

# Poland

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Rzebik-Kowalska, B. Poland. In: Hoek Ostende, L.W. van den, Doukas, C.S. & Reumer, J.W.F. (eds), *The Fossil Record of the Eurasian Neogene Insectivores (Erinaceomorpha, Soricomorpha, Mammalia)*, Part I. *Scripta Geologica Special Issue*, 5: 119-134, Leiden, November 2005.

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## Introduction

Despite the 19th century tradition of mammalian palaeontology in the present territory of Poland, the oldest records of insectivores are found in the papers of Andreae (1904), Schlosser (*in* Zittel, 1911) and Wegner (1913), who described the fauna from the Middle Miocene (MN 6) locality of Opole 1 in Silesia. The insectivores were represented in this locality by *Metacordylodon schlosseri* (Andreae, 1904) (Dimylidae), *Talpa minuta* Blainville, 1838 (Talpidae), and *Erinaceus sansaniensis* Lartet, 1851 (Erinaceidae). According to Wegner (1913) the latter form was similar to the Miocene hedgehog found at Sansan in France. The later revision of the Sansan material showed that it was not uniform. Part of it was transferred to the genus *Lantanotherium* Filhol, 1888, and another part to *Amphelchinus* Aymard, 1849 (Baudelot, 1972). As the material from Opole 1 (except the holotype of the *Metacordylodon schlosseri*) disappeared during the Second World War, it is difficult to assess the taxonomy of the hedgehog from Opole 1.

Before the Second World War only one paper mentioned (most probably Pliocene) insectivores from Polish territory: *Sorex* sp., *Talpa* sp., and *Erinaceus* sp. from the Południowa Cave near Wojcieszów in Silesia (Zotz, 1939). In the 1950s and 1960s some Pliocene and Pleistocene small mammal faunas were studied by Kowalski (1956, 1958, 1960) and Sulimski (1959, 1962a, b). Both authors described several new species, mostly shrews. The studied localities were situated in the Cracow-Wieluń Upland, a belt of Upper Jurassic limestones, well known for accumulations of fossil-bearing deposits, especially in caves and karst fissures.

Later on, several revisions, monographs, and descriptions of insectivores by Skoczeń (1976, 1980, 1993), Sulimski *et al.* (1979), Harrison & Rzebik-Kowalska (1991, 1992, 1994) and Rzebik-Kowalska (1971, 1975, 1976, 1981, 1989, 1990a, b, 1991) were published. An overview was presented by Rzebik-Kowalska (1994a). Rzebik-Kowalska (1993, 1994b, 1996) and Kowalski & Rzebik-Kowalska (2002) published on the Middle Miocene faunas from the open coal mine at Bełchatów.

So far 57 (two dimylids, two hedgehogs, 20 moles, and 33 shrews) named species were found in Poland. Among them 25 (one hedgehog, nine moles and 15 shrews) species

and five (one mole, four shrews) genera were described as new from the country.

The acronyms used in this article are:

HZM Kent	Harrison Zoological Museum, Sevenoaks, Kent, England
IP PAN Warsaw	Institute of Paleobiology Warsaw, Poland
ISEZ PAN Cracow	Institute of Systematics and Evolution of Animals, Polish Academy of Sciences in Cracow, Poland
ME Warsaw	Museum of the Earth in Warsaw, Poland
R-PM Hildesheim	Roemer-Pelizaeus Museum in Hildesheim, Germany.

### **Insectivore faunas in the Neogene of Poland**

#### **MN 4**

##### **Bełchatów C**

*Location* – The area of a brown coal mine in Central Poland, between the Cracow-Wieluń Jurassic chain and The Holy Cross Mountains [N 51°15' E 19°20'].

*Stratigraphy* – Orleanian (MN 4 according to Kowalski & Rzebik-Kowalska (2002), MN 4/5 according to Garapich (2002), level C in the coal mine.

*Literature* – Kowalski & Rzebik-Kowalska (2002).

*Insectivores* – Talpidae: Talpini gen. et sp. indet., *Desmanella* cf. *engesseri* Ziegler, 1985. Dimylidae: *Plesiodimylus* cf. *chantrei* Gaillard, 1899, *Chainodus intercedens* (Müller, 1967). Soricidae: cf. *Florinia stehlini* (Doben-Florin, 1964), *Heterosorex* sp., Heterosoricinae gen. et sp. indet.

*Taxonomic descriptions* – Rzebik-Kowalska (1994b, 1996, 2005a) gave descriptions for all of the insectivores.

*Storage of material* – ISEZ PAN Cracow.

#### **MN 5**

##### **Bełchatów B**

*Location* – The area of a brown coal mine in Central Poland, between the Cracow - Wieluń Jurassic chain and The Holy Cross Mountains [N 51°15' E 19°20'].

*Stratigraphy* – Orleanian/Astracian (MN 5 according to Kowalski & Rzebik-Kowalska (2002), MN 5/6 according to Garapich (2002)). Level B in the coal mine.

*Literature* – Kowalski & Rzebik-Kowalska (2002).

*Insectivores* – Erinaceidae: *Lantanotherium* aff. *sansaniense* (Lartet, 1851). Plesiosoricidae: *Plesiosorex germanicus* (Seemann, 1938). Talpidae: *Mygalea* cf. *antiqua* (Pomel, 1848), *Talpa minuta* Blainville, 1838, "*Scaptonyx*" cf. *edwardsi* Gaillard, 1899, *Desmanella enges-*

*seri* Ziegler, 1985. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1899, *Chainodus intercedens* (Müller, 1967). Soricidae: cf. *Miosorex* sp., *Dinosorex* cf. *zapfei* Engesser, 1972, Soricidae gen. et sp. indet.

*Taxonomic descriptions* – Rzebik-Kowalska (1993, 1994b, 1996) gave descriptions for all of the insectivores except for the Talpidae and Erinaceidae. These were listed as indet. by Kowalski & Rzebik-Kowalska (2002) and subsequently described by Rzebik-Kowalska (2005a).

*Storage of material* – ISEZ PAN Cracow.

## MN 6

### Opole 1

*Location* – Silesia [N 50°40' E 17°55'].

*Stratigraphy* – Astracian [MN 6 according to Głazek & Szyrkiewicz (1987)].

*Literature* – Andreae (1904), Wegner (1913), Kowalski (1967).

*Insectivores* – Erinaceidae: “*Erinaceus sansaniensis*” Lartet, 1851. Talpidae: *Talpa minuta* Blainville, 1838. Dimylidae: *Metacordylodon schlosseri* (Andrea, 1904) (type locality).

*Taxonomic descriptions* – Andreae (1904) described the *Cordylodon schlosseri* and Schlosser (in Zittel, 1911) created for it a new genus *Metacordylodon*. Wegner (1913) gave a description of all insectivores presented above, and Fahlbusch (1989) wrote the history and redescribed the holotype of *Metacordylodon schlosseri* found after the war (see below).

*Storage of material* – The material got lost during the Second World War and only the holotype of the *Metacordylodon* has later been found in a good shape in the Roemer-Pelizaeus Museum in Hildesheim (North Germany), where it is stored.

*Remarks* – Described as *Erinaceus sansaniensis*, the hedgehog from Opole could either belong to the galeria *Lantanotherium* or the erincineceine *Amphexchinus* (see introduction).

## MN 7/8

### Bełchatów A

*Location* – The area of a brown coal mine in Central Poland, between the Cracow-Wieluń Jurassic chain and The Holy Cross Mountains [N 51°15' E 19°20'].

*Stratigraphy* – Astracian/Vallesian (according to Kowalski & Rzebik-Kowalska (2002) and Garapich (2002) MN 7/8-MN 9). Level A in the Bełchatów coal mine.

*Literature* – Kowalski & Rzebik-Kowalska (2002).

*Insectivores* – Talpidae: *Desmanella* cf. *stehlini* Engesser, 1972, cf. *Talpa minuta* Blainville, 1838, Talpidae gen. et sp. indet. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1899, *Plesiodimylus* sp., ?*Chainodus* sp. Soricidae: cf. *Crusafontina* sp., *Dinosorex* sp.

*Taxonomic descriptions* – Rzebik-Kowalska (1994b, 1996, 2005a) gave descriptions for all of the insectivores.

*Storage of material* – ISEZ PAN Cracow.

## MN 14

### Mała Cave layers 4+5

*Location* – At Zelce Hill near Działoszyn, in the Cracow - Wieluń Upland, Central Poland [N 51°05' E 18°48'].

*Stratigraphy* – Early Ruscianian.

*Literature* – Sulimski *et al.* (1979), Rzebik-Kowalska (1994a).

*Insectivores* – Soricidae: *Paenelimnoecus pannonicus* (Kormos, 1934), *Kordosia topali* (Jánossy, 1972), *Mafia* cf. *dehneli* (Kowalski, 1956), “*Blarinella*” sp., *Sorex minutus* Linnaeus, 1766, *Sorex* sp.

*Taxonomic descriptions* – Descriptions of all of the shrews were made by Sulimski *et al.* (1979), the full species list was also given by Rzebik-Kowalska (1994a). *Petenyiella gracilis* Petényi, 1864 in Sulimski *et al.* (1979) was included in *Paenelimnoecus pannonicus* by Rzebik-Kowalska (1994a). *Amblycoptus topali* Jánossy, 1972 in Sulimski *et al.* (1979) and Rzebik-Kowalska (1994a) was placed in *Kordosia* by Mészáros (1997). “*Sorex*” cf. *dehneli* Kowalski, 1956 in Sulimski *et al.* (1979) was included in *Mafia* by Rzebik-Kowalska (1994a). *Petenyia hungarica* Kormos, 1934 in Sulimski *et al.* (1979) was included in ?*Blarinella dubia* by Rzebik-Kowalska (1994a) and in “*Blarinella*” sp. by Rzebik-Kowalska (1998) (see Storch, 1995). *Petenyiella* aff. *repenningi* Bachmayer & Wilson, 1970 in Sulimski *et al.* (1979) was tentatively included in *Sorex minutus* by Reumer (1984).

*Storage of material* – IP PAN Warsaw.

*Remarks* – According to Mészáros (1997) the Pliocene remains described from Poland as *Amblycoptus* should be included in the genus *Kordosia*.

## Pańska Góra

*Location* – Vicinity of Olsztyn near Częstochowa, in the Cracow-Wieluń Upland [N 50°45' E 19°15'].

*Stratigraphy* – Early Ruscianian.

*Literature* – Bednarczyk (1993), Rzebik-Kowalska (1994a).

*Insectivores* – Soricidae: *Asoriculus* sp., *Mafia dehneli* (Kowalski, 1956), *Blarinoides* sp., *Petenyia* sp., *Sorex* sp.

*Taxonomic descriptions* – Bednarczyk (1993) described all of the Soricidae and Rzebik-Kowalska (1994a) cited a list of them. *Episoriculus* sp. in Bednarczyk (1993) and Rzebik-Kowalska (1994a) was included in *Asoriculus* by Rzebik-Kowalska (1998).

*Storage of material* – ISEZ PAN, Cracow.

### Podlesice

*Location* – Near Kroczyce (district of Olkusz), in the Cracow-Wieluń Upland [N 50°34' E 19°32'].

*Stratigraphy* – Early Ruscinian.

*Literature* – Kowalski (1956, 1964), Rzebik-Kowalska (1994a).

*Insectivores* – Talpidae: *Urotrichus? dolichochoir?* (Gaillard, 1899), *Scapanulus? agrarius* Skoczeń, 1980 (type locality), *Parascalops fossilis* Skoczeń, 1993 (type locality), *Talpa minor* Freudenberg, 1914, *Desmanella* aff. *dubia* Rümke, 1976, *Desmana nehringi* Kormos, 1913, *Archaeodesmana* aff. *getica* (Terzea, 1980). Soricidae: *Paenelimnoecus pannonicus* (Kormos, 1934), *Paranourosorex gigas* Rzebik-Kowalska, 1975 (type locality), *Asoriculus gibberodon* (Petényi, 1864), *Neomysorex alpinoides* (Kowalski, 1956) (type locality), *Mafia dehneli* (Kowalski, 1956) (type locality), *Mafia* cf. *csarnotensis* Reumer, 1984, *Sulimskia kretzoi* (Sulimski, 1962), *Blarinoides mariae* Sulimski, 1959, *Zelceina podlesicensis* Rzebik-Kowalska, 1990 (type locality), *?Petenyia dubia* Bachmayer & Wilson, 1970, *Alloblarinella europaea* (Reumer, 1984), *Cokia robusta* (Rzebik-Kowalska, 1989) (type locality), *Deinsdorfia reumeri* Rzebik-Kowalska, 1990 (type locality), *Deinsdorfia insperata* Rzebik-Kowalska, 1990 (type locality), *Sorex minutus* Linnaeus, 1766, *Sorex bor* Reumer, 1984, *Sorex* sp. 1, *Sorex* sp. 2, *Sorex* sp. 3, Soricidae gen. et sp. indet. 1, 2, 3, 4.

*Taxonomic descriptions* – The first descriptions of the Talpidae and Soricidae were given by Kowalski (1956). A revision of the Talpidae (Desmaninae) was made by Rzebik-Kowalska (1971), and of Soricidae by the same author in 1976, 1981, 1989, 1990 a, b, and 1991; *Paranourosorex* was additionally studied by Harrison & Rzebik-Kowalska (1991), and *Archaeodesmana* and *Desmanella* by the same authors in 1992 and 1994 respectively. The remaining Talpidae were described by Skoczeń (1980, 1993). The full species list was also given by Rzebik-Kowalska (1994a).

*Suncus* cf. *pannonicus* (Kormos, 1934) in Kowalski (1956) was included in *Petenyiella gracilis* (Petényi, 1864) by Kowalski (1964) and in *Paenelimnoecus pannonicus* by Rzebik-Kowalska (1990b). *Soriculus kubinyii* Kormos, 1934 in Kowalski (1956, 1964) was included in *Episoriculus borsodensis* Jánossy, 1973 by Rzebik-Kowalska (1981), in *Episoriculus gibberodon* (Petényi, 1864) by Rzebik-Kowalska (1994a) and transferred to the genus *Asoriculus* by Rzebik-Kowalska (1998). *Sorex alpinoides* Kowalski, 1956 in Kowalski (1956, 1964) was included in *Neomysorex* by Rzebik-Kowalska (1981). *Sorex dehneli* Kowalski,

1956 in Kowalski (1956, 1964) was included in *Mafia* by Reumer (1984). *Sorex kretzoi* Sulimski, 1962 in Sulimski (1962a) was included in *Sulimskia* by Reumer (1984). *Petenyia hungarica* Kormos, 1934 (partim) in Kowalski (1956, 1964) was included in *Blarinella dubia* (Bachmayer & Wilson, 1970) by Rzebik-Kowalska (1989, 1994a) and in "*Blarinella* sp." by Rzebik-Kowalska (1998) (see Storch, 1995). *Blarinella europaea* Reumer, 1984 in Rzebik-Kowalska (1989, 1994a) was included in *Alloblarinella* by Rzebik-Kowalska (1998). *Petenyia robusta* Rzebik-Kowalska, 1989 in Rzebik-Kowalska (1989, 1994a) was included in *Cokia* by Storch (1995). *Sorex* sp. (partim) in Kowalski (1956) was included in *Sorex minutus* by Rzebik-Kowalska (1991). *Sorex* cf. *praearaneus* Kormos, 1934 (partim) in Kowalski (1956) was included in *Sorex* sp. 3 by Rzebik-Kowalska (1991), another specimen belonged to a bat. *Scaptonyx* (?) *dolichochoir* (Gaillard, 1899) in Skoczeń (1980) was cited as "*Scaptonyx* (?) *dolichochoir*" in Rzebik-Kowalska (1994a) and as *Urotrichus* ? *dolichochoir* (?) in this paper. *Scapanulus agrarius* Skoczeń, 1980 and Rzebik-Kowalska (1994a) is listed as *Scapanulus?* *agrarius* in this paper. *Dibolia* aff. *dekkersi* Rümke, 1985 in Harrison & Rzebik-Kowalska (1992) was included in *Ruemkelia* by Rzebik-Kowalska (1994a) and in *Archaeodesmana* in this paper (to make uniform the generic name for this talpid in the whole volume, see remarks). If *Dibolia dekkersi* Rümke, 1985 and *Desmana getica* Terzea, 1980 are identical (see remarks of Ciuperceni-1, Romania, Rzebik-Kowalska, 2005b) the name *getica* has priority over the name *dekkersi* and the mole from Podlesice should be named either *Ruemkelia getica* or *Archaeodesmana getica*.

*Storage of material* – Most specimens are in ISEZ PAN Cracow. *Desmanella* and *Archaeodesmana* are in HZM Kent.

*Remarks* – Inclusion of "*Scaptonyx* (?) *dolichochoir*" and *Scapanulus agrarius* in these genera by Skoczeń (1980) was questioned by Storch & Qiu (1983).

*Ruemkelia* Rzebik-Kowalska & Pawłowski, 1994 (a new name for *Dibolia* Rümke, 1985, an invalid homonym, see Rzebik-Kowalska & Pawłowski, 1994) is considered by other authors, e.g. Hutterer (1995), Ziegler *et al.* (2005), Van den Hoek Ostende & Furió (2005), as a synonym of the genus *Archaeodesmana* Topachevsky & Pashkov, 1990, originally described as a subgenus. However, the *Archaeodesmana* has as its type species *Desmana pontica* Schreuder, 1940, and the genus *Dibolia* (= *Ruemkelia*) has as its type species *Dibolia dekkersi* Rümke, 1985. According to the author of the present paper such an assumption (congenerity of *Desmana pontica* and *Dibolia dekkersi*) should not be established without a study of original material. In this situation the name *Ruemkelia* seems to be more correct because the replacement of the name *Dibolia* by *Ruemkelia* had a purely nomenclatorial character and does not depend on the "state of art" in systematics of the desmans.

### Zalesiaki 1B

*Location* – In the Cracow-Wieluń Upland [N 51°06' E 18°56'].

*Stratigraphy* – Ruscian, MN 14/MN 15?, local level B (samples 3, 6, 11, 12, 14, 15).

*Literature* – Rzebik-Kowalska (1994a).

*Insectivores* – *Paenelimnoecus pannonicus* (Kormos, 1934), *Beremendia fissidens* (Petényi, 1864), *Asoriculus gibberodon* (Petényi, 1864), cf. *Neomysorex alpinoides* (Kowalski, 1956), “*Blarinella*” sp., *Alloblarinella europaea* (Reumer, 1984), *Sorex minutus* Linnaeus, 1766, *Sorex casimiri* Rzebik-Kowalska, 1991.

*Taxonomic descriptions* – Rzebik-Kowalska (1976, 1989, 1990b, 1991) gave descriptions of *Beremendia*, *Alloblarinella*, *Petenya*, *Paenelimnoecus*, and *Sorex*. The full list of species, including the first record of *Asoriculus* and cf. *Neomysorex* in this locality was given in Rzebik-Kowalska (1994a). Rzebik-Kowalska (1998) changed the generic classification of *Episoriculus gibberodon* in Rzebik-Kowalska (1994a) and *Blarinella europaea* in Rzebik-Kowalska (1989, 1994a) into *Asoriculus* and *Alloblarinella*, respectively. *Blarinella dubia* (Bachmayer & Wilson, 1970) in Rzebik-Kowalska (1989, 1994a) was included in “*Blarinella*” sp. by Rzebik-Kowalska (1998) (see Storch, 1995).

*Storage of material* – ISEZ PAN Cracow.

### Zamkowa Dolna Cave B

*Location* – In the Cracow-Wieluń Upland [N 50°44' E 19°16'].

*Stratigraphy* – Early Ruscinian?, MN 14?, local level B.

*Literature* – Rzebik-Kowalska (1994a).

*Insectivores* – Soricidae: *Kordosia* cf. *topali* (Jánossy, 1972), *Cokia robusta* (Rzebik-Kowalska, 1989), *Asoriculus gibberodon* (Petényi, 1864), *Blarinoides mariae* Sulimski, 1959, *Beremendia fissidens* (Petényi, 1864), *Sorex casimiri* Rzebik-Kowalska, 1991.

*Taxonomic descriptions* – All of the Soricidae (except *Asoriculus*) were described by Rzebik-Kowalska (1975, 1976, 1989, 1991). The full list of species and first record of *Asoriculus* in this locality were given by Rzebik-Kowalska (1994a). *Amblycoptus* cf. *topali* in Rzebik-Kowalska (1975, 1994a) was included in *Kordosia* by Mészáros (1997). *Petenya robusta* in Rzebik-Kowalska (1989, 1994a) was included in *Cokia* by Storch (1995). *Episoriculus gibberodon* in Rzebik-Kowalska (1994a) was included in *Asoriculus* by Rzebik-Kowalska (1998).

*Storage of material* – ISEZ PAN Cracow.

*Remarks* – *Asoriculus gibberodon*, *Blarinoides mariae* and *Beremendia fissidens* may belong here, to Zamkowa Dolna Cave A or to both faunas, because the first two species survived to the Late Pliocene, and the latter to the Late Biharian and the fossils from Zamkowa Dolna Cave (faunas A and B) were mixed.

### MN 15

### Węże 1

*Location* – Near Działoszyn (province of Łódź), in the Cracow-Wieluń Upland [N 51°05' E 18°47'].

*Stratigraphy* – Late Ruscianian.

*Literature* – Sulimski (1959), Kowalski (1964), Głazek *et al.* (1976), Rzebik-Kowalska (1994a).

*Insectivores* – Erinaceidae: *Erinaceus samsonowiczii* Sulimski, 1959 (type locality).  
 Talpidae: *Condylura kowalskii* Skoczeń, 1976, *Urotrichus? dolichochoir* (?) (Gaillard, 1899),  
*Scapanulus? agrarius* (Skoczeń, 1980), *Parascalops fossilis* Skoczeń, 1993, *Talpa minor* Freuden-  
 berg, 1914, *Talpa fossilis* Petényi, 1864, *Desmana nehringi* Kormos, 1913, *Galemys sulim-  
 skii* Rümke, 1985. Soricidae: *Paenelimnoecus pannonicus* (Kormos, 1934), *Beremendia fissidens*  
 (Petényi, 1864), *Asoriculus gibberodon* (Petényi, 1864), *Mafia cf. csarnotensis* Reumer, 1984,  
*Sulimskia kretzoi* (Sulimski, 1962) (type locality), *Blarinoides mariae* Sulimski, 1959 (type lo-  
 cality), *Zelceina soriculoides* (Sulimski, 1959) (type locality), *Alloblarinella europaea* (Reumer,  
 1984), *Petenyia hungarica* Kormos, 1934, *Deinsdorfia hibbardi* (Sulimski, 1962) (type locality),  
*Deinsdorfia cf. kordosi* Reumer, 1984, *Sorex minutus* Linnaeus, 1766, *Sorex bor* Reumer, 1984,  
*Sorex pseudoalpinus* Rzebik-Kowalska, 1991 (type locality), Soricidae gen et sp. indet. 5.

*Taxonomic descriptions* – Sulimski (1959, 1962a) gave the first descriptions of *Erinaceus*,  
 Talpinae, Desmaninae, and Soricidae; revisions appeared on the Erinaceidae (Rzebik-  
 Kowalska, 1971), the Desmaninae (Rzebik-Kowalska, 1971; Rümke, 1985), Talpinae  
 Skoczeń (1976, 1993), and the Soricidae (Rzebik-Kowalska 1976, 1981, 1989, 1990 a, b,  
 1991). The full list of species was given by Rzebik-Kowalska (1994a).

*Suncus pannonicus* (Kormos, 1934) and *Suncus zelceus* in Sulimski (1959) were both  
 placed in the genus *Petenyiella* by Sulimski (1962a). Reumer (1984) recognized *P. gracilis*  
 and *P. zelcea* as synonyms of *Paenelimnoecus pannonicus*.

Over the years the generic classification of the shrews changed. *Episoriculus gibbero-  
 don* in Rzebik-Kowalska (1981, 1994a) was included in *Asoriculus* by Rzebik-Kowalska  
 (1998), and *Sorex kretzoi* in Sulimski (1962a) was included in *Sulimskia* by Reumer  
 (1984). *Neomys soriculoides* in Sulimski (1959) and Kowalski (1964) was placed in *Zelceina*  
 by Sulimski (1962a). *Blarinella europaea* in Rzebik-Kowalska (1989, 1994a) was included  
 in *Alloblarinella* by Rzebik-Kowalska (1998). Reumer (1984) classified *Sorex hibbardi* in  
 Sulimski (1962a) and Kowalski (1964) as *Deinsdorfia*.

*Sorex cf. minutus* Linnaeus, 1766 in Sulimski (1959) was classified as *Sorex minutus* by  
 Sulimski (1962a). *Sorex runtonensis* Hinton, 1911 in Sulimski (1959, 1962a) and Kowalski  
 (1964) is, according to Rzebik-Kowalska (1991), possibly *Sorex bor* Reumer, 1984. *Sorex*  
*cf. praealpinus* Heller, 1930 in Sulimski (1962a) was described as a new species, *Sorex*  
*pseudoalpinus*, by Rzebik-Kowalska (1991).

*Desmana kowalskae* Rümke, 1985 does not differ from *D. nehringi* coming from the  
 older locality of Podlesice and the younger one of Rębielice Królewskie 1A (Rzebik-  
 Kowalska 1994a).

*Galemys* (?) sp. in Sulimski (1959) was partly included in *Desmana pontica* Schreuder,  
 1940 and partly in *Desmana cf. kormosi* Schreuder, 1940 by Sulimski (1962a). Based on  
 this material Rümke (1985) described a new species, *Galemys sulimskii*, and probably  
 included in it also the material described from Węże 1 by Rzebik-Kowalska (1971) as  
*Desmana kormosi* Schreuder, 1940.

*Scaptonyx* (?) *dolichochoir* in Skoczeń (1980) was cited as “*Scaptonyx* (?) *dolichochoir*”



in Rzebik-Kowalska (1994a) and as *Urotrichus? dolichochoir* (?) in this paper. *Scapanulus agrarius* in Skoczeń (1980) and Rzebik-Kowalska (1994a) was included in "*Scapanulus*" *agrarius* in this paper. *Talpa* sp. in Sulimski (1959) was included to *Talpa fossilis* by Sulimski (1962a).

*Storage of materials* – ISEZ PAN Cracow, ME Warsaw.

*Remarks* – The author of the present paper has not found *Sorex subminutus*, *Sorex araneus*, *Sorex subaraneus*, *Sorex runtonensis* and *Sorex praeearaneus* nor *Crocidura* cf. *kornfeldi* and *Crocidura* sp., all mentioned by Sulimski (1959, 1962a) in the material from Węże 1 [see also Rzebik-Kowalska (1991, pp. 327, 331, 341). According to Reumer (1984) the morphology of the condyloid process of the mandible of the latter two forms denies their inclusion in the Crocidurinae.

On systematic position of *Urotrichus? dolichochoir* (?) and *Scapanulus? agrarius* see also remarks of Podlesice.

## Węże 2

*Location* – Near Działoszyn (province of Łódź), in the Cracow - Wieluń Upland [N 51°05' E 18°47'].

*Stratigraphy* – Ruscinian/Villanyian boundary, MN 15/MN 16.

*Literature* – Sulimski (1962b).

*Insectivores* – Talpidae: *Neurotrichus minor* Skoczeń, 1993 (type locality), *Condylura kowalskii* Skoczeń, 1976, *Talpa minor* Freudenberg, 1914, *Talpa* cf. *fossilis* Petényi, 1864. *Galemys* cf. *kormosi* (Schreuder, 1940). Soricidae: *Beremendia fissidens* (Petényi, 1864), *Blarinoides mariae* Sulimski, 1959, *Zelceina* cf. *soriculoides* (Sulimski, 1959), *Petenyia hungarica* Kormos, 1934, *Sorex* cf. *minutus* Linnaeus, 1766, *Sorex* cf. *runtonensis* Hinton, 1911, *Sorex* sp., *Crocidura* sp.

*Taxonomic descriptions* – Skoczeń (1993) gave the description of *Neurotrichus* and *Condylura*, and Sulimski (1962b) of *Talpa*, *Galemys* and all the Soricidae. *Neomyina* cf. *soriculoides* and *Desmana* cf. *kormosi* in Sulimski (1962b) were included in *Zelceina* and *Galemys*, respectively (Rzebik-Kowalska, 1994a).

*Storage of material* – IP PAN Warsaw.

*Remarks* – According to the author of the present paper, *Sorex runtonensis* is absent in the boundary of the Early/Late Pliocene and *Crocidura* in the Pliocene of Poland.

## MN 16

### Rębielice Królewskie 1A

*Location* – District of Kłobuck, in the Cracow-Wieluń Upland [N 51°00' E 18°51'].

*Stratigraphy* – Early Villanyian.

*Literature* – Kowalski (1960, 1964), Rzebik-Kowalska (1994a).

*Insectivores* – Erinaceidae: *Erinaceus* sp. Talpidae: *Condylura kowalskii* Skoczeń, 1976 (type locality), *Condylura izabellae* Skoczeń, 1976 (type locality), *Neurotrichus? polonicus* Skoczeń, 1980, *Urotrichus? dolichochoir(?)* (Gaillard, 1899), *Talpa minor* Freudenberg, 1914, *Desmana nehringi* Kormos, 1913, *Galemys kormosi* (Schreuder, 1940). Soricidae: *Paenelimnoecus pannonicus* (Kormos, 1934), *Paenelimnoecus* sp., *Beremendia fissidens* (Petényi, 1864), *Beremendia minor* Rzebik-Kowalska, 1976 (type locality), *Asoriculus gibberodon* (Petényi, 1864), *Mafia* cf. *csarnotensis* Reumer, 1984, *Sulimskia kretzoi* (Sulimski, 1962), *Blarinoides mariae* Sulimski, 1959, *Zelceina soriculoides* (Sulimski, 1959), *Alloblarinella europaea* (Reumer, 1984), *Petenyia hungarica* Kormos, 1934, *Deinsdorfia hibbardi* (Sulimski, 1962), *Deinsdorfia* cf. *kordosi* Reumer, 1984, *Sorex minutus* Linnaeus, 1766, *Sorex bor* Reumer, 1984, *Sorex casimiri* Rzebik-Kowalska, 1991, *Sorex polonicus* Rzebik-Kowalska, 1991 (type locality), *Sorex* sp. 2, Soricidae gen. et sp. indet. 6, Soricidae gen. et sp. indet. 7.

*Taxonomic descriptions* – Kowalski (1960) gave descriptions of *Talpa*, *Desmana* and Soricidae. Skoczeń (1976) revised the Talpinae with the exception of *Talpa*, Rzebik-Kowalska (1971) and Rümke (1985) revised *Desmana* and *Galemys*. Rzebik-Kowalska (1976, 1989, 1990a, b, 1991) revised all Soricidae. The full list of species was given by Rzebik-Kowalska (1994a).

*Episoriculus gibberodon* in Rzebik-Kowalska (1994a) was included in *Asoriculus* by Rzebik-Kowalska (1998). cf. *Neomys* sp. in Kowalski (1960) probably also belonged to this species but the specimen has been lost. *Neomys soriculoides* in Kowalski (1964) was included to *Zelceina* by Rzebik-Kowalska (1991), and *Blarinella europaea* in Rzebik-Kowalska (1994a) was included in *Alloblarinella* by Rzebik-Kowalska (1998). *Sorex* cf. *minutus* in Kowalski (1960) was included to *Sorex minutus* by Rzebik-Kowalska (1991). The material originally described as *Sorex runtonensis* in Kowalski (1960, 1964) is partly referable to *Sorex bor*, and partly to *Sorex casimiri* (Rzebik-Kowalska, 1991).

*Desmana kormosi* in Kowalski (1960, 1964) and Rzebik-Kowalska (1971) was transferred to *Galemys* by Rümke (1985). *?Neurotrichus polonicus* in Skoczeń (1980) was cited as “*?Neurotrichus polonicus*” in Rzebik-Kowalska (1994a). *Scaptonyx (?) dolichochoir* in Skoczeń (1980) was cited as “*Scaptonyx (?) dolichochoir*” by Rzebik-Kowalska (1994a) and as *Urotrichus? dolichochoir(?)* in this paper.

*Storage of material* – ISEZ PAN Cracow.

*Remarks* – Inclusion of *Scaptonyx (?) dolichochoir* in this genus by Skoczeń (1980) was questioned by Storch & Qiu (1983). According to Storch and Qiu (1983) *Neurotrichus? polonicus* shows significant characters of *Quyania chowi* Storch and Qiu, 1983 from Ertemte 2 in China (the Late Miocene or Early Pliocene) and of the Recent *Neurotrichus gibbsii* (Baird), 1858 from the western North America. However, because of the unknown dental formula and the lack of antemolars anterior to p3 and p4 in the Polish material they provisionally leave the taxonomical status of this species as given by Skoczeń (1980) unchanged. Nevertheless, Popov (2004) refers to Storch and Qiu (1983) as he includes his Late Pliocene specimens of aff. *polonicus* from Varshets in Bulgaria to the genus *Quyania* as Q. aff. *polonica*.

## Rębielice Królewskie 2

*Location* – District of Kłobuck, in the Cracow-Wieluń Upland [N 50°59' E 18°51'].

*Stratigraphy* – Early Villanyian.

*Literature* – Rzebik-Kowalska (1994a).

*Insectivores* – Erinaceidae: *Erinaceus* sp. Talpidae: Desmaninae: *Galemys kormosi* (Schreuder, 1940). Soricidae: *Paenelimoecus pannonicus* (Kormos, 1934), *Kordosia?* sp., *Beremendia fissidens* (Petényi, 1864), *Beremendia* cf. *minor* Rzebik-Kowalska, 1976, *Asoriculus gibberodon* (Petényi, 1864), *Mafia* cf. *csarnotensis* Reumer, 1984, *Sulimskia kretzoi* (Sulimski, 1962), *Blarinoides mariae* Sulimski, 1959, *Zelceina soriculoides* (Sulimski, 1959), *Petenya hungarica* Kormos, 1934, *Deinsdorfia hibbari* (Sulimski, 1962), *Sorex minutus* Linnaeus, 1766, *Sorex bor* Reumer, 1984, Soricidae gen. et sp. indet. 6, Soricidae gen. et sp. indet. 8.

*Taxonomic descriptions* – Rümke (1985) described the *Galemys*, Rzebik-Kowalska (1971, 1976, 1989, 1990a, b, 1991) gave descriptions for *Erinaceus* and all of the Soricidae except for *Kordosia* and *Asoriculus*, which were listed for the first time in Rzebik-Kowalska (1994a). The full list of species was given by Rzebik-Kowalska (1994a).

*Amblycoptus* sp. in Rzebik-Kowalska (1994a, 1998) most probably should be included in *Kordosia* because the Late Pliocene finds may represent the latter genus. *Episoriculus gibberodon* in Rzebik-Kowalska (1994a) was included in *Asoriculus* by Rzebik-Kowalska (1998), and *Desmana kormosi* in Rzebik-Kowalska (1971) was placed in *Galemys* by Rümke (1985).

*Storage of material* – ISEZ PAN Cracow.

## MN 17

### Kadzielnia

*Location* – The Kadzielnia Hill in the town of Kielce, the Holy Cross Mountains, Central Poland [N 50°52' E 20°38'].

*Stratigraphy* – Late Villanyian, MN 17 or Pliocene/Pleistocene boundary.

*Literature* – Kowalski (1958), Rzebik-Kowalska (1994a).

*Insectivores* – Erinaceidae: *Erinaceus* sp. Talpidae: *Neurotrichus?* *polonicus* (type locality), *Geotrypus?* *copernici* Skoczeń, 1980 (type locality), *Urotrichus?* *dolichochoir* (?) (Gaillard, 1899), *Talpa minor* Freudenberg, 1914, *Talpa fossilis* Petényi, 1864. Soricidae: *Beremendia fissidens* (Petényi, 1864), *Sulimskia kretzoi* (Sulimski, 1962), *Blarinoides mariae* Sulimski, 1959, *Petenya hungarica* Kormos, 1934, *Deinsdorfia hibbari* (Sulimski, 1962), *Sorex minutus* Linnaeus, 1766, *Sorex bor* Reumer, 1984, *Sorex subaraneus* Heller, 1958, *Sorex* (*Drepanosorex*) *praeareaneus* Kormos, 1934.

*Taxonomic descriptions* – Skoczeń (1980) described the Talpidae, except for *Talpa*. This genus was already studied by Kowalski (1958), who also described the Soricidae. A revision of the Soricidae was made by Rzebik-Kowalska (1976, 1989, 1990a, 1991). *Erinaceus* sp. was described by Rzebik-Kowalska (1971). A full list of species was given by Rzebik-Kowalska (1994a).

*Sorex* sp. in Kowalski (1958) was included in *Sorex minutus* by Kowalski (1964), and *Sorex runtonensis* in Kowalski (1958, 1964) was included in *Sorex bor* by Rzebik-Kowalska (1991).

?*Neurotrichus polonicus* and ?*Geotrypus copernici* in Skoczeń (1980) were listed in Rzebik-Kowalska (1994a) as “?*Neurotrichus polonicus*” and “?*Geotrypus copernici*”, respectively (see also remarks Rębielice Królewskie 1A on the classification of this species) *Scaptonyx* (?) *dolichochoir* in Skoczeń (1980) was cited as “*Scaptonyx* (?) *dolichochoir*” in Rzebik-Kowalska (1994a) and as *Urotrichus?* *dolichochoir* (?) in this paper.

*Storage of material* – ISEZ PAN, Cracow.

*Remarks* – Inclusion of *Scaptonyx* (?) *dolichochoir* and ?*Geotrypus copernici* in these genera by Skoczeń (1980) was questioned by Storch & Qiu (1983). Storch & Qiu (1983) and Ziegler (1999) placed the species *S. dolichochoir* in *Urotrichus?*.

### Kielniki 3B

*Location* – In the Cracow-Wieluń Upland [N 50°45' E 19°18'].

*Stratigraphy* – Late Villanyian, local level B.

*Literature* – Rzebik-Kowalska (1994a).

*Insectivores* – Talpidae: *Neurotrichus?* *polonicus* Skoczeń, 1980. Soricidae: *Beremendia fissidens* (Petéyi, 1864), *Asoriculus gibberodon* (Petényi, 1864), *Petenya hungarica* Kormos, 1934, *Deinsdorfia hibbardi* (Sulimski, 1962), *Sorex minutus* Linnaeus, 1766, *Sorex bor* Reumer, 1984, *Sorex praealpinus* Heller, 1930, *Sorex (Drepanosorex) praearaneus* Kormos, 1934.

*Taxonomic descriptions* – Skoczeń (1993) described *Neurotrichus*, and Rzebik-Kowalska (1989, 1990a, 1991) gave descriptions for all of the Soricidae, except for *Beremendia* and *Asoriculus*. These two genera were listed for the first time in the full species list given by Rzebik-Kowalska (1994a). *Episoriculus gibberodon* in Rzebik-Kowalska (1994a) was included in *Asoriculus* in Rzebik-Kowalska (1998). ?*Neurotrichus polonicus* in Skoczeń (1980) was included in *Neurotrichus polonicus* by Skoczeń (1993) and by Rzebik-Kowalska (1994a). Storch & Qiu noted the similarity to *Quyania* (see Rębielice Królewskie 1A).

*Storage of material* – ISEZ PAN Cracow.

### Przymiłowice 3A

*Location* – Near Olsztyn, in the Cracow-Wieluń Upland [N 50°45' E 19°19'].

*Stratigraphy* – Late Villanyian, local level A.

*Literature* – Nadachowski *et al.* (1991).

*Insectivores* – Talpidae: Talpidae gen. et sp. indet. Soricidae: *Beremendia* sp.

*Taxonomic descriptions* – Nadachowski *et al.* (1991) described all the insectivores.

*Storage of material* – ISEZ PAN Cracow.

### Zamkowa Dolna Cave A

*Location* – In the Cracow-Wieluń Upland [N 50°44' E 19°16'].

*Stratigraphy* – Late Villanyian, local level A.

*Literature* – Rzebik-Kowalska (1994a).

*Insectivores* – Talpidae: *Neurotrichus? polonicus* Skoczeń, 1980, *Geotrypus? copernici* Skoczeń, 1980. Soricidae: *Beremendia fissidens* (Petényi, 1864), *Blarinoidea mariae* Sulimski, 1959, *Petenya hungarica* Kormos, 1934, *Asoriculus gibberodon* (Petényi, 1864), *Sorex (Drepanosorex) praeareaneus* Kormos, 1934.

*Taxonomic descriptions* – Skoczeń (1980) described the Talpidae and Rzebik-Kowalska (1976, 1989, 1991) gave descriptions for all of the Soricidae except for *Asoriculus*, which was mentioned for the first time in Rzebik-Kowalska (1994a). The full list of species was given in Rzebik-Kowalska (1994a). *Beremendia fissidens*, *Blarinoidea mariae* and *Petenya hungarica* may belong either here or to Zamkowa Dolna Cave B (see Zamkowa Dolna Cave B).

*Episoriculus gibberodon* in Rzebik-Kowalska (1994a) was included in *Asoriculus* by Rzebik-Kowalska (1998). *?Neurotrichus polonicus* and *?Geotrypus copernici* in Skoczeń (1980) were listed by Rzebik-Kowalska (1994a) as “*?Neurotrichus polonicus*” and “*?Geotrypus copernici*”, respectively (but see remarks Rębielice Królewskie 1A).

*Storage of material* – ISEZ PAN Cracow.

*Remarks* – Inclusion of *Geotrypus? copernici* in this genus is questioned by Storch & Qiu (1983).

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