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Pliocene and Pleistocene *Insectivora (Mammalia)* of Poland. VI. *Soricidae*: *Deinsdorfia* HELLER, 1963 and *Zelceina* SULIMSKI, 1962

[With 9 text-figs.]

Plioceńskie i plejstoceńskie owadożerne *(Insectivora, Mammalia)* Polski. VI. *Soricidae*: *Deinsdorfia* HELLER, 1963 i *Zelceina* SULIMSKI, 1962

Abstract. *Deinsdorfia reumeri* n. sp., *Deinsdorfia insperata* n. sp. and *Zelceina podlesi censis* n. sp. are described from the Lower Pliocene locality Podlesice. *D. hibbardi* (SULIMSKI 1962) was found in 5 fossil localities which embrace the period from the Lower Pliocene to the Pliocene-Pleistocene boundary (MN15—MN17/Q_1): Węże 1, Rębielice Królewskie 1A and 2, Kielniki 3B and Kadzielnia.

The occurrence of *D.* cf. *kordosi* REUMER, 1984 was stated in 2 fossil localities — Węże 1 and Rębielice Królewskie 1A, and that of *Z. soriculoides* (SULIMSKI, 1959) in 3 localities — Węże 1, Rębielice Królewskie 1A and 2.

A discussion of the systematic position of above-mentioned forms, all belonging to the tribe *Soricini*, their measurements and illustrations are also given.

I. INTRODUCTION

The present paper is the sixth part in the series of studies concerning the remains of insectivores from the Neogene and the Pleistocene of Poland. The previous papers dealt with the *Erinaceidae* and *Desmaninae* (RZEBIK-KOWALSKA 1971), the genera of the family *Soricidae*: *Paranourosorex* and *Amblycoptus* (RZEBIK-KOWALSKA 1975), *Beremendia* and *Blarinoides* (RZEBIK-KOWALSKA 1976), *Neomysorex* and *Episoriculus* (RZEBIK-KOWALSKA 1981), as well as *Petenyia* and *Blarinella* (RZEBIK-KOWALSKA 1989). The present study is devoted to two further genera of *Soricidae*: *Deinsdorfia* HELLER, 1963 and *Zelceina* SULIMSKI, 1962.

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 1975 and 1988.

The specimens described are stored in the collections of the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Cracow.

I am indebted to Mr M. KAPTURKIEWICZ for the illustrations.

II. SYSTEMATIC PART

Family *Soricidae* GRAY, 1821
Subfamily *Soricinae*
Tribe *Soricini*
Genus *Deinsdorfia* HELLER, 1963

Deinsdorfia reumeri n. sp.
(Text-figs. 1—2)

Holotype. Fragmentary mandible with P_4—M_3, condyloid and coronoid processes. No. MF/1849/1, fig. 1 A, B_1—B_2.

Referred material. The list of the material is given in Table I. It includes the remains of maxillae with A^1—A^4 and P^4—M^2, and those of mandibles with all teeth and processes except for the angular process.

Table I

Deinsdorfia reumeri n. sp.

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/1849	19	37	56	12

The minimum number of individuals has been calculated as the highest number of identical elements (e. g., right M_1).

Type locality. Podlesice.

Type horizon. Lower Ruscinian.

Name derivation. Named in honour of dr J. W. F. REUMER from the Netherlands.

Diagnosis. Big *Deinsdorfia* with 5 upper inflated antemolars (especially A^1—A^2) diminishing in size; A^3 is broader in relation to its length; M^2 nearly quadrate to sub-trapezoidal in outline (PW/AW = 0.90); lower incisor with three bulbous cuspules and bulbous apex; very large double-cusped, buccally

inflated P_4; M_3 with small, reduced, single-cusped talonid, with a tiny basin; internal temporal fossa without horizontal bar.

Description of the holotype. P_4 is very large, two-cusped and extremely bulbous. Its postero-lingual basin is very shallow and reaches no more than half way down to the postero-lingual corner. In worn specimens the occlusal surface of those two cusps acquires a B- or 8- shape. The buccal overhang over the root is considerable. Buccal cingulum is broad and flat, lingual vestigial.

M_1 is also large, its trigonid valley is wide and open, the paraconid is pla-

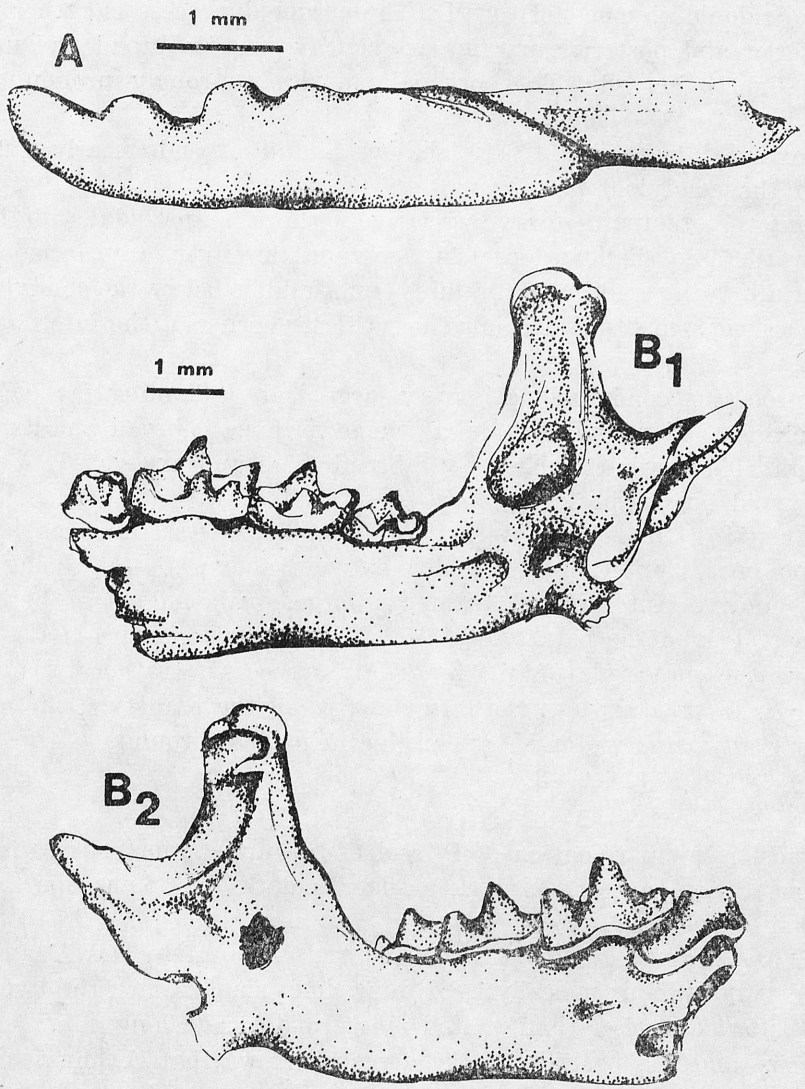

Fig. 1. *Deinsdorfia reumeri* n. sp., Podlesice: A — left I_1, spec. no MF/1849/14; B_1—B_2 — right fragment of mandible with P_4—M_3, spec. no MF/1849/1, holotype

ced far forward, the protoconid and the metaconid are close together, the same is true for the entoconid and the metaconid. The talonid is short and the entoconid crest moderately high. The buccal cingulum is broad, not very pronounced, more or less undulate. The lingual cingulum is absent.

M_2 is similar to M_1 but smaller; its buccal cingulum is less undulate.

M_3 is reduced to four cusps. Its talonid is rather small with a tiny basin discernible.

The teeth are stained a dark red.

Mandible. The horizontal ramus of the mandible is not very high and its lower margin is slightly concave under M_2. The mental foramen is situated below the talonid (hypoconid) of M_1. The coronoid process is rather low, its both anterior and posterior margins are concave, its tip broad and undulate, bending slightly inwards. The coronoid spicule is strongly pronounced and situated in 2/3 of its height.

The external temporal fossa is shallow and it extends nearly 1/2 of the height of the condyloid process.

The internal temporal fossa is relatively short, trapezoidal, but it continues upwards as a shallow depression, without, however, any horizontal bar.

There are two mandibular foramina, one hidden below the condyloid process, the second one situated below the posterior corner of the internal temporal fossa.

The processus condyloideus is very large and protruding far backwards. The upper facet is long and cylindrical, the lower facet is broad and its margins are straight. The interarticular area is broad, high and excavated. A medium size pterygoid boss is present.

Description of the remaining material. Rostrum has a shallow depression on its external side which extends above A^1—A^4, being deepest above A^1 and A^3. Interorbital foramen is large, oval and placed between the paracone of P^4 and the parastyle of M^1. The lacrimal aperture is also big and lies above the mesostyle of M^1. Zygomatic process is rather broad, curved downwards. In palatal view, the terminal part of the parastyle, the mesostyle and nearly all metastyle of M^2 are visible in its background.

Dental formula: $\frac{1—6—3}{1—2—3} = 32$

The posterior emargination of P^4 and of the upper molars is considerable. The pigmentation of teeth is dark orange to dark red. Some specimens are secondarily decolorized.

I^1, A^5 and M^3 are absent from the material. The antemolars A^1 and A^2 are large and very bulbous buccally. A^3 is four times smaller then the two anterior ones. A^4 is twice smaller than A^3 and it is broader than long.

The size and the position of the alveolus shows that A^5 must have been the smallest and totally hidden behind the parastyle of P^4.

All antemolars are unicuspid. Their buccal and lingual cingula are broad

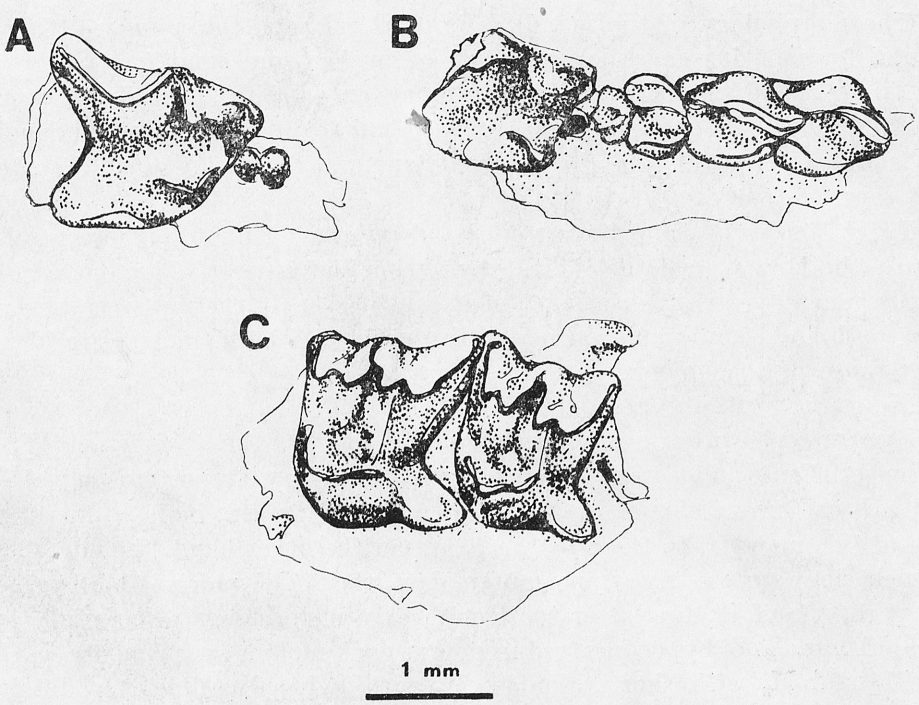

Fig. 2. *Deinsdorfia reumeri* n. sp., Podlesice: A — right P^4, spec. no MF/1849/9; B — right maxillary fragment with A^1—A^4 and P^4 (broken), spec. no MF/1849/14; C — left maxillary fragment with M^1—M^2, spec. no MF/1849/16

and well-developed, and their postero-lingual corners bend downwards. In one specimen $A^{\sim}$ is particularly wide and short, a probable pathology.

P^4 is big. Its parastyle is placed far towards the anterior, the parastylar crest is long and the tooth acquires an elongate shape. Its protocone is very distinct in the form of the crest (loph) transversal to the anterior side of the tooth. It is situated about half-way between the parastyle and the beginning of the cingular ridge. The hypocone is hardly individualized as a cusp on this cingular ridge. The protocone and the virtual hypocone (or beginning of the cingular ridge) are separated by a wide valley. The hypoconal flange is narrow and it is not surrounded posteriorly by a cingulum.

M^1 is big, nearly square in outline. Its protocone is well developed, U-shaped. The high metaloph reaches the metacone and the valley between the paracone, the protocone and the metacone is closed. The metacone is higher than the protocone. As in P^4, the hypocone is vestigial or absent, and the hypoconal flange flat and narrow, without any cingulum.

M^2 is rather rectangular and not reduced. Its PW/AW ratio = 0.90. It is similar in morphology to M^1.

The morphology of the mandible is identical with the holotype. Only the mental foramen in some specimens can be pushed somewhat forward between the trigonid and talonid of M_1, the internal temporal fossa can be more triangular in shape, the coronoid spicule placed a little higher (3/4 of the height of the coronoid process), and the external temporal fossa can be a little deeper and shorter.

I_1 is tricuspulate, and its cuspules and apex are bulbous. The central cuspule is the largest, and the central depression the deepest. The buccal cingulum is generally absent or a trace of it can be seen in the upper basal part of this tooth. A_1 is unicuspid, also slightly bulbous. P_4 and molars are identical with those of the holotype.

Measurements. See Tables II and III.

Systematic position. The pigmented teeth, the tricuspulate I_1, the presence of entoconid crest in the lower molars, P_4 with postero-lingual basin and a broad interarticular area in the condyloid process indicate the attribution of this material to the tribe *Soricini*. On the other hand, the combination of such characters as five upper antemolars, the A^5 of which is hidden behind the parastyle of P^4, the latter tooth with extremely elongate parastyle, hypoconal flanges and hypocones reduced in upper molars, tricuspulate I_1, large P_4, M_1 and M_2 with short talonids, M_3 with reduced, single-cusped talonid,

Table II

Deinsdorfia reumeri n. sp.
Dimensions of upper dentition (in mm)

		Podlesice			
		min.	avg.	max.	n
A^1	L	—	1.27	—	1
	W	—	0.82	—	1
A^2	L	—	1.15	—	1
	W	—	0.86	—	1
A^3	L	0.63	0.65	0.67	2
	W	0.63	0.66	0.69	2
A^4	L	0.29	0.34	0.39	3
	W	0.48	0.51	0.55	3
P^4	L (bucc.)	1.80	1.85	1.89	9
M^1	L (max.)	1.47	1.52	1.55	10
	L (med.)	1.08	1.16	1.27	10
	W (max.)	1.61	1.68	1.75	10
M^2	L (max.)	1.24	1.26	1.28	3
	L (med.)	0.98	1.00	1.04	3
	W (ant.) = AW	1.51	1.55	1.58	3
	W (post.) = PW	1.36	1.39	1.42	3
	PW/AW	0.89	0.90	0.91	3

Table III

Deinsdorfia reumeri n. sp.
Dimensions of mandible and lower dentition (in mm)

		Podlesice			
		min.	avg.	max.	n
I_1	L	4.48	4.86	5.10	11
	H	0.97	1.10	1.24	13
A_1	L (bucc.)	0.85	0.97	1.12	4
P_4	L (bucc.)	1.25	1.34	1.50	9
	L of talonid (bucc.)	1.00	1.11	1.24	9
	W of talonid (bucc.)	0.58	0.64	0.70	11
	W (occl.)	0.84	0.89	0.93	11
M_1	L (occl.)	1.46	1.52	1.58	17
	W (occl.)	0.92	0.97	1.02	15
M_2	L (occl.)	1.28	1.32	1.38	12
	W (occl.)	0.77	0.83	0.86	11
M_3	L (occl.)	0.98	1.04	1.08	7
	W (occl.)	0.59	0.63	0.67	7
M_1—M_3 L		3.49	3.72	3.94	5
H of mandible below M_2		1.52	1.59	1.76	18
H of ascending ramus		4.12	4.23	4.34	5
W of coronoid process		1.05	1.09	1.14	5
H of condyloid process		2.49	2.55	2.59	3

short and large coronoid process, coronoid spicule well developed, very large condyloid process and the position of a mental foramen below the talonid of M_1 allow us to attribute this remains to the genus *Deinsdorfia*.

So far three species of the genus *Deinsdorfia* have been described from Europe: *D. janossyi* REUMER, 1984 from the Early Ruscinian locality Osztramos 9 (Hungary), *D. hibbardi* (SULIMSKI, 1962) from the Late Ruscinian locality Węże 1 (Poland) and *D. kordosi* REUMER, 1984 from the Late Ruscinian locality Csarnota 2 (Hungary). The material from Podlesice differs very much from those three species, especially from the nearly equal in age *D. janossyi*.

D. reumeri n. sp. differs from *D. janossyi* by having a larger size, inflated I_1, without buccal cingulum, inflated both upper and lower antemolars (especially big and bulbous P_4 with only very small and shallow posterolingual basin), and by having a wide coronoid process.

It differs from *D. hibbardi* in the same characters and additionally by the lack of a high internal temporal fossa with bar.

In comparison to *D. kordosi* it has no reduction of M^2, a less reduced talonid of M_3, still more bulbous teeth and the big metaloph in upper molars.

Deinsdorfia insperata n. sp.
(Text-fig. 3)

Holotype. Mandible with all teeth, although I_1 is broken behind the first cuspule and all processes except for the angular process. No. MF/1850/1, fig. 3 A—C_2.

Referred material. The list of the material is given in Table IV. It includes the remains of maxillae with A^1 and P^4, A^4 and P^4, M^1—M^2 and isolated P^4, and the remains of mandibles with all teeth except for I_1, and processes except for the angular process. The minimum number of individuals has been calculated as in *D. reumeri* n.sp. (see p. 46).

Table IV

Deinsdorfia insperata n. sp.

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/1850	4	9	13	4

Type locality. Podlesice.

Type horizon. Lower Ruscinian.

Name derivation. From insperatus (Lat.) — unexpected.

Diagnosis. *Deinsdorfia* with 5 upper antemolars not inflated. A^3 broader in relation to its length; M^2 nearly quadrate to sub-trapezoidal in outline (PW/AW = 0.88); large, but only slightly buccally inflated P_4; M_3 with very small, single-cusped in the shape of comma, strongly reduced talonid; high internal temporal fossa with a horizontal bar.

Description of the holotype. I_1 is broken behind the first (beginning from the proximate part of the tooth) cuspule, a little inflated. Its buccal cingulum is lacking and only a very short groove can be seen below A_1. This latter tooth is unicuspid, its buccal cingulum is broad and flat. P_4 is large and slightly bulbous on the buccal side. Its postero-lingual basin is rather shallow, but clear, and it reaches to the end of the postero-lingual corner. In worn specimens, the occlusal surface of this tooth acquires an L-shaped outline. The buccal overhang over the root is less considerable. The buccal cingulum is also broad and flat, the lingual one hardly visible.

M_1 is typical for the genus. It has a wide, open trigonid valley, the paraconid placed far forwards, the short talonid and moderately high entoconid crest. Its buccal cingulum is broad and flat, slightly undulate. Its lingual cingulum is also hardly visible.

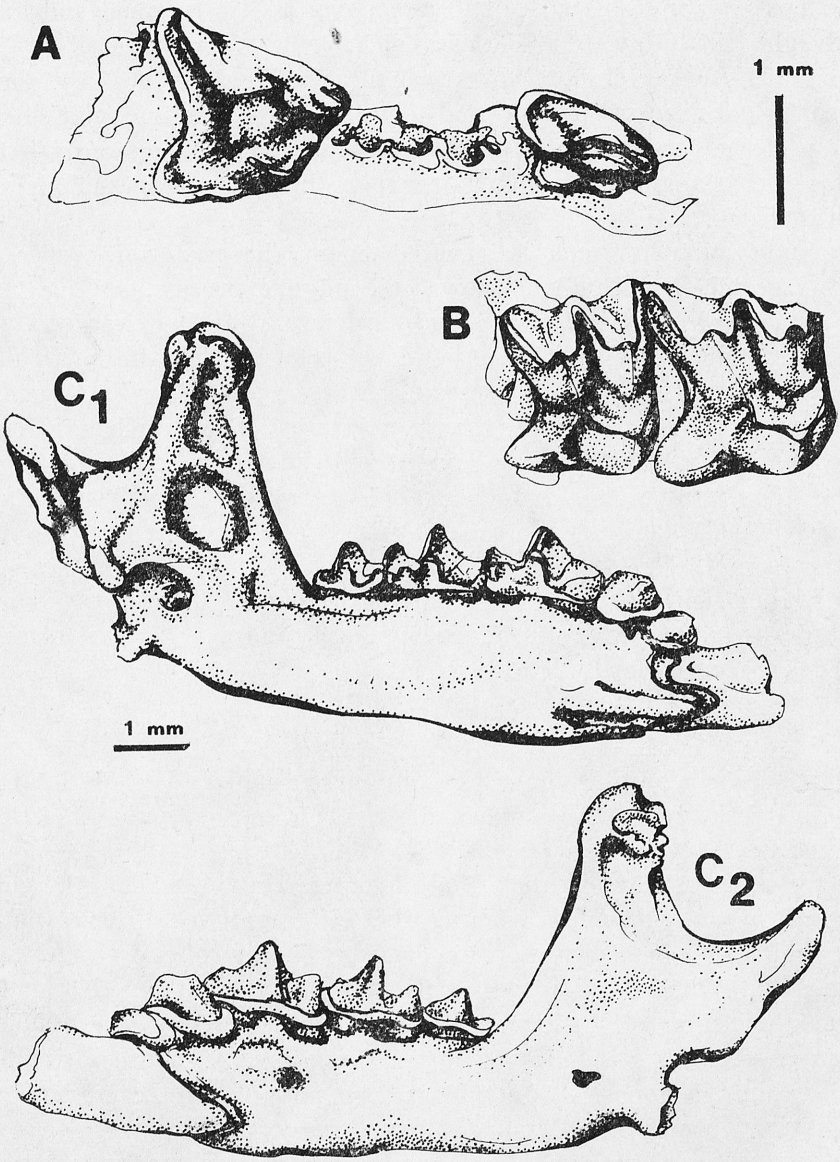

Fig. 3. *Deinsdorfia insperata* n. sp., Podlesice: A — right maxillary fragment with A^1 and P^4, spec. no MF/1850/3; B — right maxillary fragment with M^1 (broken) and M^2, spec. no MF/1850/4; C_1—C_2 — left mandible with I_1 (broken) — M_3, spec. no MF/1850/1, holotype

M_2 is similar to M_1, but smaller. M_3 has a strongly reduced talonid, which bears only a comma-shaped hypoconid (without entoconid and talonid basin).

The teeth are dark red in colour.

Mandible. The horizontal ramus of the mandible is massive and its lower margin slightly concave under M_2. The mental foramen is situated below M_1, between its trigonid and talonid. The coronoid process is not very high, its ante-

rior and posterior margins are slightly concave. Its tip is broad and undulate, and it bends a little inwards. The coronoid spicule is large and situated in 2/3 of its height. External temporal fossa is shallow and ends in the 3/4 of the height of the condyloid process. The internal temporal fossa is long, it extends nearly to the tip of the coronoid process and is provided with a horizontal bar which separates the triangular, shallow upper part from the trapezoid deep lower part of this fossa.

One mandibular foramen is situated below the posterior corner of this fossa, the second one is hidden below the condyloid process.

The condyloid process is large and protruding far backwards. Its upper facet is long and cylindrical, the lower facet is broad. The interarticular area is also broad, high and slightly concave. The pterygoid boss is absent.

Description of the remaining material. Rostrum has a depression on its external side, which begins above A^1 and ends above A^4, being the deepest above A^1. The infraorbital foramen extends between the metastyle of P^4 and the parastyle of M^1, and is more or less oval. The lacrimal aperture is also oval and lies above the mesostyle of M^1.

The zygomatic process is rather narrow. It curves slightly backwards and downwards. In palatal view the metastyle of M^2 and a small part of the parastyle of M^3 are visible in its background.

Dental formula: $\frac{1—6—3}{1—2—3} = 32$

The posterior emargination of P^4 and upper molars is considerable. The tips of the teeth are dark orange to dark red, some of them are secondarily decolorized.

The teeth: I^1, A^2, A^3, A^5 and M^3 are lacking. The antemolar A^1 is big, unicuspid and only slightly inflated buccally. Its cingulum is broad and its postero-lingual corner bends slightly downwards. The morphology of A^4 is similar (it is longer in relation to its width), but the tooth is smaller. It can be seen from the dimensions of the alveoli that the antemolars were diminishing in size from A^1—A^5. This is however only a supposition, because a small difference in size in the opposite direction is also possible (in *D. hibbardi* e.g. A^2 can be slightly bigger than A^1 — see REUMER 1984).

P^4 is typical for the genus. It is characterized by a strongly developed and far anteriorly placed parastyle, a moderately high parastylar crest, a well developed protocone and an almost or completely absent hypocone. The hypoconal flange is narrow and it is not bordered posteriorly by a cingular ridge.

M^1 is also typical. Its protocone is well developed in the shape of U. The metaloph is also present. The hypoconal flange is narrow, deprived of the cingular ridge along its posterior margin and hypocone. Vestigial hypocone however can be seen in some specimens.

M^2, similar to M^1, is nearly quadrate to sub-trapezoidal in outline; its PW/AW ratio = 0.88.

Mandible and lower dentition. Only one broken I_1 (in the holotype) is present in the material. The remaining mandibles show no significant differences in relation to the holotype. Only the position of the mental foramen can be slightly shifted forwards or backwards in comparison to the holotype. In one specimen, this aperture lies far backwards, i.e. under the posterior root of M_1. Also the coronoid spicule can be situated a little higher, in 3/4 of the height of the coronoid process, and the external temporal fossa can be slightly shorter.

Measurements. See Tables V and VI.

Systematic position. The above-described remains have been included into the tribe *Soricini* and the genus *Deinsdorfia* on the basis of the same characters as in the case of *D. reumeri* n.sp. They show a great similarity to *D. hibbardi*, known from the younger localities, but there are also some differences between them. *D. insperata* n. sp. differs from *D. hibbardi* by having a slightly more massive mandible and slightly more inflated teeth, by a bigger and differently shaped A^4 (longer in relation to its width), by the presence of very high metalophs in upper molars, by a slightly more anterior position of the mental foramen and, first of all, by the extremely reduced M_3, the talonid of which is very small, single-cusped, in comma shape as in *D. kordosi*.

It differs from *D. kordosi* by less inflated teeth, a nearly quadrate M^2, and a high internal temporal fossa with horizontal bar.

It can be distinguished from *D. janossyi* on the basis of the more massive mandible and more inflated teeth, the presence of the high metalophs in upper molars, by a very broad and undulate coronoid process, by the presence of

Table V

Deinsdorfia insperata n. sp.
Dimensions of upper dentition (in mm)

		Podlesice			
		min.	avg.	max.	n
A^2	L	—	1.22	—	1
	W	—	0.81	—	1
A^4	L	—	0.60	—	1
	W	—	0.54	—	1
P^4	L (bucc.)	1.70	1.75	1.78	3
M^1	L (max.)	—	1.47	—	1
	L (med.)	—	1.18	—	1
	W (max.)	—	1.75	—	1
M^2	L (max.)	—	1.37	—	1
	L (med.)	—	1.06	—	1
	W (ant.) = AW	—	1.59	—	1
	W (post.) = PW	—	1.40	—	1
	PW/AW	—	0.88	—	1

Table VI

Deinsdorfia insperata n. sp.
Dimensions of mandible and lower dentition (in mm)

		Podlesice			
		min.	avg.	max.	n
I_1	L	—	—	—	0
	H	1.03	1.05	1.07	2
A_1	L (bucc.)	0.82	0.87	0.92	2
P_4	L (bucc.)	1.14	1.28	1.37	3
	L of talonid (bucc.)	0.96	1.03	1.11	3
	W of talonid (bucc.)	0.63	0.65	0.66	3
	W (occl.)	0.82	0.84	0.86	3
M_1	L (occl.)	1.49	1.55	1.59	7
	W (occl.)	0.90	0.96	1.01	7
M_2	L (occl.)	1.30	1.31	1.32	6
	W (occl.)	0.82	0.85	0.91	5
M_3	L (occl.)	0.94	1.00	1.04	6
	W (occl.)	0.58	0.62	0.65	5
M_1—M_3 L		3.67	3.73	3.79	5
L. of mandible without I_1		—	9.00	—	1
H of mandible below M_2		1.45	1.56	1.70	7
H of ascending ramus		4.07	4.23	4.47	6
W of coronoid process		0.97	1.10	1.20	7
H of condyloid process		2.38	2.48	2.69	6

the horizontal bar of the internal temporal fossa and by the extreme reduction of M_3.

In relation to *D. reumeri* n.sp. from the same locality, *D. insperata* n.sp. has much slender teeth, especially A^1 and P_4 (the latter also having a longer and more excavated postero-lingual basin), A^4 different in size and shape, narrower zygomatic process, a horizontal bar of the internal temporal fossa and highly reduced talonid of M_3.

Deinsdorfia hibbardi (Sulimski, 1962)
(Text-figs. 4—5)

1962 a — *Sorex hibbardi* n.sp., A. Sulimski, Supplementary studies . . . , pp. 467—469, Pl. II, fig. 8, Text—pl. II, fig. 6 a—b.

1964 — *Sorex hibbardi* Sulimski, 1962, K. Kowalski, Paleoekologia ssaków . . . , 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 VII. 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 *D. reumeri* n.sp. (see p. 46)

Table VII

Deinsdorfia hibbardi (SULIMSKI, 1962)

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Węże 1 MF/1851	1	40	41	16
Rębielice Królewskie 1A MF/1852	3	113	116	38
Rębielice Królewskie 2 MF/1853	6	12	18	6
Kielniki 3B MF/1854	1	2	3	1
Kadzielnia MF/1855	0	1	1	1

Description of the material. Original description of the genus *Deinsdorfia* (but only concerning the ramus) is to be found in the work of HELLER (1963), and the original description of the species "*hibbardi*" (concerning only mandibular material) in the work of SULIMSKI (1962a). An additional, detailed description of the genus and species, their history, diagnostic characters and complete synonymies are given by REUMER in his monograph (1984). For this reason, the present paper only contains a description of the maxillary fragments not mentioned in REUMER'S paper and a comparison between the Hungarian material and that from the five different Polish localities.

Rostrum is depressed above the four succesive antemolars A^1—A^4. The oval or nearly oval infraorbital foramen begins above the mesostyle of P^4 (where it is open in the direction of the teeth) and terminates above its metastyle, or it is longer and extends as far as the end of the parastyle of M^1. The oval or round lacrimal foramen lies above the mesostyle or, rarely, between the parastyle and mesostyle of M^1.

The zygomatic process is rather narrow. Seen from the outside it covers the metastyle of M^2 only, but sometimes can be broader.

A comparison of the material from five Polish localities shows a slight increase in dimensions with geological age. The specimens from Węże 1 are similar in size to these from Osztramos 7 and smaller than those from Rębielice Królewskie 1A and 2, Kielniki 3B and Kadzielnia.

In relation to the Hungarian material, the Polish specimens differ by the presence of very weak but distinct hypocones in P^4 and M^1 (in M^2 it is always vestigial), and more distinct metalophs of upper molars.

In a single specimen of maxilla from Węże 1, the antemolars have got a broader external cingula and worn, but distinct small additional cingular cusps

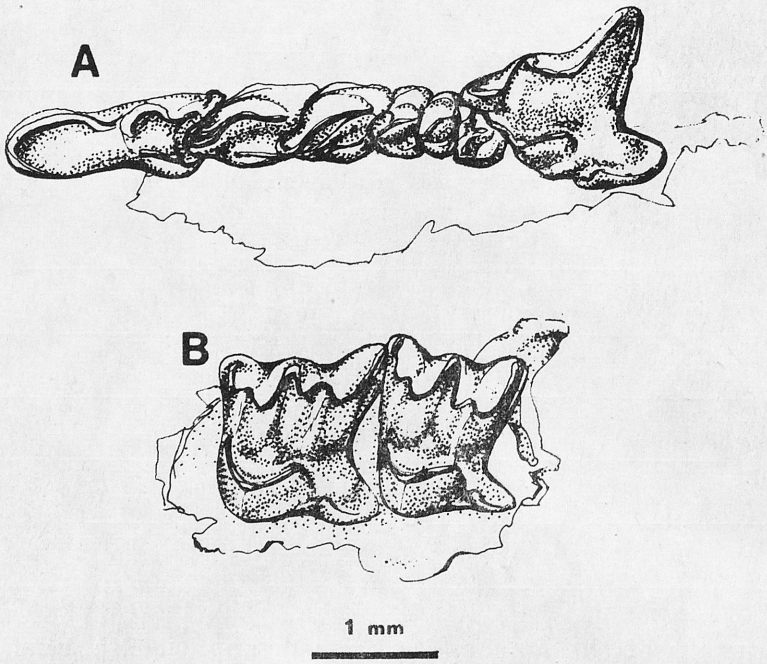

Fig. 4. *Deinsdorfia hibbardi*, Węże 1: A-B — left maxillary fragment with I^1—M^2 broken in two during measurements, spec. no MF/1851/1

in A^2 and A^4. The remaining characters of the upper dentition are typical for the species e.g. PW/AW ratio of M^2 is 0.90 (N = 4); in REUMER'S specimen from Osztramos 7 this ratio is 0.92.

The mandibles of the specimens from Węże 1 are similar to those from Osztramos 7, whereas the mandibles of the specimens from the remaining four Polish localities: Rębielice Królewskie 1A and 2, Kielniki 3B and Kadzielnia, are more robust and the tips of their coronoid process are broader, with a strongly undulated outline. The buccal cingulum of their lower molars, especially that of M_1, is also often more undulate, the entoconid crest a little higher and, in some specimens of M_3, a trace of the second cusp (entoconid) can be seen.

Measurements. See Tables VIII and IX.

Systematic position and distribution. This fossil species of *Deinsdorfia* was originally described by SULIMSKI in 1962 from the Upper Ruscinian locality Węże 1, as *Sorex hibbardi*. Some authors, however, such as REPENNING (1967), JAMMOT (1977 — unpublished thesis) and others, have already indicated the necessity for establishing a new genus for it because its characters such as the elongate parastyle in P^4, a short and stout horizontal ramus with a low coronoid process, the relatively large condyloid process, M_3 with reduced talonid (small, usually single-cusped) and the position of the mental foramen exclude it from the genus *Sorex* (but not from the tribe *Soricini*).

In 1984, REUMER found that the ascending ramus of *Sorex hibbardi*, characterized by the presence of the horizontal bar in the internal temporal fossa,

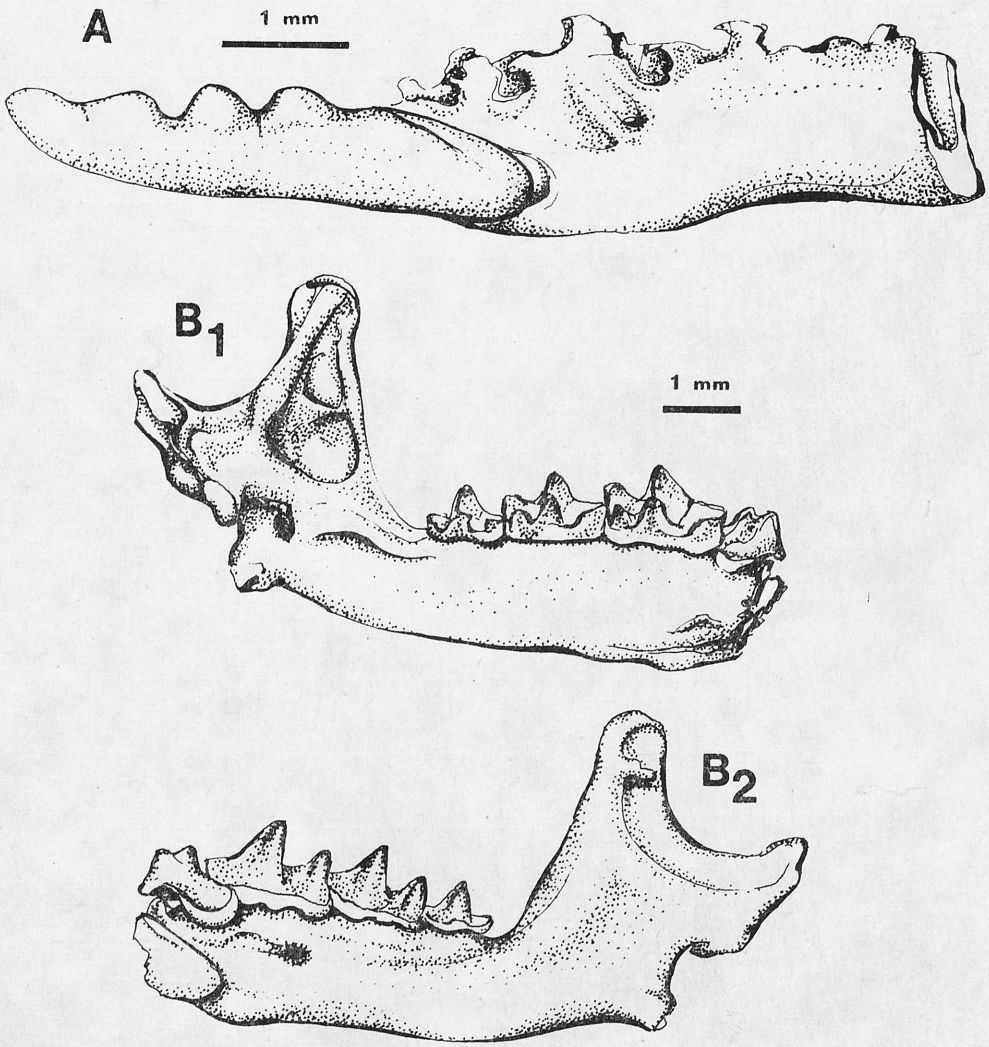

Fig. 5. *Deinsdorfia hibbardi*, Węże 1: A — left I_1 in fragmentary mandible, spec. no MF/1851/1; B_1—B_2 — left fragment of mandible with P_4—M_3, spec. no MF/1851/3

is identical with the ramus of *Deinsdorfia franconica* described by HELLER (1963) from Deinsdorf (Germany), dated as MN17/Q_1, and he included the species "*hibbardi*" into genus *Deinsdorfia*.

Till now this shrew, characterized by somewhat inflated (exoedaenodont) teeth (I^1, A^1—A^2, I_1), has been found in localities dated from the Upper Ruscinian to the Plio-Pleistocene boundary in Poland (MN15—MN17/Q_1): Węże 1 (SULIMSKI 1962a), Rębielice Królewskie 1A and 2, Kielniki 3B and Kadzielnia, and in localities of similar age in Hungary: Osztramos 7 (RÉUMER 1984), in Germany: Deinsdorf (HELLER 1963), in Austria: Deutsch-Altenburg (RABEDER, pers. comm. to REUMER in 1984), in France: Seynes, Balaruc 2 (JAMMOT 1977) and possibly in Czechoslovakia: Ivanovce (FEJFAR 1966).

Table VIII

Deinsdorfia hibbardi (Sulimski, 1962)
Dimensions of upper dentition (in mm)

		Węże 1				Rębielice Królewskie 1 A				Rębielice Królewskie 2				Kielniki 3 B			
		min.	avg.	max.	n	min.	avg.	max.	n	min.	avg.	max.	n	min.	avg.	max.	n
I^1	L	—	2.03	—	1	—	—	—	0	—	—	—	0	—	—	—	0
	L of talon	—	1.04	—	1	—	—	—	0	—	—	—	0	—	—	—	0
	H of talon	—	1.27	—	1	—	—	—	0	—	—	—	0	—	—	—	0
A^1	L	—	1.14	—	1	—	—	—	0	—	—	—	0	—	—	—	0
	W	—	0.67	—	1	—	—	—	0	—	—	—	0	—	—	—	0
A^2	L	—	0.90	—	1	—	—	—	0	—	—	—	0	—	—	—	0
	W	—	0.67	—	1	—	—	—	0	—	—	—	0	—	—	—	0
A^3	L	—	0.50	—	1	—	—	—	0	—	—	—	0	—	—	—	0
	W	—	0.62	—	1	—	—	—	0	—	—	—	0	—	—	—	0
A^4	L	—	0.38	—	1	—	—	—	0	—	0.36	—	1	—	—	—	0
	W	—	0.54	—	1	—	—	—	0	—	0.55	—	1	—	—	—	0
A^5	L	—	0.45	—	1	—	—	—	0	—	0.40	—	1	—	—	—	0
	W	—	0.48	—	1	—	—	—	0	—	0.46	—	1	—	—	—	0
P^4	L (bucc.)	—	1.68	—	1	1.66	1.76	1.86	3	1.78	1.86	1.93	4	—	—	—	0
M^1	L (max.)	—	1.42	—	1	1.52	1.53	1.54	2	1.44	1.47	1.50	4	—	1.54	—	1
	L (med.)	—	1.15	—	1	1.10	1.11	1.12	2	1.10	1.14	1.17	4	—	1.23	—	1
	W (max.)	—	1.53	—	1	1.58	1.60	1.62	2	1.55	1.59	1.65	4	—	1.68	—	1
M^2	L (max.)	—	1.17	—	1	—	—	—	0	1.27	1.27	1.27	2	—	1.28	—	1
	L (med.)	—	0.96	—	1	—	—	—	0	1.01	1.02	1.03	2	—	1.11	—	1
	W (ant.) = AW	—	1.50	—	1	—	—	—	0	1.55	1.55	1.55	2	—	1.52	—	1
	W (post.) = PW	—	1.34	—	1	—	—	—	0	1.41	1.41	1.41	2	—	1.37	—	1
	PW/AW	—	0.89	—	1	—	—	—	0	0.90	0.90	0.91	2	—	0.90	—	1

Deinsdorfia hibbardi (SULIMSKI, 1962)
Dimensions of mandible and lower dentition (in mm)

		Węże 1				Rębielice Królewskie 1 A				Rębielice Królewskie 2				Kielniki 3 B				Kadzielnia			
		min.	avg.	max.	n	min.	avg.	max.	n	min.	avg.	max.	n	min.	avg.	max.	n	min.	avg.	max.	n
I_1	L	—	4.35	—	1	4.43	4.54	4.79	6	—	—	—	0	—	4.45	—	1	—	—	—	0
	H	0.92	0.95	0.98	3	0.96	1.02	1.06	9	—	—	—	0	—	0.98	—	1	—	—	—	0
A_1	L (bucc.)	—	0.92	—	1	0.90	0.92	0.96	3	—	—	—	0	—	0.86	—	1	—	—	—	0
P_4	L (bucc.)	1.08	1.18	1.26	3	1.29	1.43	1.51	3	—	—	—	0	—	1.20	—	1	—	—	—	0
	L of talonid	0.84	0.90	0.92	3	0.96	1.06	1.17	11	—	—	—	0	—	1.04	—	1	—	—	—	0
	W of talonid (bucc.)	0.51	0.52	0.54	3	0.53	0.62	0.66	11	—	—	—	0	—	0.57	—	1	—	—	—	0
	W (occl.)	0.72	0.74	0.76	3	0.82	0.84	0.87	11	—	—	—	0	—	0.77	—	1	—	—	—	0
M_1	L (occl.)	1.39	1.50	1.62	22	1.49	1.54	1.60	29	1.49	1.56	1.59	5	—	1.52	—	1	—	1.50	—	1
	W (occl.)	0.84	0.89	0.96	24	0.88	0.96	1.00	29	0.90	0.96	1.02	5	—	0.94	—	1	—	0.91	—	1
M_2	L (occl.)	1.24	1.30	1.36	24	1.28	1.33	1.37	32	1.28	1.31	1.35	2	—	1.35	—	1	—	1.32	—	1
	W (occl.)	0.74	0.79	0.85	24	0.74	0.82	0.88	32	0.80	0.84	0.89	3	—	0.85	—	1	—	0.81	—	1
M_3	L (occl.)	1.00	1.04	1.08	11	0.96	1.03	1.09	11	—	1.07	—	1	—	1.01	—	1	—	1.01	—	1
	W (occl.)	0.56	0.59	0.63	12	0.55	0.62	0.68	12	—	0.69	—	1	—	0.63	—	1	—	0.63	—	1
M_1—M_3 L		3.70	3.76	3.87	7	3.64	3.78	3.94	6	—	—	—	0	—	—	—	0	—	3.68	—	1
H of mandible below M_2		1.31	1.38	1.57	29	1.30	1.53	1.68	37	1.52	1.59	1.75	9	1.50	1.54	1.58	2	—	1.54	—	1
L of mandible without I_1		—	—	—	0	—	8.40	—	1	—	—	—	0	—	—	—	0	—	—	—	0
H of ascending ramus		3.72	3.86	3.98	7	3.74	4.08	4.35	29	3.85	4.16	4.33	9	—	4.05	—	1	—	4.11	—	1
W of coronoid process		0.87	0.93	0.98	9	0.85	1.06	1.22	27	0.92	1.05	1.17	8	—	1.24	—	1	—	1.08	—	1
H of condyloid process		2.21	2.30	2.45	9	2.20	2.38	2.62	24	2.38	2.46	2.67	5	—	2.52	—	1	—	2.30	—	1

Deinsdorfia cf. *kordosi* REUMER, 1984

Referred material. The list of the material is given in Table X. It contains the remains of maxillae with the teeth P^4—M^3 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 *D. reumeri* n. sp. (see p. 46).

Table X

Deinsdorfia cf. *kordosi* REUMER, 1984

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Węże 1 MF/1856	5	3	8	4
Rębielice Królewskie 1 A MF/1857	0	6	6	3

Description of the material. A very detailed description of *D. kordosi* is given by REUMER (1984). Here we can add that the rostrum is depressed above the antemolars, the oval or nearly oval infraorbital foramen begins above the mesostyle of P^4 (where it is open in the direction of the teeth), but it is shorter than in *D. hibbardi* and it terminates earlier, above the end of P^4. The big lacrimal foramen lies above the parastyle of M^1, but sometimes it is longer (oval, not round) and reaches the half of the mesostyle of M^1. The zygomatic process is rather broad. In palatal view, the space between the parastyle and the mesostyle, the mesostyle, and the space between the mesostyle and the metastyle of M^2 are visible in the background of this process.

A comparison of the material (unfortunately very scant) from two Polish localities shows no significant differences in size and structure. In relation to the Hungarian material, the Polish specimens are somewhat smaller, although their dimensions lie within the range of variation of this from Csarnota 2.

Some small differences between Polish and Hungarian specimens can also be seen where morphology is concerned. In Polish material, unlike the Hungarian one, the upper teeth P^4, M^1 and M^2 are characterized by small but distinct hypocones, the biggest in P^4, the smallest or absent in M^2, and the presence of a very weak bar of the internal temporal fossa in one specimen from Rębielice Królewskie 1A (although its M_3 is heavy reduced).

Measurements. See Tables XI and XII.

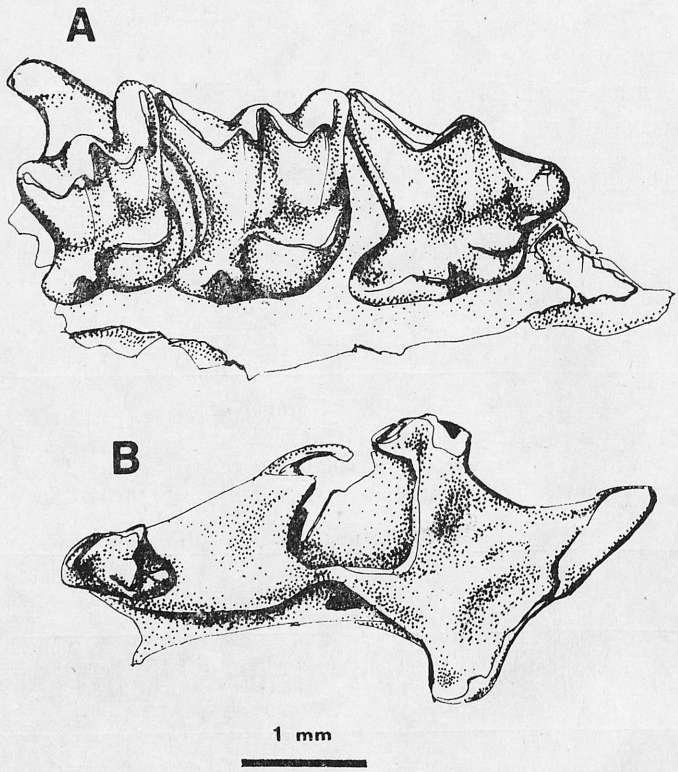

Fig. 6. *Deinsdorfia* cf. *kordosi*, Węże 1: A — right maxillary fragment with P^4—M^2, spec. no MF/1856/1; B — right fragment of mandible with M_3 (occlusal view), spec. no MF/1856/1

Systematic position and distribution. *D. kordosi* was described by REUMER in 1984 on the basis of the abundant material from the Late Ruscinian locality Csarnota 2 (MN16) in Hungary. According to REUMER it is characterized by the inflated talon of P^1, a strongly reduced (trapezoidal) M^2, bulbous I_1, a strongly reduced talonid of M_3 and the internal temporal fossa not reaching the tip of the coronoid process (without bar). Polish material was listed as *D.* cf. *kordosi* because it differs slightly from the Hungarian one described by REUMER (1984). My material is also very scant, without some important elements such as P^1, upper antemolars and I_1. This is particularly true in Rębielice Królewskie 1A, where the maxillae are totally lacking.

To be sure, three M^2 present in the material show the reduction of their posterior parts and they have the shape of the trapezoids, but the PW/AW ratio is higher than in REUMER'S specimens, being: min. 0.74, avg. 0.79, max. 0.83 (N = 3), while in REUMER'S material (1984) avg. is 0.71 (N = 3).

If the determination is correct, the discovery of *D. kordosi* in Poland extends its range northwards, and downwards in geological scale to the zone MN15.

Remarks. The two newly described species, *D. reumeri* n.sp. and *D. in-*

Table XI

Deinsdorfia cf. *kordosi* REUMER, 1984
Dimensions of skull and upper dentition (in mm)

	Węże 1			
	min.	avg.	max.	n
L of palate	—	8.15	—	1
P^4 L (bucc.)	1.88	1.99	2.04	5
L (max.)	1.53	1.56	1.65	4
M^1 L (med.)	1.17	1.22	1.30	4
W (max.)	1.80	1.86	1.91	4
L (max.)	1.10	1.16	1.26	3
L (med.)	0.91	0.96	1.03	3
M^2 W (ant.) = AW	1.62	1.64	1.66	3
W (post.) = PW	1.20	1.30	1.37	3
PW/AW	0.74	0.79	0.83	3
M^3 L	—	0.48	—	1
M^3 W	—	1.06	—	1

Table XII

Deinsdorfia cf. *kordosi* RUEMER, 1984
Dimensions of mandible and lower dentition (in mm)

		Węże 1				Rębielice Królewskie 1A			
		min.	avg.	max.	n	min.	avg.	max.	n
A_1	L (bucc.)	—	—	—	0	—	0.85	—	1
P_4	L (bucc.)	—	—	—	0	—	—	—	0
	L of talonid (bucc.)	—	—	—	0	—	1.08	—	1
	W of talonid (bucc.)	—	—	—	0	—	0.58	—	1
	W (occl.)	—	—	—	0	—	0.82	—	1
M_1	L (occl.)	—	1.55	—	1	1.52	1.54	1.56	4
	W (occl.)	—	0.88	—	1	0.90	0.94	0.97	4
M_2	L (occl.)	1.23	1.25	1.28	2	1.30	1.34	1.36	4
	W (occl.)	0.72	0.75	0.79	2	0.81	0.85	0.88	4
M_3	L (occl.)	0.95	0.98	1.01	2	1.03	1.03	1.03	2
	W (occl.)	0.52	0.53	0.55	2	0.58	0.60	0.62	2
M_1—M_3 L		—	—	—	0	—	3.92	—	1
H of mandible below M_2		—	1.54	—	1	1.38	1.48	1.58	5
H of ascending ramus		—	—	—	0	4.09	4.13	4.23	4
W of coronoid process		—	—	—	0	1.02	1.05	1.08	3
H of condyloid process		—	2.40	—	1	2.35	2.44	2.57	3

sperata n.sp., and the three already described earlier, *D. janossyi*, *D. hibbardi* and *D. kordosi*, differ very clearly in morphology and can be easy distinguished one from another.

The discovery of those two species in Podlesice, however, has disturbed the clear picture of the evolution of this genus from the Early Ruscinian (*D. janossyi*) to the Late Ruscinian (*D. kordosi*), as presented by REUMER in 1984. According to him two evolutionary lineages were possible in the genus *Deinsdorfia*: *janossyi* — *hibbardi* — *kordosi*, or: *janossyi* — *hibbardi* and *kordosi*. The species ordered that way show the following trends: slight general enlargement, enlargement of the condyloid process, shortening and widening of the coronoid process, progressing exoedaenodonty of the anterior dentition and reduction of the posterior dentition.

Unfortunately, both Early Ruscinian species from Podlesice are large, they have very broad coronoid process and, althought to a various degree, exoedaenodont anterior teeth and reduced posterior lower teeth (upper not very much).

In this situation, a construction of two other lineages suggests itself. The first would be: *reumeri* — *kordosi*, because these species, having more or less the same size, both lacking the bar in the internal temporal fossa and having the same position of M^2 in relation to the zygomatic process differ in the degree of reduction of the dentition, it being stronger in *D. kordosi*. In relation to *D. reumeri* n.sp., *D. kordosi* has, however, less inflated anterior teeth, countrary to what could be expected, at least I^1, I_1 and P_4 (the upper antemolars are lacking in the material). It is probable, however, that this strong exoedaenodonty in *D. reumeri* n.sp. is not a steady evolutionary trend but adaptation to local conditions, e.g. to a greater share of molluscs in the diet. The slightly larger size of *D. reumeri* n.sp. may be connected with a more northern situation of locality in relation to the area of *D. kordosi*.

The second lineage: *janossyi* — *hibbardi* is the one suggested by REUMER. The species succeed one another in time and have a limited grade of exoedaenodonty. *D. janossyi*, being the smaller and less evolved form, could be an ancestor of *D. hibbardi*.

D. insperata n.sp. does not fit any of those two lineages and it can be supposed that it is a migrant from outside Europe.

In any case, *D. kordosi* cannot be a direct descendant of *D. hibbardi* because they occurred parallelly in Węże 1 and Rębielice Królewskie 1A.

Genus *Zelceina* SULIMSKI, 1962

Zelceina podlesicensis n.sp.
(Text-figs. 7—8)

Holotype. Fragmentary mandible with M_1—M_3, condyloid and coronoid process. No. MF/1858/1, fig. 7 B_1—B_2.

Referred material. The list of the material is given in Table XIII. It includes the remains of maxillae with I^1 (apex broken), A^1—A^2 and P^1—M^2

Table XIII

Zelceina podlesicensis n. sp.

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Podlesice MF/1858	14	96	110	35

and mandibles with all teeth and processes except for the angular process. The minimum number of individuals has been calculated as in *D. reumeri* n.sp. (see p. 46).

Type locality. Podlesice.

Type horizon. Lower Ruscinian.

Name derivation. The species is named after the village of Podlesice.

Diagnosis. Small *Zelceina* with 5 upper antemolars; P^4 trapezoidal in outline with the parastyle protruding anteriorly; almost quadrate molars (M^1—M^2) in occlusal view, with distinct hypocones and rather very slight posterior emargination; two cuspules in lower incisor; M_3 with reduced talonid; narrow interarticular area of condyloid process.

Description of the holotype. The horizontal ramus of the mandible is low and delicate, and its lower margin is concave under M_2. The mental foramen is placed underneath the protoconid/hypoconid re-entrant valley of M_1. Two small mandibular foramina are visible from under the lower facet of the condyloid process. The ascending ramus of the mandible forms a somewhat obtuse angle with its horizontal branch. The small boss is visible on the anterior edge of it. The coronoid process is rather slim and sharply pointed, with posterior and anterior edges slightly concave. The coronoid spicule is small but distinct and placed at three-fourths of process height. The external temporal fossa is very shallow and extends downwards at two-thirds of the height of the condyle. The internal temporal fossa is rather small and has the form of an equilateral triangle. The superior pterygoid fossa is deep and the superior pterygoid boss is present as a rough patch.

The condyloid process is relatively large. Unfortunately the upper facet is broken. The lower one is broad, devoid of any dorsal undulation. The interarticular area is narrow, narrower than it is usual in the *Soricini* tribe.

M_1 is characterized by a moderately high entoconid crest and well-developed, straight cingula on both sides. The buccal one is more convex, the lingual rather flat. M_2 similar to M_1 but smaller. M_3 has a reduced talonid although a talonid basin is still distinguishable.

Description of the remaining material. I_1 is bicuspulate but with a tendency to be tricuspulate. Both cuspules are placed relatively far anterior-

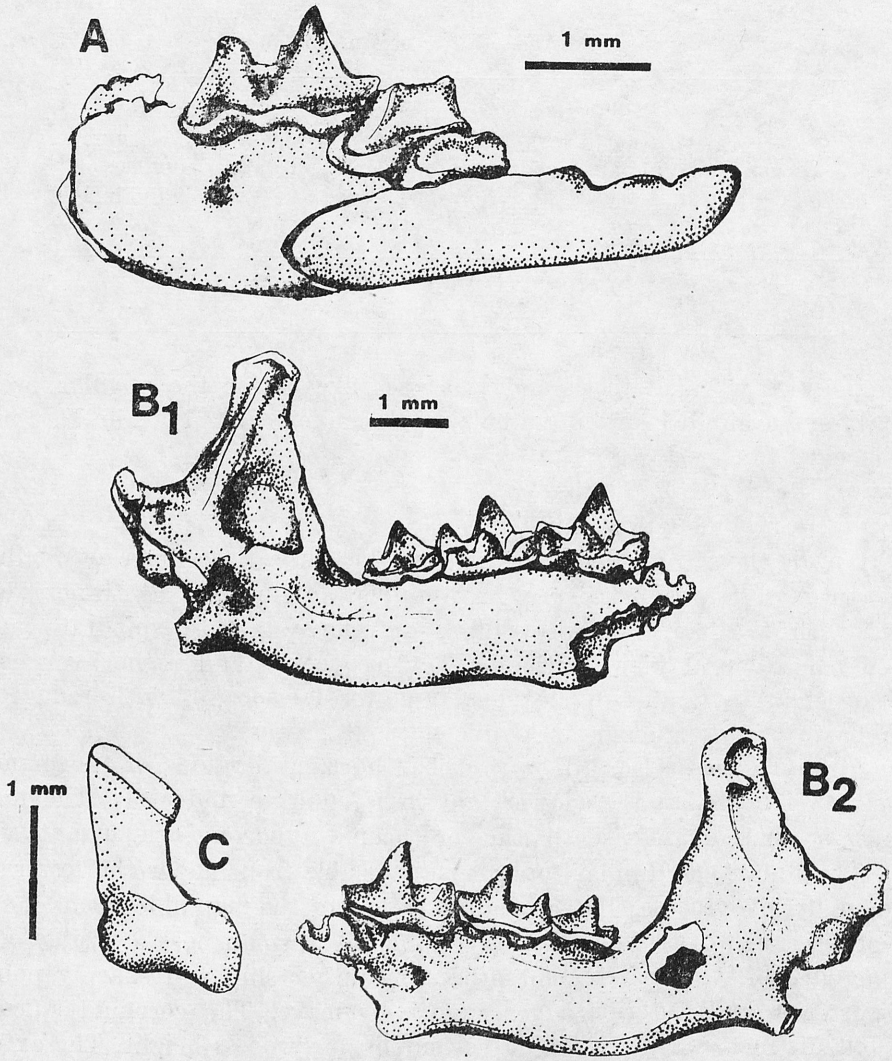

Fig. 7. *Zelceina podlesicensis* n. sp., Podlesice: A — right fragment of mandible with I_1—M_1, spec. no MF/1858/25; B_1—B_2 — left fragment of mandible with M_1—M_3, spec. no MF/1858/1, holotype; C — caudal view of condyle, spec. no MF/1858/3

ly, and the posterior part of the tooth is elongate. The cingulum is hardly visible or absent. A_1 is long and narrow. P_4 typical, with a well developed postero-lingual basin, broad and convex cingulum, but its buccal overhang of the root by the crown is not very long.

The infraorbital foramen begins above the metastyle of P^4, or between the P^4/M^1, and ends above the mesostyle of M^1. The big lacrimal aperture lies above the metastyle of M^1. The zygomatic process of maxilla is rather narrow. It originates opposite the metastyle of M^2 and continues having in its background (in palatal view) also a part of the M^3 parastyle.

Dental formula: $\frac{1—6—3}{1—2—3} = 32$.

Unfortunately there is only one I^1 in the material and its apex is broken. Its talon is relatively large, not very pointed and slightly curved downwards. The apex and the talon are separated by a shallow groove. The buccal cingulum is only present along the ventral half of the posterior edge (along the talon).

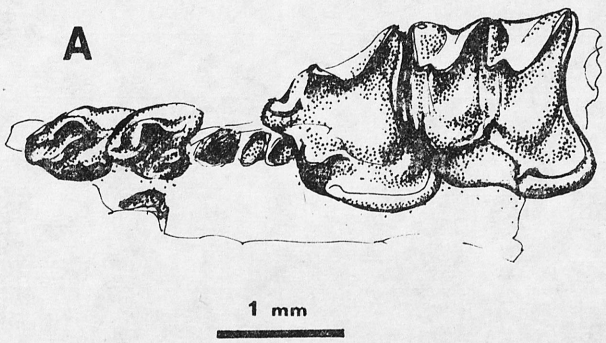

Fig. 8. *Zelceina podlesicensis* n. sp., Podlesice: A — left fragment of maxillae with A^1—A^2 and P^4—M^1, spec. no MF/1858/2

The number of antemolars is indicated by their alveoli, because only A^1—A^2 are present in the material. A^1 is bigger than A^2. They are characterized by shallow antero-buccal and deep postero-lingual basins and this is why the teeth appear to be two-cusped from the lingual side. They have also very broad cingula at both sides and cingular cusps in their posterolingual parts.

Gathering from the size of the alveoli, A^3—A^5 were smaller than A^1—A^2. The alveolus of A^5 is partially or totally hidden behind the parastyle of P^4.

P^4 has a big and well-individualized parastyle, but a parastylar crest is short and low. The L-shaped protocone is also well developed and placed relatively far buccally, hence the general trapezoid outline of P^4. The small hypocone is separated from the protocone by a deep valley. The deeply concave hypoconal flange is surrounded by the cingulum, which continues at the posterior side of the tooth upwards.

M^1, more or less quadrate in outline, is characterized by a considerable metaloph and a small tetrahedric hypocone separated from the protocone by a rather shallow valley.

M^2 is similar to M^1, but smaller. M^3 is lacking.

The posterior emargination of P^4 and of the upper molars is very slight. The colour of teeth varies from bright red to almost black on the tips.

Measurements. See Tables XIV—XV.

Systematic position. The combination of such characters as the morphology of A^1 and A^2 (presence of antero-buccal and postero-lingual basins and

Table XIV

Zelceina podlesicensis n. sp.
Dimensions of upper dentition (in mm)

		Podlesice			
		min.	avg.	max.	n
I^1	L	—	—	—	0
	L of talon	—	1.07	—	1
	H of talon	—	1.26	—	1
A^1	L	0.93	0.96	0.99	2
	W	0.70	0.71	0.72	2
A^2	L	0.77	0.79	0.81	2
	W	0.67	0.67	0.67	2
P^4	L (bucc.)	1.43	1.47	1.52	9
M^1	L (max.)	1.35	1.46	1.54	11
	L (med.)	1.25	1.32	1.36	11
	W (max.)	1.47	1.54	1.63	10
M^2	(L (max.)	1.32	1.35	1.37	3
	L (med.)	1.15	1.19	1.22	4
	W (ant.)	1.40	1.48	1.54	4
	W (post.)	1.35	1.38	1.42	2

Table XV

Zelceina podlesicensis n. sp.
Dimensions of mandible and lower dentition (in mm)

		Podlesice			
		min.	avg.	max.	n
I_1	L	3.33	3.50	3.64	16
	H	0.67	0.79	0.85	24
A_1	L (bucc.)	0.79	0.90	0.96	7
P_4	L (bucc.)	1.04	1.09	1.13	12
	W of talonid (bucc.)	0.46	0.51	0.56	11
M_1	L (occl.)	1.38	1.43	1.49	39
	W (occl.)	0.85	0.89	0.94	39
M_2	L (occl.)	1.25	1.30	1.39	40
	W (occl.)	0.74	0.80	0.84	38
M_3	L (occl.)	1.01	1.06	1.12	20
	W (occl.)	0.55	0.58	0.62	20
M_1—M_3	L	3.58	3.70	3.77	17
I_1—M_3	L	6.54	6.72	6.86	3
H of mandible below M_2		1.20	1.30	1.42	41
H of ascending ramus		3.63	3.74	3.82	7
W of coronoid process		0.77	0.81	0.91	6
H of condyloid process		1.95	2.06	2.19	4

cingular cuspules), the shape and morphology of P^4 and of upper molars M^1—M^2 (slight posterior emargination, presence of the metalophs and tetrahedric hypocones), the morphology of I_1 (cuspules placed relatively anteriorly and the posterior part of the tooth elongated), the presence of the entoconid crest in M_1 and M_2, the reduction of M_3 and first of all the morphology of the condyle, which is relatively large but has a narrow interarticular area (not as narrow as in *Soriculini* but not as wide as in *Soricini*), clearly indicate the attribution of this remains to the genus *Zelceina*.

In relation to *Z. soriculoides* from Węże 1, they differ by their smaller size, the presence of an additional upper antemolar (general number 5), a less posterior emargination of P^4 and of upper molars, higher metalophs, less distinct hypocones of P^4, M^1, and M^2 and by a reduced M_3. These differences have allowed us to create a new taxon for this form.

In many respects *Z. podlesicensis* resembles *Petenyia* and *Blarinella dubia* but these three forms are all clearly separable on morphological grounds.

From *Petenyia*, especially *P. robusta* and *Blarinella dubia*, which have been also found in Podlesice and which are also characterized by the presence of 5 upper antemolars, the lack of posterior emargination of P^4 and upper molars, and by more or less the same size, *Z. podlesicensis* n.sp. differs by having a much smaller, slender and different in shape I^1, characteristic upper antemolars with cingular cusps, a more trapezoid P^4 with a distinct protocone and hypocone, but a shorter parastylar crest, by the presence of tetrahedric hypocones in M^1—M^2, a much slender I_1 and a lower horizontal branch of the mandible, a lower and narrower coronoid process, a lower entoconid crest of M_1 and M_2 and a different condyle with narrow interarticular area.

It is likely that *Z. podlesicensis* n.sp., being smaller and more primitive (higher number of antemolars, M_3 less reduced) can be ancestral to *Z. soriculoides*. The discovery of the genus *Zelceina* in Podlesice extends its range in geological time backwards to Lower Ruscinian (MN14).

Zelceina soriculoides (Sulimski, 1959)
(Text-fig. 9)

1959 — *Neomys soriculoides* n.sp., A. Sulimski, Pliocene Insectivores . . . , pp. 149—152, Pl. III, Fig. 4a—c, Text-fig. 5C—D.

1960 — Cf. *Neomys* sp., K. Kowalski, Pliocene Insectivores and Rodents . . . , p. 169.

1962a — *Zelceina soriculoides* (Sulimski, 1959), A. Sulimski, Supplementary studies . . . , pp. 478—479, Text-fig. 2, 3 a—c.

1962b — *Neomyina* cf. *soriculoides* Sulimski, A. Sulimski, O nowym znalezisku . . . , p. 221.

1964 — *Neomys soriculoides* Sulimski, 1959, K. Kowalski, Paleoekologia ssaków . . . , p. 77.

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

Table XVI

Zelceina soriculoides (SULIMSKI, 1959)

Locality	Number of fragmentary maxillae and detached upper teeth	Number of fragmentary mandibles and detached lower teeth	Total	Minimum number of individuals
Węże 1 MF/1859	156	447	603	128
Rębielice Królewskie 1 A MF/66/60	0	1	1	1
Rębielice Królewskie 2 MF/1861	0	3	3	2

Referred material. The list of the material is given in Table XVI. 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 *D. reumeri* n.sp. (see p. 46).

Description of the material. Original description of the genus *Zelceina* and species *Z. soriculoides* is given by SULIMSKI in his works of 1959, 1962a. An additional description, the discussion of the tribal attribution (to *Soricini*), and complete synonymies are to be found in the work of REUMER (1984).

Some differences between SULIMSKI'S description and the material used in the present paper (concerning the same locality Węże 1) can be found.

According to SULIMSKI (1959, 1962a), the infraorbital foramen of *Z. soriculoides* is placed above M^1, whereas in the material presented here it begins above the metastyle of P^4 and ends above the parastyle of M^1. The lacrimal aperture lies not above the M^1/M^2 connection (above the contact M^1/M^2) but above the mesostyle or the metastyle of M^1. The description of the upper antemolars given by SULIMSKI is not very accurate (they are absent from REUMER'S material). Their number is four, but two specimens are atypical, one with three in both sides, one with three in one side and four in the other side. The occurrence of the varying number of upper antemolars is also known in representatives of genera *Episoriculus* and *Petenyia*.

A^1 and A^2 are very big, although A^2 is somewhat smaller than A^1. As in *Z. podlesicensis* n.sp., these teeth are characterized by two basins (shallow antero-buccal and deeper postero-lingual) and they appear two-cusped from the lingual side. A^3 is broader in relation to its length and it is about half smaller than A^1. A^4 is also broad and short and by half smaller in relation to A^3. All those teeth (antemolars) as mentioned by SULIMSKI have the cingular cusps in their lingual side. A^4 is totally hidden behind the parastyle of P^4 and unvi-

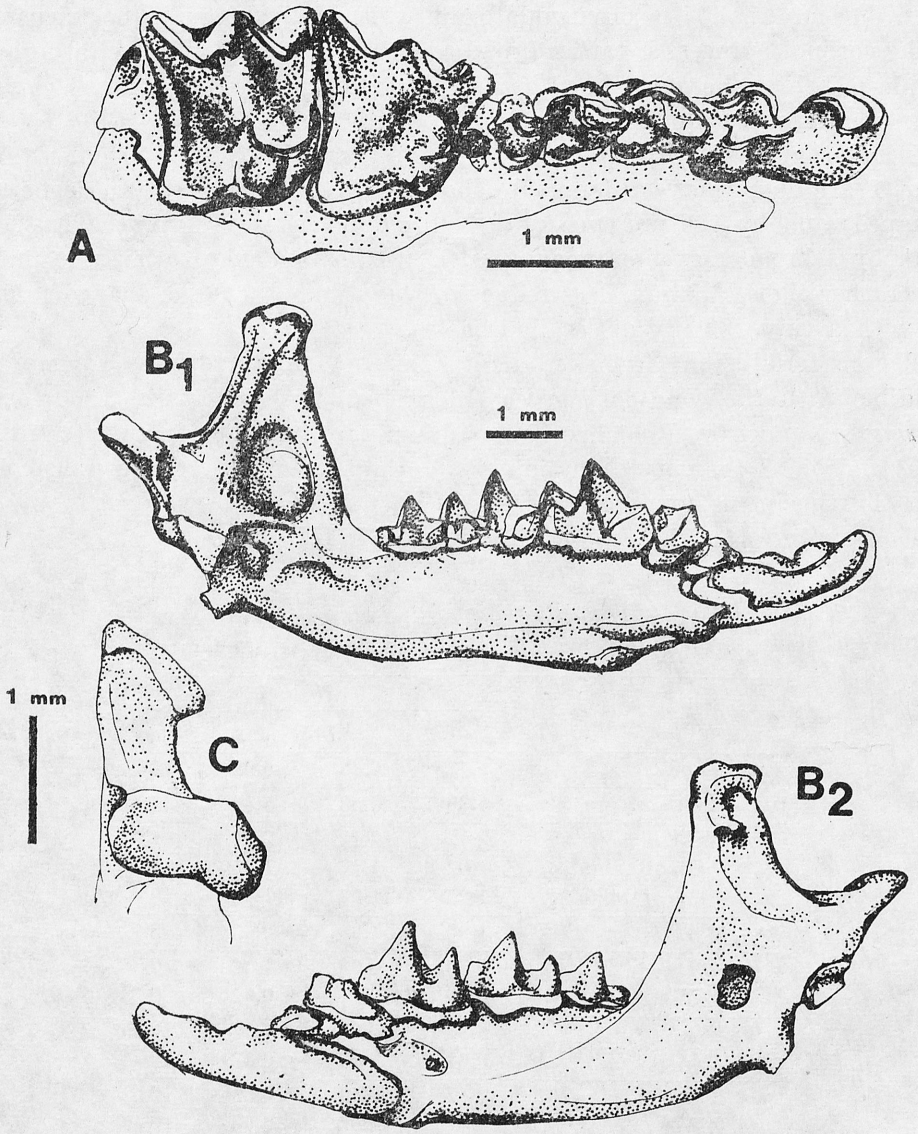

Fig. 9. *Zelceina soriculoides*, Węże 1: A — right maxillary fragment with I^1—A^3 and P^4—M^1, spec. no MF/1859/4; B_1—B_2 — mandible with all teeth, spec. no MF/1859/2; C — caudal view of condyle, the same specimen

sible from the outside. According to SULIMSKI's description, it is ... "laterally barely visible"..., while according to his drawing it is laterally totally visible!

As concerns the mandible, I_1 in SULIMSKI's material is bicuspulate, the coronoid process is slender and the mental foramen placed under protoconid/hypoconid junction of M_1, or, as he writes in the description of the holotype, "occasionally between roots of P_4 and M_1...". This remark evidently concerns the whole material, not the holotype only.

In our material I_1 is biscuspulate, but with a tendency to be tricuspulate, the coronoid process is rather broad and the position of the mental foramen is indeed below the protoconid/hypoconid junction of M_1 or far backwards but never onwards from this junction.

In relation to REUMER'S material from Csarnota 2, the specimens from Węże 1 are somewhat different by having the cusp-shaped protocone (not L-shaped) and by the presence of a well and not poorly-developed hypocone of P^4, by a broader zygomatic process, I_1 with a tendency to be tricuspulate, by a rather short P_4 and a less reduced M_3 (without a comma-shaped talonid, but with a tiny, usually discernible basin).

The material from Rębielice Królewskie 1A (one toothless fragment of mandible with the condyloid process described by KOWALSKI (1960) as Cf. *Neomys* sp.) and from Rębielice Królewskie 2 (two toothless fragments of mandibles and one I_1) is very scant, but it does not differ in size and morphology from the specimens found at Węże 1.

Measurements. See Tables XVII and XVIII.

Table XVII

Zelceina soriculoides (SULIMSKI, 1959)
Dimensions of skull and upper dentition (in mm)

		Węże 1			
		min.	avg.	max.	n
L of palate		6.47	6.68	6.92	7
W on zygom. proc.		5.33	5.53	5.80	4
I^1	L	2.12	2.12	2.12	2
	L of talon	1.02	1.11	1.25	11
	H of talon	1.25	1.34	1.46	10
A^1—A^2	L	1.90	1.96	2.05	3
A^1	L	0.80	0.99	1.06	7
	W	0.70	0.77	0.92	7
A^2	L	0.83	0.90	0.99	10
	W	0.67	0.73	0.83	10
A^3	L	0.42	0.49	0.58	10
	W	0.51	0.62	0.69	10
A^4	L	0.27	0.29	0.34	8
	W	0.38	0.42	0.45	8
P^4	L (bucc.)	1.50	1.58	1.69	30
M^1	L (max.)	1.35	1.48	1.56	28
	L (med.)	1.25	1.32	1.41	28
	W (max.)	1.53	1.63	1.76	26
M^2	L (max.)	1.25	1.32	1.40	20
	L (med.)	1.06	1.14	1.21	21
	W (ant.)	1.51	1.57	1.67	21
	W (post.)	1.32	1.40	1.51	19
M^3	L	0.56	0.60	0.64	9
	W	1.08	1.13	1.17	9

Zelceina soriculoides (SULIMSKI, 1959)
Dimensions of mandible and lower dentition (in mm)

	Węże 1				Rębielice Królewskie 1 A				Rębielice Królewskie 2			
	min.	avg.	max.	n	min.	avg.	max.	n	min.	avg.	max.	n
I_1 L	3.64	3.72	3.86	17	—	—	—	0	—	3.84	—	1
I_1 H	0.85	0.90	0.95	23	—	—	—	0	—	0.89	—	1
A_1 L (bucc.)	0.88	0.94	1.07	11	—	—	—	0	—	—	—	0
P_4 L (bucc.)	1.28	1.36	1.44	17	—	—	—	0	—	—	—	0
P_4 W of talonid (bucc.)	0.52	0.59	0.65	20	—	—	—	0	—	—	—	0
M_1 L (occl.)	1.40	1.51	1.58	31	—	—	—	0	—	—	—	0
M_1 W (occl.)	0.87	0.94	1.03	31	—	—	—	0	—	—	—	0
M_2 L (occl.)	1.23	1.35	1.42	36	—	—	—	0	—	—	—	0
M_2 W (occl.)	0.74	0.83	0.89	36	—	—	—	0	—	—	—	0
M_3 L (occl.)	0.93	1.04	1.12	24	—	—	—	0	—	—	—	0
M_3 W (occl.)	0.56	0.61	0.68	24	—	—	—	0	—	—	—	0
M_1—M_3 L	3.47	3.74	3.95	18	—	—	—	0	—	—	—	0
I_1—M_3 L	6.30	6.56	6.85	6	—	—	—	0	—	—	—	0
L of mandible without I_1	7.81	8.26	8.90	6	—	—	—	0	—	—	—	0
H of mandible below M_2	1.40	1.51	1.60	39	—	—	—	0	1.49	1.50	1.51	2
H of ascending ramus	3.93	4.08	4.28	19	—	—	—	0	3.91	4.01	4.12	2
W of coronoid process	0.85	0.99	1.15	21	—	0.98	—	1	—	0.97	—	1
H of condyloid process	2.17	2.28	2.55	16	—	2.25	—	1	—	2.22	—	1

Systematic position and distribution. At the first sight problematical tribal attribution of *Zelceina* to the *Soricini* has been explained by REUMER in his work of 1984. It has to be outlined that the same suggestion was made already earlier by REPENNING in 1967, so further discussion seems to be unnecessary.

Till now, *Zelceina soriculoides* was restricted to the Upper Ruscinian/Csarnotanian of Central Europe. Its remains were found at Węże 1 in Poland (SULIMSKI 1959, 1962a), Ivanovce A in Czechoslovakia (FÉJFAR 1966) and then at Csarnota 2 in Hungary (REUMER 1984). The occurrence of its remains at localities Rębielice Królewskie 1A and 2 dated at MN16 permits us to state that this species, although not numerous, survived in some convenient places a little longer, until the Lower Villanyian.

This fact is in opposition to the theory of REUMER (1984, 1985) that *Zelceina*, as well as some other *Insectivora* genera (*Blarinella*, *Sulimskia*, *Mafia*), disappeared from Europe in connection with climate deterioration at the Ruscinian-Villanyian boundary. Similarly to *Blarinella europaea*, which was found in Rębielice Królewskie 1A (RZEBIK-KOWALSKA 1989), *Zelceina* probably also disappeared later, during the Villanyian.

Although the origin of *Z. soriculoides* is unknown, the discovery of the new species *Z. podlesicensis* n.sp. in Podlesice (Lower Ruscinian) indicates its much earlier arrival to Europe. *Z. podlesicensis* n.sp. being more primitive, could be an ancestor of *Z. soriculoides*.

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REFERENCES

FÉJFAR O. 1966. Die plio-pleistozänen Wirbeltierfaunen von Hajnáčka und Ivanovce (Slovakei), ČSSR. V. *Allosorex stenodus* n. g. n. sp. aus Ivanovce A. Neues Jb. Geol. Paläont. Abh., **123** (3): 221—248.

HELLER F. 1963. Eine altquartäre Wirbeltierfauna des untern Cromerium aus der nördlichen Frankenalb. Neues Jb. Geol. Paläont. Abh., **118** (1): 1—20.

JAMMOT D. 1977. Les musaraignes (*Soricidae, Insectivora*) du Plio-Pléistocène d'Europe. Thèsis, Dijon, 341 pp.

KOWALSKI K. 1960. Pliocene Insectivores and Rodents from Rębielice Królewskie (Poland). Acta zool. cracov., **5** (5): 155—201.

KOWALSKI K. 1964. Paleoekologia ssaków pliocenu i wczesnego plejstocenu Polski. Acta theriol., **8** (4): 73—88.

REPENNING C. A. 1967. Subfamilies and genera of the *Soricidae*. Geol. Surv. Profes. Papers, Washington, **565**, 74 pp.

Reumer J. W. F. 1984. Ruscinian and early Pleistocene *Soricidae* (*Insectivora, Mammalia*) from Tegelen (The Netherlands) and Hungary. Scr. geol., **73**: 1—173.

Reumer J. W. F. 1985. The paleoecology of *Soricidae* (*Insectivora, Mammalia*) and its application to the debate on the Plio-Pleistocene boundary. Revue Paléob., **4** (2): 211—214.

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 *Amblycoptus*. 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*: *Petenyia* Kormos, 1934 and *Blarinella* Thomas, 1911. Acta zool. cracov., 32 (11): 521—546.

Sulimski A. 1959. Pliocene Insectivores from Węże. Acta palaeont. pol., **4** (2): 119—173.

Sulimski A. 1962a. Supplementary studies on the Insectivores from Węże 1 (Poland). Acta palaeont. pol., **7** (3—4): 441—502.

Sulimski A. 1962b. O nowym znalezisku kopalnej fauny kręgowców w okolicy Działoszyna. Przegl. geol., **10** (4—5): 219—223.

STRESZCZENIE

Praca jest szóstą częścią opracowania całości szczątków *Insectivora* z pliocenu i plejstocenu Polski. Zawiera ona opis trzech nowych gatunków: *Deinsdorfia reumeri* n.sp., *D. insperata* n.sp. i *Zelceina podlesicensis* n.sp. (*Soricinae, Soricini*) z Podlesic (dolny Ruscinian, MN14), oraz opis uzupełniający, dyskusję systematyczną, dane o rozmieszczeniu i ewolucji trzech innych gatunków tego trybu, a to *D. hibbardi* (Sulimski, 1962), *D.* cf. *kordosi* Reumer, 1984 i *Z. soriculoides* (Sulimski, 1959).

Rodzaj *Deinsdorfia* został opisany przez Hellera w 1963 roku na podstawie bezzębnego ułamka żuchwy z Deinsdorf (RFN), stanowiska datowanego na przełom pliocenu i plejstocenu, jako *D. franconica*.

Reumer opracowując plioceńskie i plejstoceńskie materiały z Węgier (1984) zauważył, że ramię wznoszące żuchwy *Sorex hibbardi* Sulimski, 1962 z Osztramos 7 i z Węży 1, odznaczające się poprzeczną przegrodą kostną w wewnętrznym dole żuchwy, jest morfologicznie identyczne z ramieniem wznoszącym *D. franconica*.

Ponieważ wielu autorów, m. in. Repenning (1967), Jammot (1977), zwracało uwagę, że gatunek „*hibbardi*" ze względu na swoją budowę (wydłużony parastyl P^4, masywne poziome ramię żuchwy, niski wyrostek dziobiasty, stosunkowo duży wyrostek stawowy, zredukowany M_3 i przesunięty do tyłu pod

M_1 otwór bródkowy) nie może być zaliczany do rodzaju *Sorex*, REUMER przeniósł go do rodzaju *Deinsdorfia*. *D. franconica* HELLER, 1963 stała się synonimem *D. hibbardi* (SULIMSKI, 1962).

W tej samej pracy REUMER opisał z Węgier jeszcze dwa dalsze gatunki z rodzaju *Deinsdorfia*: *D. janossyi* ze stanowiska Osztramos 9 (MN14) i *D. kordosi* ze stanowiska Csarnota 2 (MN16). Zauważył przy tym, że forma geologicznie starsza (*D. janossyi*) odznacza się mniejszymi rozmiarami i delikatniejszą budową zębów, bez śladów redukcji, gdy formy młodsze (*D. hibbardi*, a zwłaszcza *D. kordosi*) stają się większe, ich przednie zęby przybierają bulwiaste kształty (cecha powszechnie uważana za przystosowanie do diety złożonej z mięczaków i nazywana exoedaenodoncją), a zęby tylne ulegają redukcji. Na tej podstawie wyraził pogląd, że *D. janossyi* mogła być przodkiem *D. hibbardi*, a ta ostatnia przodkiem *D. kordosi*.

Znalezienie w Podlesicach, a więc w stanowisku nieznacznie tylko młodszym od najstarszego, w którym wystąpiła *Deinsdorfia* (Osztramos 9) dwu gatunków: *D. reumeri* n.sp. i *D. insperata* n.sp., o cechach uznanych przez REUMERA (1984) za progresywne, oraz znalezienie *D. hibbardi* i *D.* cf. *kordosi* razem w stanowiskach Węże 1 i Rębielice Królewskie 1A (co wskazuje, że *D. hibbardi* nie mogła być przodkiem *D. kordosi*) zaburzyło jasny obraz ewolucji, sugerowany przez tego autora.

Z nowych danych wynika, że istniały prawdopodobnie w Europie dwie linie ewolucyjne. Pierwsza to sugerowana przez REUMERA (1984): *janossyi* — *hibbardi*, druga to: *reumeri* — *kordosi*.

W linii pierwszej, o wyraźnie mniejszym stopniu exoedaenodoncji, *D. janossyi* jako geologicznie starsza, mniejsza i mniej ewoluowana mogłaby być przodkiem geologicznie młodszej, większej, o bardziej zredukowanych zębach *D. hibbardi*.

W linii drugiej, wyraźnie bardziej przystosowanej do diety złożonej z mięczaków, forma starsza (*D. reumeri*) jest wprawdzie nieco większa i ma bardziej rozdęte zęby przednie niż forma młodsza (*D. kordosi*), ale stopień redukcji jej trzonowców jest mniejszy, typowy dla form geologicznie starszych. Te nieco większe wymiary *D. reumeri* n.sp. możemy tłumaczyć bardziej północnym położeniem miejsca jej występowania w stosunku do miejsca występowania *D. kordosi*. Stopień exoedaenodoncji natomiast jest prawdopodobnie jedynie przystosowaniem do lokalnych warunków (mniejszy lub większy udział mięczaków w diecie), a nie stałym trendem ewolucyjnym.

D. insperata n.sp. nie mieści się w żadnej z tych dwu linii i należy przypuszczać, że była bezpośrednim przybyszem spoza Europy.

D. hibbardi została znaleziona w Polsce w 5 stanowiskach: Węże 1 (SULIMSKI 1962a), Rębielice Królewskie 1A i 2, Kielniki 3B i Kadzielnia, a poza tym szczątki jej znane są również z Osztramos 7 na Węgrzech (REUMER 1984), z Deinsdorf w RFN (HELLER 1963), Deutsch-Altenburg 21 w Austrii (informacja ustna RABEDERA), z Ivanovców A w Czechosłowacji (FÉJFAR 1966) oraz z Balaruc 2 i Seynes we Francji (JAMMOT 1977).

D. cf. *kordosi* występowała w Polsce w dwu stanowiskach — w Wężach 1 i Rębielicach Królewskich 1A, a poza tym na Węgrzech w Csarnota 2 (REUMER 1984).

Drugi rodzaj omawiany w pracy to *Zelceina*, opisana przez SULIMSKIEGO (1959) z Węży 1, pierwotnie jako *Neomys soriculoides*. Poza stanowiskiem Węże 1 została również znaleziona w Polsce w Rębielicach Królewskich 1A i 2, a poza Polską w Czechosłowacji w Ivanovcach A (FÉJFAR 1966) i na Węgrzech w stanowisku Csarnota 2 (REUMER 1984). Pochodzenie tej formy, tak jak i rodzaju *Deinsdorfia*, nie jest znane, nie mają one odpowiednika w faunie współczesnej.

Znalezienie w Podlesicach nowego gatunku *Z. podlesicensis* n.sp. wskazuje, że rodzaj ten przybył do Europy wcześniej niż sądzono i że, będąc mniejszy i prymitywniejszy, mógłby być przodkiem *Z. soriculoides*.

Występowanie *Z. soriculoides* w Rębielicach Królewskich 1A i 2 wskazuje również, że gatunek ten nie wymarł wraz z ochłodzeniem klimatu na granicy Ruscinianu i Villanyianu, lecz przeżył, choć nieliczny, do dolnego Villanyianu.

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