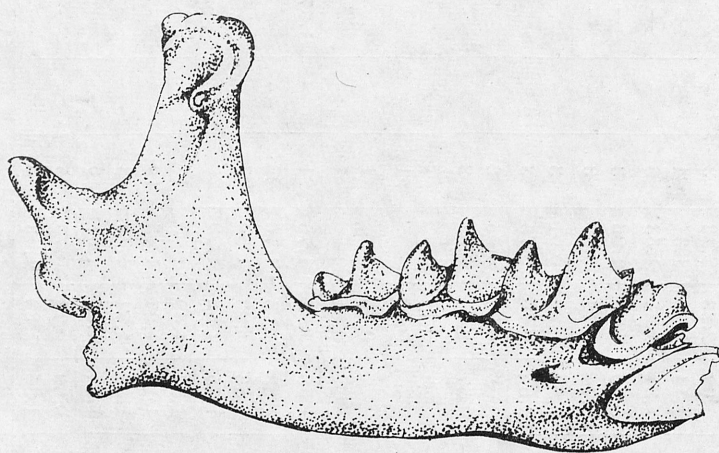
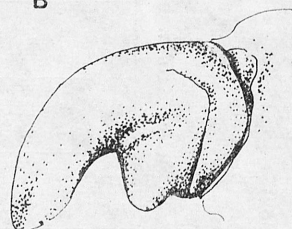


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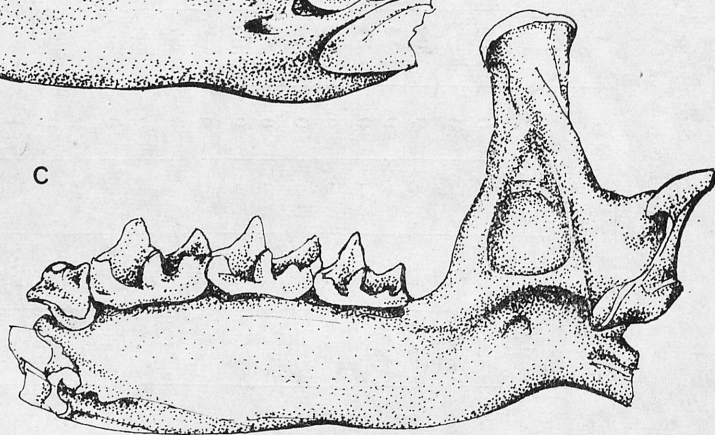


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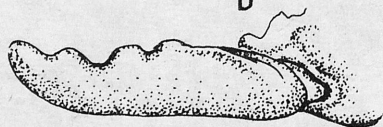
B



C



D



1mm

Table VIII

Sulimskia kretzoi (SULIMSKI, 1962)
Dimensions of mandible and lower dentition (in mm)

		Podlesice				Węże 1				Rębiełlice Królewskie 1A				Rębiełlice Królewskie 2				Rębiełlice Królewskie 4				Kadzielnia			
		min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n
I ₁	L	—	4.31	—	1	4.15	4.22	4.27	5	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
	H	—	0.97	—	1	0.90	0.96	1.05	12	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
A ₁	L (bucc.)	—	1.00	—	1	1.00	1.07	1.17	10	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
P ₄	L (bucc.)	1.21	1.25	1.29	2	1.23	1.31	1.45	19	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
	W of talonid (bucc.)	0.62	0.66	0.70	2	0.57	0.65	0.78	19	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
	W (occl.)	0.82	0.86	0.90	2	0.84	0.91	0.98	19	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
M ₁	L (occl.)	1.55	1.57	1.59	2	1.56	1.62	1.75	32	1.74	1.74	1.74	2	1.58	1.63	1.69	2	—	—	—	0	—	—	—	0
	W (occl.)	1.04	1.05	1.07	2	1.05	1.12	1.19	31	1.17	1.19	1.21	2	1.06	1.12	1.19	2	—	—	—	0	—	—	—	0
M ₂	L (occl.)	1.45	1.46	1.48	3	1.40	1.45	1.50	26	—	1.55	—	1	—	1.43	—	1	—	1.47	—	1	—	—	—	0
	W (occl.)	0.96	0.98	1.01	3	0.93	0.98	1.06	26	—	1.00	—	1	—	0.94	—	1	—	0.98	—	1	—	—	—	0
M ₃	L (occl.)	—	1.29	—	1	1.20	1.27	1.34	21	—	1.34	—	1	—	—	—	0	—	1.28	—	1	—	—	—	0
	W (occl.)	0.66	0.70	0.75	2	0.66	0.73	0.80	22	—	0.83	—	1	—	—	—	0	—	0.74	—	1	—	—	—	0
M ₁ —M ₃	L (occl.)	—	4.15	—	1	4.07	4.24	4.38	15	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
L of mandible without I ₁		—	—	—	0	—	9.87	—	1	—	—	—	0	—	—	—	0	—	—	—	0	—	—	—	0
H mandible below M ₂		1.58	1.62	1.67	3	1.61	1.70	1.83	29	1.85	1.87	1.94	4	1.62	1.76	1.92	4	—	1.50	—	1	—	1.76	—	1
H of ascending ramus		—	—	—	0	4.70	4.86	5.07	9	5.02	5.27	5.45	4	4.85	5.09	5.30	4	—	—	—	0	—	—	—	0
W of coronoid process		—	—	—	0	1.18	1.27	1.34	10	1.20	1.30	1.37	4	1.15	1.26	1.35	4	—	—	—	0	—	—	—	0
H of condyloid process		—	—	—	0	1.57	1.68	1.77	14	1.70	1.80	1.90	4	1.53	1.67	1.77	4	—	—	—	0	—	1.80	—	1
W of interarticular area		—	—	—	0	0.82	0.88	0.98	13	0.89	0.94	1.04	4	0.86	0.92	1.04	4	—	—	—	0	—	1.00	—	1

A big P_4 has a shallow postero-lingual basin, so in occlusal view its two worn cusps form a B-shaped rather than a L-shaped figure. The cingula of lower teeth are broad but very flat. For the most part, the buccal cingulum disappeared almost totally between protoconid and hypoconid in a large, broad M_1 .

In relation to the abundant material from Weże 1 the remaining one from Podlesice, Rębielice Królewskie 1A, 2, 4 and Kadzielnia is very scant, so that a comparison is rather difficult. It seems, however, that it shows no significant differences in structure (except for material from Podlesice where it is more delicate), and that its dimensions lie within the range of variation of the specimens from Weże 1. The teeth from Osztramos 7 are rather smaller.

Measurements. See Tables VII and VIII.

Systematic position and distribution. The position of A^5 in relation to the parastyle of P^4 , the morphology of the condyle, the lack of the entoconid crest in lower molars, and the position of the mental foramen exclude the attribution of "*Sorex*" *kretzoi* SULIMSKI, 1962 to the genus *Sorex*. This problem was seen a long time ago, first by REPENNING (1967), and then by JAMMOT (1977). REUMER, having at his disposal some teeth from Osztramos 7 similar to these of Weże 1, decided to create a new genus for them. Considering that they are representative of *Blarinini* tribe, but that they could be assigned neither to *Blarinoides* nor to *Mafia*, he erected a genus *Sulimskia* (1984), including the remains from Weże 1 as well as from Osztramos 7.

As his material from Osztramos 7 is scarce, he based the diagnosis of *Sulimskia* on SULIMSKI's description and illustrations. These illustrations are, however, not quite correct, so the diagnosis must be changed a little. It is as follows.

Relatively small representative of *Blarinini* with heavy teeth; trigonid valley open and low; lingual cuspids pointed; I_1 tricuspluate without well-developed cingulum, a soricini-type P_4 , but with the posterolingual basin of this tooth shallow; coronoid process broad and spatulate, with well pronounced coronoid spicule; condyle large and low, with a broad interarticular area; I^1 not fissident; five upper antemolars present.

According to REUMER (1984), the material of *Sulimskia kretzoi* from Osztramos 7 and Apolakkia (Rhodes, Greece) resembles in size and morphology the Weże 1 material but, according to the present study, the remains from Hungary seem to be much smaller (for ex. in Osztramos 7 — L of $M_2 = 1.34-1.37$, $W = 0.76-0.78$; in Weże 1 the same tooth dimensions are — L = $1.41-1.50$, $W = 0.93-1.06$. It is suggested here that the material from localities situated south of Carpathian Mts., according to BERGMAN's rule might be smaller

Fig. 4. *Sulimskia kretzoi*, Weże 1: A — left fragment of maxilla with A^2-A^5 , spec. no. MF/1868/1; B — right fragment of maxilla with P^4-M^2 and I^1 , spec. no. MF/1868/6; C — right fragment of mandible with P_4-M_3 , spec. no. MF/1868/2; D — left I_1 , spec. no. MF/1868/17

or even belong to a different species. More material is needed to answer this question.

Sulimskia kretzoi is now known from the Lower Pliocene (Early Ruscinian) up to the Plio-Pleistocene boundary in Poland (SULIMSKI 1962 and present study), in Czechoslovakia (Ivanovce A, FEJFAR 1966), in Hungary (Osztramos 7, REUMER 1984) and probably in Rhodes, Greece (Apolakkia, van de WEERD et al. 1982).

Tribe *Allosoricini* FEJFAR, 1966
= *Neomyini* REPENNING, 1967 (partim)
Genus *Paenelimnoecus* BAUDELLOT, 1972

Paenelimnoecus pannonicus (KORMOS, 1934)

- 1956 — *Suncus* cf. *pannonicus* (KORMOS, 1934), K. KOWALSKI, Insectivores, bats and rodents..., pp. 354—356, Pl. II, fig. 2, Text-fig. 1e.
- 1959 — *Suncus pannonicus* (KORMOS, 1934), A. SULIMSKI, Pliocene insectivores..., pp. 157—158, Pl. III, fig. 1a—b, P. IV, fig. 2a—b.
- 1959 — *Suncus zelceus* n.sp., A. SULIMSKI, Pliocene insectivores..., pp. 158—159, Pl. III, fig. 2a—b, Pl. IV, fig. 1a—c.
- 1962 — *Petenyiella gracilis* (PETENYI, 1864), A. SULIMSKI, Supplementary studies..., pp. 479—480.
- 1962 — *Petenyiella zelcea* (SULIMSKI, 1959), A. SULIMSKI, Supplementary studies..., p. 480, Pl. II, fig. 1.
- 1964 — *Petenyiella gracilis* (PETENYI, 1864), K. KOWALSKI, Palaeoecology of mammals..., p. 77.
- 1964 — *Petenyiella zelcea* (SULIMSKI, 1959), K. KOWALSKI, Palaeoecology of mammals..., p. 77.

The above list only contains the names used for material from Poland.

Referred material. The list of the material is given in Table IX. It contains the remains of maxillae with P⁴—M³ and mandibles with all types of teeth and processes. The minimum number of individuals has been calculated as in *M. dehneli* (see p. 304).

Description of the material. Diagnosis of the genus *Paenelimnoecus* is given by BAUDELLOT (1972), the description of the species *pannonicus* by KORMOS (1934). An emended detailed diagnosis can be found in REUMER (1984), a description of the Polish material from Podlesice in KOWALSKI (1956) and from Węże 1 in SULIMSKI (1959, 1962).

Here, the morphology of some skull elements should be added, as absent in previous descriptions.

The rostrum is depressed above the antemolars, the most deeply above A¹. The infraorbital foramen is more or less triangular. Its angles are round. It begins above the beginning of the metastyle of P⁴ and continues to the end

Table IX

Paenelimnoecus pannonicus (KORMOS, 1934)

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/9/60	1	17	18	10
Zalesiaki 1B MF/1875/89	0	1	1	1
Weże 1 MF/1873/89	2	26	28	14
Rębielice Królewskie 1A MF/1874/89	0	1	1	1

of the mesostyle of M^1 . The big, round lacrimal aperture is situated above the metastyle of M^1 . The zygomatic process is short and broad. In palatal view it begins between the parastyle and mesostyle of M^2 and ends at the level of the metastyle of the same tooth.

So far, the number of upper antemolars in the species of the genus *Paenelimnoecus* is unknown, due to the scarcity of maxillary material. REUMER (1984) is of the opinion that there were four of them, but he had at his disposal only rostral fragment with I^1 — A^2 (from Csarnota 2). In the material described above, there is one specimen from Podlesice and one specimen from Weże 1, where all alveoli between I^1 and P^4 are visible, and there are only 3 of them in a row. The first one is, however, very long and 8-shaped in occlusal view (see fig. 5A). As A^1 and A^2 (judging from REUMER's drawings, Pl. 36, fig. 5b, 1984) are rather short, it is possible that this alveolus holds two teeth and there were really four antemolars at one side.

The two upper M^3 present in the material from Weże 1 confirm the description of this tooth given by REUMER (1984) on the basis of one specimen only.

A comparison of the material from four Polish localities shows no differences in size and structure among them. The upper facet of the condyle seems to be rather oval (not triangular) in Podlesice, but unfortunately the material is in bad state and its outline is unclear.

In relation to the Hungarian material from Osztramos 7, 9 and Csarnota 2, the Polish specimens differ a little by the presence of very weak hypocones in upper molars. The lower incisors in our material are always biscuspluate, very rarely tricuspluate, and never smooth unless worn.

Measurements. See Tables X and XI.

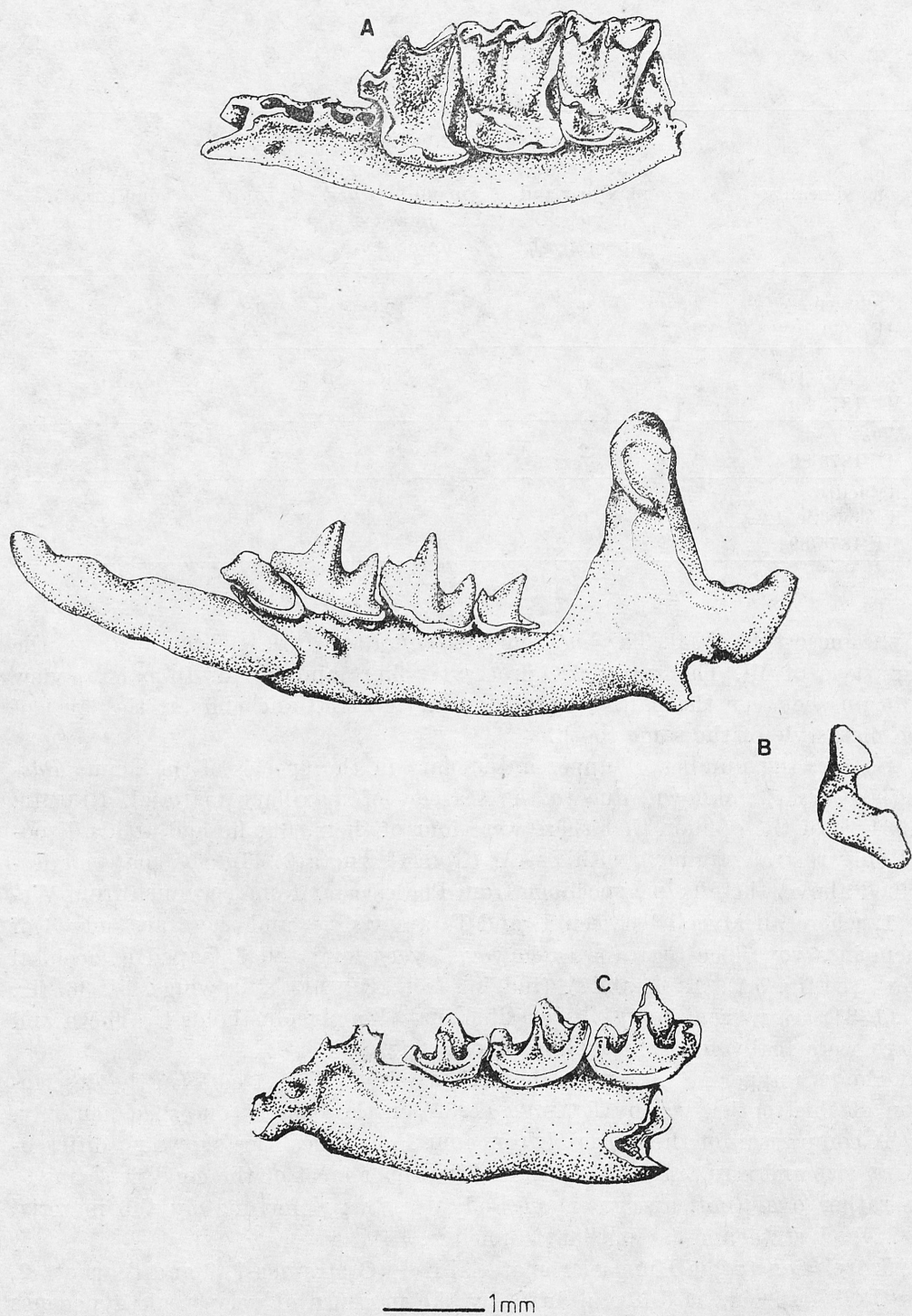


Fig. 5. *Paenelimnoecus pannonicus*, Podlesice: A — left fragment of maxilla with P^4 — M^2 , spec. no. MF/9/1; Węże 1: B — left mandible with I_1 — M_3 and proc. condyloideus, both specimen no. MF/1873/1; C — left fragment of mandible with M_1 — M_3 , spec. no. MF/1873/11

Systematic position and distribution. Such characters as the very small size, trapezoidal P^4 with linguallly placed protocone, lack of the meta-lophs in the upper teeth, small M^3 devoid of any protocone, mainly bicuspluate I_1 without buccal cingulum, extremely small A_1 , strongly reduced M_3 and, above all, M_1 and M_2 very characteristic by the near or complete absence of entoconid and entoconid crest (hence hypolophid ends in entostylid), permit to attribute our remains to the tribe *Allosoricini* and to the genus *Paenelimnoecus*.

On the other hand, the position of the lower I_1 , which ends below the protoconid of M_1 , and the position of the mental foramen, situated below the re-entrant valley or below the hypoconid of M_1 , would indicate its appurtenance to *P. pannonicus*.

The explanation of the very complicated history of taxonomy of the genus *Paenelimnoecus* and the species *pannonicus* is given in detail in REUMER (1984) so its repetition is redundant.

So far four species of this genus are known: *P. crouzeli* BAUDELLOT, 1972 from Sansan, France (Aragonian, MN6), *P. repenningi* (BACHMAYER and WILSON, 1970) from Kohfidisch, Austria (Turolian, MN11) (BACHMAYER and WILSON 1978) and Mała Cave, Poland (Ruscinian, MN14) (SULIMSKI et al. 1978), *P. zelceus* (SULIMSKI, 1959) from Węże 1, Poland (Ruscinian, MN15) (SULIMSKI 1969, KOWALSKI 1964) and *P. pannonicus* (KORMOS, 1934) from several localities in Europe dated from the Early Ruscinian to the Early Vilanyian (MN14—MN16).

Table X

Paenelimnoecus pannonicus (KORMOS, 1934)
Dimensions of skull and upper dentition (in mm)

		Podlesice				Węże 1			
		min.	\bar{x}	max.	n	min.	\bar{x}	max.	n
L	of palate	—	4.90	—	1	—	4.73	—	1
W	on zygom. proc.	—	3.84	—	1	3.54	3.67	3.80	2
A^3	L	—	—	—	0	—	0.49	—	1
	W	—	—	—	0	—	0.53	—	1
P^4	L (bucc.)	—	1.06	—	1	1.08	1.09	1.10	2
	L (max.)	—	1.11	—	1	1.06	1.08	1.10	2
M^1	L (med.)	—	0.81	—	1	0.78	0.79	0.80	2
	W (max.)	—	1.43	—	1	1.26	1.27	1.28	2
M^2	L (max.)	—	0.98	—	1	0.90	0.92	0.94	2
	L (med.)	—	0.78	—	1	0.73	0.74	0.75	2
	W (ant.)	—	1.35	—	1	1.21	1.21	1.21	2
	W (post.)	—	1.24	—	1	1.16	1.17	1.19	2
M^3	L	—	—	—	0	0.34	0.35	0.36	2
	W	—	—	—	0	0.80	0.81	0.82	2

Table XI

Paenelimonocerus pannonicus (Kormos, 1934)
Dimensions of mandible and lower dentition (in mm)

	Podlesie				Zalesiaki 1B				Weże 1				Rebiełce Królewskie 1A			
	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n	min.	\bar{x}	max.	n
I ₁	2.63	2.79	2.93	5	—	—	—	0	2.81	2.91	2.97	7	—	—	—	0
	0.55	0.61	0.68	8	—	—	—	0	0.63	0.66	0.69	8	—	—	—	0
A ₁	—	—	—	0	—	—	—	0	0.45	0.49	0.54	2	—	—	—	0
L (bucc.)	—	—	—	0	—	—	—	0	0.83	0.91	1.02	4	—	—	—	0
P ₄	0.40	0.40	0.40	2	—	—	—	0	0.39	0.44	0.53	4	—	—	—	0
	—	0.57	—	1	—	—	—	0	0.53	0.60	0.67	3	—	—	—	0
L (occl.)	1.14	1.19	1.22	9	—	—	—	0	1.15	1.22	1.30	15	—	1.17	—	1
W (occl.)	0.65	0.68	0.73	6	—	—	—	0	0.60	0.66	0.70	15	—	0.65	—	1
L (occl.)	1.01	1.06	1.08	7	—	—	—	0	1.02	1.10	1.18	14	—	1.06	—	1
W (occl.)	0.60	0.63	0.66	7	—	—	—	0	0.59	0.65	0.72	12	—	0.61	—	1
L (occl.)	0.78	0.79	0.80	4	—	—	—	0	0.71	0.76	0.85	8	—	0.69	—	1
W (occl.)	0.47	0.49	0.54	4	—	—	—	0	0.47	0.52	0.59	7	—	0.50	—	1
M ₁ —M ₃	2.63	2.72	2.78	3	—	—	—	0	2.50	2.71	2.89	5	—	2.54	—	1
I ₁ —M ₃	—	5.09	—	1	—	—	—	0	—	5.20	—	1	—	—	—	0
L of mandible without I ₁	5.62	5.83	6.08	3	—	—	—	0	—	5.90	—	1	—	—	—	0
H of mandible below M ₂	0.88	0.93	0.97	7	—	0.92	—	1	0.77	0.93	1.07	17	—	0.94	—	1
H of ascending ramus	2.51	2.60	2.70	3	—	2.80	—	1	2.54	2.64	2.83	8	—	2.64	—	1
W of coronoid process	0.56	0.59	0.62	4	—	0.59	—	1	0.55	0.62	0.73	8	—	0.58	—	1
H of condyloid process	1.01	1.14	1.24	3	—	1.35	—	1	1.20	1.27	1.33	6	—	1.18	—	1
W of interarticular area	0.29	0.35	0.39	5	—	0.42	—	1	0.30	0.36	0.38	8	—	0.30	—	1

According to REUMER (1984) *Paenelimnoecus* sp. from Eskihişar in Turkey (MN8) described by ENGESSER (1980) should be probably included within *P. crouzeli*.

Basing on the description and drawings of *Petenyiella gracilis* and *Petenyiella* aff. *repenningi* presented in the paper concerning Mala Cave, they do not resemble *Paenelimnoecus* at all. Their lower molars have a distinct entoconid crests and straight (not "boat-shape") lingual borders, and rather *Sorex*-like condyloid processes. REUMER (1984) thinks that these remains can belong to *Sorex minutus*.

The differences in the structure of I₁, coronoid process and internal temporal fossa between *Paenelimnoecus pannonicus* and *P. zelceus* from Weže 1 (originally described first as *Suncus zelceus*, then as *Petenyiella zelcea*) given by SULIMSKI (1959, 1962) are unclear and they are not confirmed in the present study. SULIMSKI (SULIMSKI et al. 1979) decided himself later that the material from Weže 1 would be referred to one species only. This species is, as we now know, *Paenelimnoecus pannonicus*.

Thus *P. pannonicus* has been found in Hungary at Beremend (KORMOS 1934, KRETZOI 1956), Csarnota 2 (KRETZOI 1959, 1962, REUMER 1984), Osztramos 7 and 9 (JÁNOSSY 1973, 1978, JÁNOSSY and KORDOS 1977, REUMER 1984) and in Poland at Podlesice (KOWALSKI 1956, 1964), Weže 1 (SULIMSKI 1959, 1962), Zalesiaki 1B and Rebielice Królewskie 1A.

It is also mentioned from Romania at Betfia 13 (TERZEA 1973, TERZEA and JURCSÁK 1976) and from Austria at Eichkogel (DAXNER-HÖCK and RABEDER 1970, RABEDER 1970).

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REFERENCES

- BACHMAYER F., WILSON R. W. 1970. Die Fauna der altplozänen Höhlen- und Spaltenfüllungen bei Kohfidisch, Burgenland (Österreich). *Annl. naturh. Mus., Wien*, **74**: 533—587.
- BACHMAYER F., WILSON R. W. 1978. A second contribution to the small mammal fauna of Kohfidisch, Austria. *Annl. naturh. Mus., Wien*, **81**: 129—161.
- BAUDELOT S. 1972. Etude des chiroptères et rongeurs du Miocène de Sansan (Gers). Thèse, Univ. Paul Sabatier, Toulouse, 364 pp.
- DAXNER-HÖCK G., RABEDER G. 1970. Vorläufige Ergebnisse der paläontologischen Grabung 1968 im Altplozän (O-Pannon) des Eichkogels/N. Ö. Anz. Akad. Wiss., Wien, **2**: 47—50.
- ENGESSER B. 1980. *Insectivora und Chiroptera (Mammalia)* aus dem Neogen der Türkei. *Schweiz. palaeont. Abh.*, **102**: 47—149.

- FEJFAR O. 1966. Die plio-pleistozänen Wirbeltierfaunen von Hajnáčka und Ivanovce (Slovakien), CSSR. V. *Allosorex stenodus* n. g. n. sp. aus Ivanovce A. Neues Jb. Geol. Palaont., **123** (3): 221—248.
- JAMMOT D. 1977. Les musaraignes (*Soricidae*, *Insectivora*) du Plio-Pléistocène d'Europe. Thèse, Dijon, 341 pp.
- JÁNOSSY D. 1973. The boundary of the Plio-Pleistocene based on the microvertebrate faunas in North Hungary (Osztramos locality 7). *Vertebr. hung.*, **14**: 101—112.
- JÁNOSSY D. 1978. Larger mammals from the lowermost Pleistocene fauna, Osztramos, loc. 7 (Hungary). *Annls hist.-nat. Mus. natn. hung.*, **70**: 69—79.
- JÁNOSSY D., KORDOS L. 1977. Az Osztramos gerinces lelőhelyeinek faunistikai és karsztmorfológiai áttekintése (1975-ig). *Fragm. miner. pal.*, **8**: 39—72.
- KORMOS T. 1934. Neue Insektenfresser, Fledermäuse und Nager aus dem Oberpliozän der Villányi Gegend. *Földt. Közl.*, **64**: 296—321.
- KOWALSKI K. 1956. Insectivores, bats and rodents from the Early Pleistocene bone breccia of Podlesice near Kroczyce (Poland). *Acta palaeont. pol.*, **1** (4): 331—394.
- KOWALSKI K. 1960. Pliocene insectivores and rodents from Rebielice Królewskie (Poland). *Acta zool. cracov.*, **5** (5): 155—198.
- KOWALSKI K. 1964. Palaeoecology of mammals from Pliocene and Pleistocene of Poland. *Acta theriol.*, **8** (4): 73—88.
- KRETZOI M. 1956. A Villányi hegység alsó-Pleistocén gerinces-faunái. (Die Altpleistozänen Wirbeltierfaunen des Villányi Gebirges). *Geologica hung.*, s. *Palaeont.*, **27**: 1—264.
- KRETZOI M. 1959. Insectivoren, Nagetiere und Lagomorphen der jüngstpliozänen Fauna von Csarnóta im Villányi Gebirge (Südungarn). *Vertebr. hung.*, **1** (2): 237—246.
- KRETZOI M. 1962. A Csarnóta Fauna és Faunaszint. (Fauna und Faunenhorizont von Csarnóta). *Evi Jelent. magy. K. földt. Intéz.*, **1959**: 297—395.
- RABEDER G. 1970. Die Wirbeltierfauna aus dem Alt-Pliozän (O-Pannon) vom Eichkogel bei Mödling (NÖ). *Annln. naturh. Mus., Wien*, **74**: 589—595.
- REPENNING C. A. 1967. Subfamilies and genera of the *Soricidae*. *Geol. Surv. Profes. Pap.*, **565**: 1—77.
- REUMER J. W. F. 1984. Ruscinian and early Pleistocene *Soricidae* (*Insectivora*, *Mammalia*) from Tegelen (The Netherlands) and Hungary. *Ser. geol.*, **73**: 1—173.
- RZEBIK-KOWALSKA B. 1971. The Pliocene and Pleistocene insectivores (*Mammalia*) of Poland. I. *Erinaceidae* and *Desmaninae*. *Acta zool. cracov.*, **16** (9): 435—461.
- RZEBIK-KOWALSKA B. 1975. The Pliocene and Pleistocene insectivores (*Mammalia*) of Poland. II. *Soricidae*: *Paranourosorex* and *Amblyoptus*. *Acta zool. cracov.*, **20** (6): 167—182.
- RZEBIK-KOWALSKA B. 1976. The Neogene and Pleistocene insectivores (*Mammalia*) of Poland. III. *Soricidae*: *Beremendia* and *Blarinoides*. *Acta zool. cracov.*, **21** (12): 359—385.
- RZEBIK-KOWALSKA B. 1981. The Pliocene and Pleistocene *Insectivora* (*Mammalia*) of Poland. IV. *Soricidae*: *Neomysorex* n. gen. and *Episoriculus* ELLERMAN et MORRISON-SCOTT, 1951. *Acta zool. cracov.*, **25** (8): 227—250.
- RZEBIK-KOWALSKA B. 1988. Studies on the genus *Crocidura* (*Insectivora*, *Mammalia*) in Algeria. *Acta zool. cracov.*, **31** (4): 167—192.
- RZEBIK-KOWALSKA B. 1989. Pliocene and Pleistocene *Insectivora* (*Mammalia*) of Poland. V. *Soricidae*: *Petenya* KORMOS, 1934 and *Blarinella* THOMAS, 1911. *Acta zool. cracov.*, **32** (1): 513—537.
- RZEBIK-KOWALSKA B. 1990. Pliocene and Pleistocene *Insectivora* (*Mammalia*) of Poland. VI. *Soricidae*: *Deinsdorfia* HELLER, 1963 and *Zelceina* SULIMSKI, 1962. *Acta zool. cracov.*, **33** (4): 45—77.
- SULIMSKI A. 1959. Pliocene insectivores from Węże. *Acta palaeont. pol.*, **4** (2): 119—173.
- SULIMSKI A. 1962. Supplementary studies on the insectivores from Węże 1 (Poland). *Acta palaeont. pol.*, **7** (3—4): 441—502.
- SULIMSKI A., SZYNKIEWICZ A., WOŁOŻYŃ B. 1979. The Middle Pliocene micromammals from Central Poland. *Acta palaeont. pol.*, **24** (3): 377—403.

- TERZEA E. 1973. A propos d'une faune villafranchienne finale de Betfia (Bihor, Roumanie) (Note préliminaire). Trav. Inst. Speol. Emile Racovitza, **12**: 229—242.
- TERZEA E., JURCSÁK T. 1976. Fauna de mamifères de Betfia-XIII (Bihor, Roumanie) et son âge géologique. Trav. Inst. Speol. Emile Racovitza. **15**: 175—185.
- WEERD A. van de, REUMER J. W. F., Vos J. 1982. Pliocene mammals from the Apolakkia Formation (Rhodes, Greece). Proc. K. ned. Akad. Wet., **85** (1): 89—112.

STRESZCZENIE

Praca jest siódmą częścią opracowania całości szczątków *Insectivora* z pliocenu i plejstocenu Polski. Zawiera opis uzupełniający, dyskusję systematyczną, dane o rozmieszczeniu, wymiary i ilustracje czterech gatunków kopalnych. Są to *Mafia dehneli* (KOWALSKI, 1956) z dolnopliocenijskiego stanowiska Podlesice, *Mafia* cf. *csarnotensis* REUMER, 1984 z czterech stanowisk kopalnych (Podlesice, Węże 1, Rębielice Królewskie 1A i 2) obejmujących okres od dolnego do górnego pliocenu, *Sulimskia kretzoi* (SULIMSKI, 1962) z sześciu stanowisk (Podlesice, Węże 1, Rębielice Królewskie 1A, 2, 4 i Kadzielnia) datowanych od dolnego pliocenu po granicę plio-plejstocenu i wreszcie *Paenelimnocus pannonicus* (KORMOS, 1934) z czterech stanowisk (Podlesice, Zalesiaki 1B, Węże 1 i Rębielice Królewskie 1A) obejmujących okres od dolnego do górnego pliocenu.

M. dehneli znana jest z Polski (KOWALSKI 1956) i być może z Węgier (JÁNOSSY i KORDOS 1977), *M. csarnotensis* z Polski i Węgier (REUMER 1984), *S. kretzoi* z Polski (SULIMSKI 1962), Węgier (REUMER 1984), Czechosłowacji (FEJFAR 1966) i prawdopodobnie z Grecji (van de WEERD i in. 1982), a *P. pannonicus* z Polski (KOWALSKI 1956, 1964, SULIMSKI 1956, 1964, SULIMSKI 1959, 1962), z Węgier (JÁNOSSY 1973, KORMOS 1934, KRETZOI 1956, 1959, 1962, REUMER 1984) oraz prawdopodobnie z Rumunii (TERZEA 1973, TERZEA i JURCSÁK 1976) i z Austrii (DAXNER-HÖCK i RABEDER 1970, RABEDER 1970).

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