

Germany

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Contents

Introduction	61
Insectivore faunas in the Neogene of Germany	63
References	92

Introduction

Research of Miocene and Pliocene insectivores has a long history in Germany. Already in the middle of the 19th century Miocene insectivore species have been described from South German localities. Most of these were authored by Herman von Meyer, who deserves to be named a pioneer of German insectivores research. Weisenau, today part of the city of Mainz, is the type locality of *Dimylus paradoxus* described by von Meyer (1846: 473). Haslach near Ulm yielded the type of *Cordylodon haslachensis*, also described by von Meyer (1859: 174). The widely known Steinheim fauna yielded among others the type of *Parasorex socialis*, again described by von Meyer (1865: 884). Von Meyer often received fossils from private collectors for determination. Usually, he described the specimens, drew them, and returned them to the owners. He communicated his conclusions and the descriptions of new species in his "Mittheilungen an Professor Bronn" (communications to Professor Bronn). Schlosser often referred to the handmade drawings of von Meyer and published them in his 1887 oeuvre. He also described new species, among them the soricid *Sorex neumayrianus* Schlosser, 1887, today known as *Heterosorex neumayrianus*.

In the early 20th century Ernst Stromer published on Miocene insectivores from south Germany. In his monographs from 1928 and 1940 he compiled the knowledge of the Late Miocene fauna from the Munich area, including a couple of insectivores. However, until that time, finds of fossil insectivores as well as of small mammals in general have been more or less accidental. Occasionally private collectors found fossil small mammal remains at road works and on construction sites. But they, just like the professional naturalists, focussed mainly on large vertebrates.

From the 1930s on Samuel Schaub in Switzerland and Florian Heller in Heidelberg were among the first who concentrated their research on small mammals. In the early

1930s Heller excavated Villanyian fissure fillings near Gundersheim, Rheinhessen (Heller, 1936). Schaub was the first to use systematic screen washing to prospect for small mammals. He was followed by Johannes Hürzeler, a curator at the Basle museum. Richard Dehm, director of the Bayerische Staatssammlung and the Universitätsinstitut für Paläontologie und historische Geologie from 1950 to 1976, introduced this technique in Germany roughly at the same time. He and his students found many mammal faunas in the karstic fissure fillings of the Swabian and Franconian Alb as well as in the deposits of the Upper Freshwater Molasse. However, among the small mammals the main focus was on the rodents, because these are good biostratigraphic markers. But with monographs on marsupials (Koenigswald, 1970), soricids (Doben-Florin, 1964) and dimylids (Müller, 1967), non-rodent small mammals were also taken into account.

From the late 1960s on Heinz Tobien, director of the Institut für Geowissenschaften of the Johannes Gutenberg Universität Mainz, the doyen of German vertebrate palaeontology, studied numerous localities and faunas in the Cenozoic of the Mainz basin. Nevertheless, insectivores played only a minor role in his work. In 1972 the fossil site of Dorn-Dürkheim 1 (Mainz basin, Rheinhessen) was discovered (Franzen & Storch, 1975). It turned out to be the first and till today the only Turolian site in Germany. With around ninety mammal species it is one of the richest localities in the world; Dorn-Dürkheim 1 has yielded thirteen insectivore species and is type locality for three of them (Storch, 1978). Since the 1980s Reinhard Ziegler extends our knowledge about the Neogene insectivores of South Germany with descriptions of numerous faunas and new taxa.

In 1996 - 179 years after the first systematic collections by the "Naturalienkabinet" of the Grand Duke of Hessen (1817) with its later "Inspektor" Johann Jakob Kaup - excavations at the classic Vallesian locality of Eppelsheim (Rheinhessen) were started again by the staff of the Senckenberg Museum in Frankfurt am Main (Franzen, 2000). These excavations yielded the first micromammals from this site, among which four species of insectivores, one of them described as new (Franzen *et al.*, 2003). The insectivores from the Ruscian localities Gundersheim 4 (Rheinhessen) and Wölfersheim (Wetterau) were described by Dahlmann & Storch (1995) and Dahlmann (2001).

Little material is known from the lower part of NW Germany (Niederrheinische Bucht - Lower Rhine Embayment) that forms part of the North Sea Basin structure. What is known, comes from the vast expanse of Neogene lignitic deposits situated in the triangular area between Aachen (Aix-la-Chapelle), Mönchen-Gladbach and Bonn. The lignites (Zagwijn & Hager, 1987) are commercially exploited in enormous open-air mines (locally called 'Tagebau') for combustion in power plants; sometimes fossil mammal remains are encountered during the mining operations. The geologically oldest locality known to date is Hambach 6C, correlated to MN 5 (early Middle Miocene); in addition, several localities of Pliocene age are known. Much of the descriptions we owe to Thomas Mörs, University of Bonn (Mörs *et al.*, 1998, 2000; Ziegler & Mörs, 2000; Mörs 2002).

The acronyms used in this paper are;

BSP	Bayerische Staatssammlung für Paläontologie und Historische Geologie München
IvAU	Instituut voor Aardwetenschappen Utrecht (faculty of Geosciences), Utrecht, The Netherlands
IPB	Institut für Paläontologie, Rheinischen Friedrich-Wilhelms-Universität, Bonn

IPW	Institut der Paläontologie der Universität Würzburg
NHML	The Natural History Museum, London, United Kingdom
MNHM	Naturhistorisches Museum Mainz/Landessammlung für Naturkunde Rheinland-Pfalz
NMA	Naturmuseum Augsburg
NMR	Natuurmuseum Rotterdam, Rotterdam, The Netherlands
PIM	Palaeontological Institute, University of Mainz
SMF	Senckenbergmuseum Frankfurt am Main
TM	Teylers Museum, Haarlem, The Netherlands
SMNK	Staatliches Museum für Naturkunde, Karlsruhe
SMNS	Staatliches Museum für Naturkunde, Stuttgart
CRW	Collection Rummel, Weisenburg.

Insectivore faunas in the Neogene of Germany

MN 1

Altheim-Breitenlauch 1

Location – Sandpit c. 1.5 km east of Altheim and c. 15 km south-west of Ulm, Baden-Württemberg, South Germany [N 48°19'47.800" E 9°47'49.771"].

Stratigraphy – Lower Freshwater Molasse, Ulm Beds, Early Aagenian.

Literature – Sach & Heizmann (2001).

Insectivores – Erinaceidae: *Amphexinus* sp. Talpidae: cf. *Desmanella* sp., Talpidae indet. Soricidae: Heterosoricinae indet., Soricidae indet.

Taxonomic descriptions – The insectivores were listed in Sach & Heizmann (2001).

Storage of material – SMNS.

Lautern 2

Location – Quarry at the road from Herrlingen into the Lauter Valley, c. 10 km west of Ulm, Baden-Württemberg, South Germany [N 48°26'14.790" E 9°53'13.825"].

Stratigraphy – Lower Freshwater Molasse, Early Aagenian.

Literature – Ziegler & Werner (1994).

Insectivores – Talpidae: *Asthenoscapter* sp., *Paratalpa* sp., *Geotrypus* aff. *montisani* Ziegler, 1990. Dimylidae: ?*Chainodus ulmensis* Ziegler, 1990, *Dimyloides stehlini* Hürzeler, 1944, *Dimyloides vireti* (Hürzeler, 1944). Soricidae: *Heterosorex neumayrianus neumayrianus* (Schlosser, 1887), *Oligosorex* cf. *thauensis* (Crochet), 1975, Soricidae gen. et sp. indet.

Taxonomic descriptions – The fauna was presented and described in detail by Ziegler

& Werner (1994). Van den Hoek Ostende (2001a: 51) resurrected the genus *Oligosorex* Kretzoi, 1959 and restricted the genus *Crocidosorex* Lavocat, 1951 to its type species *C. piveteaui*. This proposal is followed here.

Storage of material – SMNS.

Remarks – Some authors emphasise the presence of *Ritteneria* and correlate the fauna with MN 2 in stead of MN 1.

Tomerdingen 2

Location – Karstic fissure filling in a former quarry south-west of Tomerdingen, about 10 km north-west of Ulm, Baden-Württemberg, South Germany [N 48°28'36.757" E 9°54'17.905"].

Stratigraphy – Lower Freshwater Molasse, Early Agenian.

Literature – Seemann & Berckhemer (1930), Tobien (1939), Werner (1994), Ziegler (1989, 1990a, b).

Insectivores – Erinaceidae: *Amphelichinus edwardsi* (Filhol, 1879). Talpidae: *Mygatalpa* aff. *arvernensis* Schreuder, 1940, *Paratalpa brachychir* (von Meyer, 1846), *Geotrypus tomerdingensis* (Tobien, 1939), (type locality) *Geotrypus* aff. *montisasini* Ziegler, 1990. Soricidae: *Oligosorex antiquus* (Pomel, 1853).

Taxonomic descriptions – Tobien (1939) presented the first detailed descriptions of the insectivores and rodents. Werner (1994) specified the stratigraphic correlation. Ziegler (1989, 1990a, b) re-described the insectivores, recognising new species and presenting an updated faunal list.

Storage of material – SMNS.

Weisenau

Location – Today part of the city of Mainz, Calcareous Tertiary of the Mainz Basin, South Germany [N 49°58'08.280" E 8°8'12.679"].

Stratigraphy – Agenian, Corbicula Beds.

Literature – Storch (1988).

Insectivores – Erinaceidae: *Amphelichinus edwardsi* (Filhol, 1879), Erinaceidarum gen. et sp. indet. Talpidae: *Paratalpa ?brachychir* (von Meyer, 1846)(type locality), Talpidarum gen. et sp. indet. Dimylidae: *Dimylus paradoxus* von Meyer, 1846 (type locality), ?Dimylidarum gen. et sp. indet. Soricidae: *Heterosorex neumayrianus neumayrianus* (Schlosser, 1887), *Oligosorex* sp., Soricidarum gen. et sp. indet.

Taxonomic descriptions – Schlosser (1887) was the first to figure specimens from Weisenau, Doben-Florin (1964) described the soricids in detail. Müller (1967) described *Dimylus paradoxus* in detail, Storch (1988) presented an overview over the whole insectivore fauna and designated a lectotype of *Paratalpa brachychir*.

Storage of material – SMF.

Weißenburg 6

Location – Karstic fissure filling in a quarry in the Upper Jurassic delta south-east of Weißenburg in Bavaria, South Germany [N 49°00'30.931" E 11°01'10.318"].

Stratigraphy – Middle Aquitanian, Early Agenian.

Literature – Dehm (1961), Fahlbusch (1968), Müller (1967), Werner (1994).

Insectivores – Dimylidae: *Dimyloides stehlini* Hürzeler, 1944.

Taxonomic descriptions – Müller (1967) described *Dimyloides stehlini* in detail.

Storage of material – BSP.

MN 1/2

Eggingen (classical site Eckingen)

Location – Former quarry situated above the locality Eggingen, c. 10 km south-west of Ulm, Baden-Württemberg, South Germany [N 48°22'21.296" E 9°52'15.820"].

Stratigraphy – Lower Freshwater Molasse, Agenian.

Literature – Schlosser (1887), Werner (1994).

Insectivores – Talpidae: *Paratalpa meyeri* (Schlosser, 1887) (type locality), *Hugueneya primitiva* (Hutchison, 1974) (type locality). Dimylidae: *Dimylus paradoxus* von Meyer, 1846, *Chainodus eggingensis* Ziegler, 1990 (type locality). Soricidae: *Heterosorex neumayrianus neumayrianus* (Schlosser, 1887) (type locality).

Taxonomic descriptions – Schlosser (1887) was the first to describe and figure the Eggingen material. The soricids have been published in more detail by Doben-Florin (1964) and by Ziegler (1989), the dimylids by Müller (1967) and Ziegler (1990a).

Storage of material – BSP.

Oberer Eselsberg, Eselsberg and Fort Eselsberg (classical sites)

Location – The Eselsberg is the north-western part of the city of Ulm, Baden-Württemberg, South Germany. It is mainly made up of deposits of the Lower Freshwater Molasse. The fossils have been collected from the southern slope of the Eselsberg and during the construction works of a fort on the Eselsberg [N 48°25'00.375" E 9°57'33.496"].

Stratigraphy – Lower Freshwater Molasse, Aagenian, probably all MN 2.

Literature – Schlosser (1887), Werner (1994).

Insectivores – Talpidae: *Mygalea jaegeri* (Seemann, 1938), *Hugueney* aff. *primitiva* (Hutchison, 1974). Dimylidae: *Chainodus sulcatus* (Stephan-Hartl, 1972).

Taxonomic descriptions – Hutchison (1974) described *Proscapanus primitivus* among the old finds, published in Schlosser (1887). Van den Hoek Ostende (1989) referred the species to his new genus *Hugueney*. Ziegler (1990a, b) published all material.

Storage of material – BSP, SMNS.

MN 2

Budenheim

Location – Local fauna from the Calcareous Tertiary in the Mainz Basin [N 50°01'17.805" E 8°11'08.905"].

Stratigraphy – Hydrobien Beds, Aagenian.

Literature – Storch (1988).

Insectivores – Talpidae: *Paratalpa* sp., cf. *Talpa minuta* Blainville, 1838. Dimylidae: *Dimylus paradoxus* von Meyer, 1846, *Chainodus sulcatus* (Stephan-Hartl, 1972). Soricidae: *Heterosorex neumayrianus neumayrianus* (Schlosser, 1887), *Oligosorex antiquus* (Pomel, 1853).

Taxonomic descriptions – Storch (1988) published an annotated faunal list. *Dimylus paradoxus* was described and figured by Müller (1967). *Chainodus sulcatus* was published by Stephan-Hartl (1972) and Ziegler (1990a), the soricids by Doben-Florin (1964) and Ziegler (1989).

Storage of material – SMF.

Budenheim and/or Hessler

Location – Exact provenance unclear, either from Budenheim or from Hessler [see coordinates there]

Stratigraphy – Hydrobien Beds, Agenian.

Literature – Storch (1988).

Insectivores – Talpidae: *Mygalea magna* Ziegler, 1990 (type locality), *Paratalpa* sp., *Paratalpa* ? *brachychir* (von Meyer, 1846), *Hugueneya primitiva* (Hutchison, 1974), *Talpa minuta* Blainville, 1838, Talpidarum gen. et sp. indet. Dimylidae: *Dimylus paradoxus* von Meyer, 1846. Soricidae: *Carposorex* sp.

Taxonomic descriptions – An annotated faunal list was published by Storch (1988). The insectivores were described in detail by Ziegler (1989, 1990a, b).

Storage of material – SMF.

Haslach

Location – Railway trench c. 5 km north of Ulm, in prolongation of the Örlingen Valley, Baden-Württemberg, South Germany [N 48°25'50.314" E 10°00'12.568"].

Stratigraphy – Lower Freshwater Molasse, Middle Agenian.

Literature – Schlosser (1887), Werner (1994).

Insectivores – Talpidae: *Asthenoscapter* sp., *Paratalpa meyeri* (Schlosser, 1887), *Geotrypus montisasini* Ziegler, 1990. Dimylidae: *Dimylus paradoxus* von Meyer, 1846, *Cordylodon haslachensis* von Meyer, 1859 (type locality).

Taxonomic descriptions – Schlosser (1887) presented first description and figures. The talpids were described by Hutchison (1974) and Ziegler (1990b), the dimylids by Müller (1967) and Ziegler (1990a).

Storage of material – BSP, SMNS (Collection Gutekunst).

Hessler

Location – Today part of the city of Wiesbaden, Rhineland-Palatinate, Southwest Germany [N 50°2'47.799" E 8°6'01.959"].

Stratigraphy – Hydrobien Beds, Agenian.

Literature – Storch (1988).

Insectivores – Talpidae: *Hugueneya primitiva* (Hutchison, 1974). Dimylidae: ?*Chainodus* sp.

Taxonomic descriptions – An annotated faunal list was published by Storch (1988). The dimylid has tentatively been referred to *Chainodus* by Ziegler (1990a). Van den Hoek Ostende (1989) established the genus *Hugueneya* for *Proscapanus primitivus*.

Storage of material – SMF.

Ulm-Uniklinik

Location – On the top of the Eselsberg, c. 800 m east of Ulm-Westtangente in the north-western part of Ulm, Baden-Württemberg, South Germany [N 48°25'23.904" E 9°57'15.696"].

Stratigraphy – Lower Freshwater Molasse, Middle Aagenian.

Literature – Heizmann *et al.* (1989), Werner (1994).

Insectivores – Talpidae: *Mygalea jaegeri* (Seemann, 1938), *Hugueneya* aff. *primitiva* (Hutchison, 1974). Dimylidae: *Chainodus* sp.

Taxonomic descriptions – The scarce insectivore remains were described and figured by Ziegler (1989, 1990a, b).

Storage of material – SMNS.

Ulm-Westtangente

Location – Ring road on the western slope of the Eselsberg in the north-western part of the city of Ulm, Baden-Württemberg, South Germany [N 48°25'09.487" E 9°56'05.523"].

Stratigraphy – Lower Freshwater Molasse, Middle Aagenian.

Literature – Heizmann *et al.* (1989), Werner (1994).

Insectivores – Plesiosoricidae: *Plesiosorex* cf. *soricinoides* (Blainville, 1838). Talpidae: *Desmanella* sp., *Asthenoscapter* sp., *Mygalea jaegeri* (Seemann, 1838), *Myxomygale minor* Ziegler, 1990 (type locality), *Paratalpa meyeri* (Schlosser, 1887), *Geotrypus montisasini* Ziegler, 1990 (type locality), *Talpa tenuidentata* Ziegler, 1990 (type locality), ?*Hugueneya* aff. *primitiva* (Hutchison, 1974). Dimylidae: *Dimylus paradoxus* von Meyer, 1846, *Chainodus ulmensis* Ziegler, 1990 (type locality), *Dimyloides* cf. *vireti* (Hürzeler, 1944). Soricidae: *Oligosorex antiquus* (Pomel, 1853), *Oligosorex* sp., *Soricella* cf. *discrepans* Doben-Florin, 1964, *Heterosorex neumayrianus neumayrianus* (Schlosser, 1887).

Taxonomic descriptions – All insectivores have been published by Ziegler (1989, 1990a, b).

Storage of material – SMNS.

MN 3

Frankfurt-Nordbassin

Location – Urban area in the Northern part of Frankfurt/Main, Hesse, Southwest Germany [N 50°07'57.621" E 8°41'35.668"].

Stratigraphy – Early Orleanian.

Literature – Stephan-Hartl (1972).

Insectivores – Erinaceidae: *Galerix* sp. Talpidae: ?*Paratalpa meyeri* (Schlosser, 1887), ?*Talpa minuta* Blainville, 1838. Dimylidae: *Chainodus sulcatus* (Stephan-Hartl, 1972) (type locality), cf. *Plesiodimylus* sp. Soricidae: *Miosorex* cf. *pusilliformis* (Doben-Florin, 1964).

Taxonomic descriptions – The whole fauna was published in detail by Stephan-Hartl (1972). The names have been updated here to the current classification.

Storage of material – SMF.

Remarks – Tobien (1987) updated the stratigraphic correlation.

Stubersheim 3

Location – Karstic fissure filling in the Upper Jurassic („Massenkalk“ facies) of the Swabian Alb, at the western exit of the locality Stubersheim, c. 30 km north-west of Ulm, Baden-Württemberg, South Germany [N 48°35'48.766" E 9°54'48.070"].

Stratigraphy – Early Orleanian.

Literature – Heizmann (1983), Ziegler (1994) updated stratigraphic correlation.

Insectivores – Erinaceidae: *Galerix aurelianensis* Ziegler, 1990. Talpidae: *Desmanella* aff. *engesseri* Ziegler, 1985, *Myxomygale hutchisoni* (Ziegler, 1985), *Paratalpa meyeri* (Schlosser, 1887) vel *Desmanodon antiquus* Ziegler, 1985, *Geotrypus* sp. Dimylidae: *Chainodus intercedens* (Müller, 1967), Dimylidae gen. et. sp. indet. Soricidae: *Heterosorex neumayrianus neumayrianus* (Schlosser, 1887), *Carposorex* sp., *Miosorex pusilliformis* (Doben-Florin, 1964), *Soricella discrepans* Doben-Florin, 1964, Crocidosoricinae gen. et sp. indet., ?*Hemiosorex* sp.

Taxonomic descriptions – All insectivores were described and figured by Ziegler (1989, 1990a, b).

Storage of material – BSP and SMNS (small part).

Schnaitheim and/or Bissingen

Location – Both sites are karstic fissure fillings in the Upper Jurassic. The former quarry „Am Wütherich“ is situated 1.5 km north-north-west of Bissingen, Bavaria, South Germany. Another former quarry is situated west Schnaitheim near Heidenheim a. d. Brenz [Schnaitheim N 48°42'36.283" E 10°08'55.485"; Bissingen N 48°43'39.782" E 10°36'51.933"].

Stratigraphy – Early Orleanian.

Literature – Bissingen was discovered and first published by Schalk (1957), Schnaitheim by Dehm (1939).

Insectivores – Dimylidae: *Plesiodimylus huerzeleri* Müller, 1967, *Chainodus intercedens* (Müller, 1967).

Taxonomic descriptions – A preliminary faunal list from Schnaitheim was published by Dehm (1939). The dimylids were described in detail by Müller (1967).

Storage of material – BSP.

Wintershof-West

Location – Karstic fissure filling the Upper Jurassic of the Franconian Alb near Eichstätt, Bavaria, South Germany [N 48°54'34.023" E 11°09'50.109"].

Stratigraphy – Early Orleanian.

Literature – Discovered and first preliminary faunal list published by Dehm (1937).

Insectivores – Erinaceidae: *Galerix aurelianensis* Ziegler, 1990, ?*Galerix symeonidisi* Doukas, 1986. Talpidae: *Desmanella engesseri* Ziegler, 1985, *Myxomygale hutchisoni* (Ziegler, 1985), *Geotrypus* sp., *Talpa minuta* Blainville, 1838. Dimylidae: *Plesiodimylus huerzeleri* Müller, 1967 (type locality), *Chainodus intercedens* (Müller, 1967) (type locality). Soricidae: *Miosorex pusilliformis* (Doben-Florin, 1964) (type locality), *Soricella discrepans* Doben-Florin, 1964 (type locality), *Paenelimmoecus micromorphus* (Doben-Florin, 1964), *Florinia stehlini* (Doben-Florin, 1964) (type locality), *Heterosorex neumayrianus subsequens* (Doben-Florin, 1964) (type locality).

Taxonomic descriptions – The soricids were published in detail by Doben-Florin (1964), the dimylids by Müller (1967). Ziegler (1989, 1990a, 1994) updated the generic names of the soricids and dimylids and identified and described the remaining insectivores.

Storage of material – BSP.

Remarks – Wintershof-West is the reference locality for MN 3.

MN 4

Erkertshofen 1

Location – [Karstic fissure filling in the same quarry as Erkertshofen 1 to Erkertshofen 2] [N 48°58'50.913" E 11°12'29.611"].

Stratigraphy – Middle Orleanian.

Literature – Fahlbusch (1966), Ziegler & Fahlbusch (1986).

Insectivores – Erinaceidae: *Galerix aurelianensis* Ziegler, 1990, *Galerix symeonidisi* Doukas, 1986. Talpidae: *Proscapanus intercedens* Ziegler, 1985, *Myxomygale hutchisoni* (Ziegler, 1985), *Geotrypus* sp., Talpini gen. et sp. indet. Dimylidae: *Plesiodimylus* aff. *chantrei* Gaillard, 1897, *Chainodus intercedens* (Müller, 1967). Soricidae: *Heterosorex neumayrianus* aff. *subsequens* (Doben-Florin, 1964), *Dinosorex* aff. *zapfei* Engesser, 1975.

Taxonomic descriptions – The talpids have been published by Ziegler (1985), the erinaceids, dimylids and soricids by Ziegler & Fahlbush (1986) and Ziegler (1989, 1990a). The small soricids have not been published.

Storage of material – BSP.

Erkertshofen 2

Location – [Karstic fissure filling in the Upper Jurassic. Former quarry 1 km west of Erkertshofen, c. 10 km north of Eichstätt, Bavaria, South Germany to Erkertshofen 1] [N 48°58'46.681" E 11°12'26.235"].

Stratigraphy – Middle Orleanian.

Literature – Heissig (1978), Ziegler & Fahlbusch (1986).

Insectivores – Erinaceidae: *Galerix aurelianensis* Ziegler, 1990 (type locality), *Galerix symeonidisi* Doukas, 1986, *Ampechinus* sp. Talpidae: *Desmanella engesseri* Ziegler, 1985, *Myxomygale hutchisoni* (Ziegler, 1985), *Geotrypus* sp., *Talpa* sp., Talpini gen. et sp. indet. Dimylidae: *Plesiodimylus* aff. *chantrei* Gaillard, 1897, *Chainodus intercedens* (Müller, 1967). Soricidae: *Miosorex pusilliformis* (Doben-Florin, 1964), *Soricella discrepans* Doben-Florin, 1964, *Florinia stehlini* (Doben-Florin, 1964), *Lartetium petersbuchense* Ziegler, 1989, *Lartetium dehmi* (Viret & Zapfe, 1952), *Paenelimnoecus micromorphus* (Doben-Florin, 1964), *Heterosorex neumayrianus* aff. *subsequens* (Doben-Florin, 1964), *Dinosorex* aff. *zapfei* Engesser, 1975.

Taxonomic descriptions – The talpids have been published by Ziegler (1985), the erinaceids, dimylids and soricids by Ziegler & Fahlbush (1986) and Ziegler (1989, 1990a).

Storage of material – BSP.

Forsthart

Location – Former marl pit, 1 km west-north-west of the the church of Forsthart, 12 km west of Vilshofen, East Bavaria, South Germany [N 48°38'21.420" E 13°00'57.247"].

Stratigraphy – “Limnische Süßwasserschichten”, transitional between the “Onco-phora-Schichten” and the Upper Freshwater Molasse, Ottnangian/Karpatian.

Literature – Cicha et al. (1972), Ziegler & Fahlbusch (1986).

Insectivores – Erinaceidae: *Galerix symeonidisi* Doukas, 1986. Talpidae: *Desmanella engesseri* Ziegler, 1985, *Proscapanus intercedens* Ziegler, 1985-*sansaniensis* (Lartet, 1851), *Scaptonyx* cf. *edwardsi* Gaillard, 1899, *Desmanodon antiquus* Ziegler, 1985. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Lartetium dehmi* (Viret & Zapfe, 1952), *Miosorex* aff. *grivensis* (Depéret, 1892), *Paenelimnoecus* sp., *Dinosorex* aff. *zapfei* Engesser, 1975, *Heterosorex neumayrianus* aff. *subsequens* (Doben-Florin, 1964).

Taxonomic descriptions – The entire small mammal fauna was published by Ziegler & Fahlbusch (1986). Ziegler (1989) is relevant for taxonomic changes in soricids.

Storage of material – BSP.

Langenau 1

Location – Trench cut into the „Galgenberg“ for the Autobahn A 7, 1 km south-west of Langenau, Baden-Württemberg, South Germany [N 48°29'07.908" E 10°05'58.645"].

Stratigraphy – Ottnangian/Karpatian.

Literature – Heizmann (1992), Sach & Heizmann (2001).

Insectivores – Erinaceidae: *Galerix* cf. *symeonidisi* Doukas, 1986. Plesiosoricidae: *Plesiosorex germanicus* (Seemann, 1938). Talpidae: *Mygalea* cf. *antiqua* (Pomel, 1848), *Proscapanus* cf. *intercedens* Ziegler, 1985, *Scaptonyx* sp., Talpidae indet. Dimylidae: Dimylidae indet. Soricidae: *Lartetium dehmi* (Viret & Zapfe, 1952), Crocidosoricinae indet.

Taxonomic descriptions – The species were listed in Sach & Heizmann (2001).

Storage of material – SMNS.

Petersbuch 2

Location – Karstic fissure filling in the Upper Jurassic. Former quarry east of Petersbuch near Eichstätt, Bavaria, South Germany [N 48°58'39.008" E 11°11'53.403"].

Stratigraphy – Middle Orleanian.

Literature – Heissig (1978), Ziegler & Fahlbusch (1986).

Insectivores – Erinaceidae: *Galerix aurelianensis* Ziegler, 1990, *Galerix symeonidisi* Doukas, 1986, ?*Amphelichinus* sp. Talpidae: *Desmanella engesseri* Ziegler, 1985 (type locality), *Proscapanus intercedens* Ziegler, 1985 (type locality), *Hugueneya* cf. *primitiva* (Hutchison, 1974), *Myxomygale hutchisoni* (Ziegler, 1985) (type locality), *Geotrypus* sp., *Talpa minuta* Blainville, 1838, Talpini gen. et sp. indet. Dimylidae: *Plesiodimylus* aff. *chantrei* Gaillard, 1897, *Chainodus intercedens* (Müller, 1967). Soricidae: *Miosorex pusilliformis* (Doben-Florin, 1964), *Miosorex* cf. *desnoyersianus* (Lartet, 1851), *Soricella discrepans*

Doben-Florin, 1964, *Soricella* sp., *Florinia stehlini* (Doben-Florin, 1964), *Lartetium petersbuchense* Ziegler, 1989 (type locality), *Paenelimnoecus micromorphus* (Doben-Florin, 1964), *Dinosorex* aff. *zapfei* Engesser, 1975, *Heterosorex neumayrianus* aff. *subsequens* (Doben-Florin, 1964).

Taxonomic descriptions – The talpids were published by Ziegler (1985), the erinaceids, dimylids and soricids by Ziegler & Fahlbusch (1986) and Ziegler (1989, 1990a).

Storage of material – BSP and SMNS (small part).

Rauscheröd

Location – Former gravel pit, 2.5 km east-north-east of Ortenburg, 10 km south-south-east of Vilshofen, East Bavaria, South Germany [N 48°33'29.143" E 13°15'34.780"].

Stratigraphy – “Limnische Süßwasserschichten”, transitional between the “Onco-phora-Schichten” and the Upper Freshwater Molasse, Ottnangian/Karpatian.

Literature – Ziegler & Fahlbusch (1986).

Insectivores – Erinaceidae: *Galerix symeonidisi* Doukas, 1986. Talpidae: *Desmanella engesseri* Ziegler, 1985, *Proscapanus intercedens* Ziegler, 1985-*sansaniensis* (Lartet, 1851), *Scaptonyx* cf. *edwardsi* Gaillard, 1899, *Desmanodon antiquus* Ziegler, 1985. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Lartetium dehmi* (Viret & Zapfe, 1952), *Florinia stehlini* (Doben-Florin, 1964).

Taxonomic descriptions – The talpids were published by Ziegler (1985), the entire small mammal fauna by Ziegler & Fahlbusch (1986). Ziegler (1989) is relevant for taxonomic changes in soricids.

Storage of material – BSP.

Rembach

Location – Former marl pit 350 m south-east of Rembach, 20 km east of Vilshofen, East Bavaria, South Germany [N 48°36'13.116" E 12°54'39.721"].

Stratigraphy – “Limnische Süßwasserschichten”, transitional between the “Onco-phora-Schichten” and the Upper Freshwater Molasse, Ottnangian/Karpatian, Middle Orleanian.

Literature – Cicha et al. (1972), Ziegler & Fahlbusch (1986).

Insectivores – Erinaceidae: *Galerix* aff. *symeonidisi* Doukas, 1986. Talpidae: *Desmanella engesseri* Ziegler, 1985, *Proscapanus intercedens* Ziegler, 1985-*sansaniensis* (Lartet, 1851), *Scaptonyx* cf. *edwardsi* Gaillard 1899, *Desmanodon antiquus* Ziegler, 1985 (type locality).

Dimylidae: *Chainodus intercedens* (Müller, 1967). Soricidae: *Lartetium dehmi* (Viret & Zapfe, 1952), *Miosorex grivensis* (Depéret, 1892), *Heterosorex neumayrianus* aff. *subsequens* (Doben-Florin, 1964).

Taxonomic descriptions – The talpids were published by Ziegler (1985), the entire small mammal fauna by Ziegler & Fahlbusch (1986). Ziegler (1989, 1990a) is relevant for taxonomic changes in dimylids and soricids.

Storage of material – BSP.

MN 5

Edelbeuren-Maurerkopf

Location – Sandpit c. 750 m east of Edelbeuren, c. 20 km east of Biberach a. d. Riss, Baden-Württemberg, South-Germany [N 48°05'44.229" E 10°01'56.166"].

Stratigraphy – Upper Freshwater Molasse, Karpatian.

Literature – Sach (1999) published the geological setting and mammal faunas of several sites of the area.

Insectivores – Erinaceidae: *Galerix* aff. *symeonidisi* Doukas, 1986, *Atelerix* sp. vel *Amphexinus* sp. Talpidae: Talpidae indet. Dimylidae: *Plesiodimylus* sp. Soricidae: *Miosorex* sp., Soricidae indet.

Taxonomic descriptions – The entire mammal fauna was published by Sach (1999). Here *Miochinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – SMNS.

Engelswies

Location – Former quarry where freshwater tufas have been mined in the Talsberg south-west of Engelswies; c. 10 km south-west of Sigmaringen, c. 80 km south-west of Ulm, Baden-Württemberg, South Germany [N 9°07'31.436" E 9°07'31.436"].

Stratigraphy – Karpatian.

Literature – First detailed stratigraphic correlation was given by Schweigert (1992), who published the fossil flora. There are also earlier references listed.

Insectivores – Erinaceidae: *Galerix* aff. *exilis* (Blainville, 1839). Dimylidae: *Plesiodimylus huerzeleri* Müller, 1967 seu *chantrei* Gaillard, 1897.

Taxonomic descriptions – The entire micromammal fauna was published by Ziegler (1995).

Storage of material – SMNS.

Hambach 6c

Location – Open lignite mine ('Tagebau Hambach'), some 35 km W of Cologne between the towns of Jülich and Elsdorf, Land Nordrhein-Westfalen.

Stratigraphy – Langhian or Reinbekian.

Literature – Zagwijn & Hager (1987), Mörs *et al.* (2000), Ziegler & Mörs (2000), Mörs (2002).

Insectivores – Erinaceidae: *Lantanotherium* aff. *sansaniense* (Lartet, 1851), *Atelerix depereti* Mein & Ginsburg, 2002. Plesiosoricidae: *Plesiosorex germanicus* (Seemann, 1938). Talpidae: *Proscapanus sansaniensis* (Lartet, 1851), Talpini gen. et sp. indet., *Mygalea* cf. *antiqua* (Pomel, 1848), Desmaninae gen. et sp. indet., Talpidae gen. et sp. indet. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897, *Chainodus* aff. *intercedens* (Müller, 1967). Soricidae: "*Allosorex*" *gracilidens* (Viret & Zapfe, 1951), *Dinosorex* aff. *zapfei* Engesser, 1975, *Heterosorex* sp, Soricidae gen. et sp. indet.

Taxonomic descriptions – Ziegler & Mörs (2000) gave detailed descriptions of the insectivores together with those of marsupials and bats. Mein & Ginsburg replaced the problematic nomen *Mioechinus sansaniensis* (Lartet, 1851) by *Atelerix depereti*.

Storage of material – IPB.

Maßendorf

Location – Former gravel pit, located c. 20 km east of Landshut, Bavaria, South Germany [N 48°35'53.589" E 12°27'42.119"].

Stratigraphy – Upper Freshwater Molasse, Karpatian.

Literature – Schötz (1983).

Insectivores – Erinaceidae: *Galerix* sp., *Lantanotherium* aff. *sansaniense* (Lartet, 1851), Erinaceinae gen. et sp. indet. Plesiosoricidae: *Plesiosorex germanicus* (Seemann, 1938). Talpidae: Desmaninae indet. Dimylidae: *Plesiodimylus bavaricus* Schötz, 1985 (type locality), *Chainodus* aff. *intercedens* (Müller, 1967). Soricidae: *Dinosorex* cf. *sansaniensis* (Lartet, 1851), *Miosorex grivensis* (Depéret, 1892), Soricidae indet.

Taxonomic descriptions – Detailed descriptions for the dimylids were given in Schötz (1985), for the erinaceids in Schötz (1988), and for *Plesiosorex* in Schötz (1989).

Storage of material – BSP.

Niederaichbach

Location – Former gravel pit c. 15 km north-east of Landshut, Bavaria, South Germany [N 48°36'36.598" E 12°20'08.431"].

Stratigraphy – Upper Freshwater Molasse, Karpatian.

Literature – Fahlbusch (1964), Schötz (1988).

Insectivores – Erinaceidae: *Galerix* aff. *symeonidisi* Doukas, 1986, Erinaceinae gen. et sp. indet.

Taxonomic descriptions – Only the erinaceids have been published in detail by Schötz (1988). There is no published complete insectivore list.

Storage of material – BSP.

Puttenham

Location – Former clay pit 3.5 km south of Mainburg, Bavaria, South Germany [N 48°36'44.679" E 11°46'25.556"].

Stratigraphy – Upper Freshwater Molasse, Karpatian.

Literature – Fahlbusch & Wu (1981).

Insectivores – Erinaceidae: *Galerix* aff. *exilis* (Blainville, 1838), *Lantanotherium* sp., *Amphychinus* sp. Talpidae: *Proscapanus sansaniensis* (Lartet, 1851), *Scaptonyx* cf. *edwardsi* Gaillard, 1899, *Desmanodon antiquus* Ziegler, 1985. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Dinosorex* aff. *zapfei* Engesser, 1975, *Lartetium dehmi* (Viret & Zapfe, 1952), *Paenelimnoecus* sp.

Taxonomic descriptions – Descriptions of the Talpidae were given in Ziegler (1985), those of *Galerix* and soricids in Ziegler & Fahlbusch (1986).

Storage of material – BSP.

Randecker Maar

Location – Funnel-shaped depression of volcanic origin, 1 km in diameter; one of the largest funnels of the Urach-Kirchheim volcanic area. The fossils come from the deposits of a Miocene lake, c. 60 km south-east of Stuttgart, Baden-Württemberg, South Germany [N 48°34'32.708" E 9°30'39.476"].

Stratigraphy – Karpatian.

Literature – Schweigert (1998) published a comprehensive contribution on the Randecker Maar. Therein earlier references are listed.

Insectivores – Erinaceidae: *Galerix* sp., Erinaceinae indet. Talpidae: *Mygalea antiqua* (Pomel, 1848). Soricidae: *Dinosorex* sp.

Taxonomic descriptions – The insectivores were listed in a faunal list by Heizmann (1983).

Storage of material – SMNS.

Sandelzhausen

Location – Today part of the town of Mainburg, c. 70 km north of Munich, Bavaria, South Germany [N 48°37'39.921" E 11°48'15.693"].

Stratigraphy – Upper Freshwater Molasse, Karpatian.

Literature – A large number of publications appeared on the geology, invertebrates, and vertebrates of the site. Most of the references are listed in Fahlbusch & Liebreich (1996) and Fahlbusch (2003).

Insectivores – Erinaceidae: *Galerix* aff. *exilis* (Blainville, 1839), *Galerix aurelianensis* Ziegler, 1990-*stehlini* (Gaillard, 1929), *Lantanothereium* aff. *sansaniense* (Lartet, 1851), *Atelerix* sp. Talpidae: *Talpa minuta* Blainville, 1838, *Proscapanus sansaniensis* (Lartet, 1851), *Proscapanus* sp., *Myxomygale hutchisoni* (Ziegler, 1985), ?*Urotrichus* cf. *dolichochir* (Gaillard, 1899), *Mygalea jaegeri* (Seemann, 1838), Talpidae gen. et sp. indet. Dimylidae: *Metacordylodon* aff. *schlosseri* (Andreae, 1904), *Plesiodimylus* sp. Soricidae: *Dinosorex* aff. *zapfei* Engesser, 1975, *Florinia* aff. *stehlini* (Doben-Florin, 1964), *Miosorex* sp. 1, *Miosorex* sp. 2.

Taxonomic descriptions – The insectivore fauna was published by Ziegler (2000). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – BSP.

Schellenfeld 2

Location – Area of freshwater tufas, c. 200 long and at maximum 110 m wide; 10 km north-east of Sigmaringen, c. 60 km south west of Ulm, Baden-Württemberg, South Germany. Three fossil-bearing units are distinguished: Schellenfeld 2, 3 and 4 [N 48°07'43.751" E 9°17'51.339"].

Stratigraphy – Karpatian.

Literature – Golwer (1978) published a geological map of the area and details of the geological setting.

Insectivores – Erinaceidae: *Galerix* aff. *exilis* (Blainville, 1838). Soricidae: *Florinia stehlini* (Doben-Florin, 1964).

Taxonomic descriptions – The micromammal fauna was published by Ziegler (1995).

Storage of material – SMNS.

Schellenfeld 3

Location – Area of freshwater tufas, c. 200 long and at maximum 110 m wide; 10 km north-east of Sigmaringen, c. 60 km south west of Ulm, Baden-Württemberg, South Germany. Three fossil-bearing units are distinguished: Schellenfeld 2, 3 and 4 [N 48°07'43.751" E 9°17'51.339"].

Stratigraphy – Karpatian.

Literature – Golwer (1978) published a geological map of the area and details of the geological setting.

Insectivores – Erinaceidae: *Galerix* sp. Dimylidae: *Plesiodimylus huerzeleri* Müller, 1967 seu *chantrei* Gaillard, 1897. Soricidae: *Florinia stehlini* (Doben-Florin, 1964).

Taxonomic descriptions – Ziegler (1995) published the entire micromammal fauna.

Storage of material – SMNS.

Schellenfeld 4

Location – Area of freshwater tufas, c. 200 long and at maximum 110 m wide; 10 km north-east of Sigmaringen, c. 60 km south west of Ulm, Baden-Württemberg, South Germany. Three fossil-bearing units are distinguished: Schellenfeld 2, 3 and 4 [N 48°07'43.751" E 9°17'51.339"].

Stratigraphy – Karpatian.

Literature – Golwer (1978) published a geological map of the area and details of the geological setting.

Insectivores – Erinaceidae: *Galerix symeonidisi* Doukas, 1986.

Taxonomic descriptions – The entire micromammal fauna was published by Ziegler (1995).

Storage of material – SMNS.

MN 5/6

Viehhausen

Location – Former brown coal pit Ludwigszeche in Viehhausen, c. 10 km south-west of Regensburg, Bavaria, South Germany [N 48°58'48.000" E 11°57'36.000"].

Stratigraphy – Early Astaracian.

Literature – Seemann (1938).

Insectivores – Erinaceidae: *Galerix exilis* (Blainville, 1839), *Lantanothereum sansaniense* (Lartet, 1851). Plesiosoricidae: *Plesiosorex germanicus* (Seemann, 1938) (type locality). Talpidae: *Mygalea jaegeri* (Seemann, 1938) (type locality), *Proscapanus sansaniensis* (Lartet, 1851), *Desmanella* sp. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Dinosorex* sp.

Taxonomic descriptions – The small mammal fauna was published by Seemann (1938). The taxonomy has been updated by Viret (1940, *Plesiosorex*), Hutchison (1974, *Mygalea*), and the first author (identification of *Dinosorex* and *Desmanella*).

Storage of material – IPW.

Wannenwaldtobel 2

Location – Outcrop at the western slope of the Umlach rivulet, c. 2 km south-west of Fischbach, c. 10 km. south of Biberach a. d. Riss, Baden-Württemberg, South Germany. The bed that yielded the vertebrate remains is called Wannenwaldtobel 2 [N 48°01'54.257" E 9°50'05.250"].

Stratigraphy – Upper Freshwater Molasse, Karpatian.

Literature – Sach (1999) published the geological setting and the mammal faunas of several sites of the area.

Insectivores – Erinaceidae: *Galerix* aff. *exilis* (Blainville, 1838), *Atelerix* sp. vel *Amphelichinus* sp. Talpidae: *Proscapanus* cf. *sansaniensis* (Lartet, 1851), Talpidae indet. Soricidae: Soricidae indet.

Taxonomic descriptions – The entire mammal fauna was published by Sach (1999). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – SMNS.

MN 6

Gallenbach 2b

Location – Sandpit, c. 15 km east of Augsburg, Bavaria, South Germany [N 48°24'09.172" E 11°04'43.628"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Early Astaracian.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp., *Lantanotherium sansaniense* (Lartet, 1851).
Talpidae: *Proscapanus sansaniensis* (Lartet, 1851), Talpinae indet. Soricidae: cf. *Lartetium dehmi* (Viret & Zapfe, 1952), *Dinosorex* cf. *sansaniensis* (Lartet, 1851).

Taxonomic descriptions – Heissig (1989) gave a faunal list. *Sorex dehmi* was referred to *Lartetium* by Ziegler (1989).

Storage of material – BSP.

Gallenbach 2c

Location – Sandpit, c. 15 km east of Augsburg, Bavaria, South Germany [N 48°24'09.172" E 11°04'43.628"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Early Astaracian.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp. Talpidae: Talpidae indet. Dimylidae: *Plesiodimylus* cf. *chantrei* Gaillard, 1897. Soricidae: *Dinosorex sansaniensis* (Lartet, 1851).

Taxonomic descriptions – A faunal list was given by Heissig (1989).

Storage of material – BSP.

Gisseltshausen 1a

Location – Gravel pit, c. 1 km north of the church, about 75 km north-east of Munich [N 48°11'48.939" E 12°01'46.549"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Middle Miocene.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp., *Lantanotherium sansaniense* (Lartet, 1851). Talpidae: *Proscapanus sansaniensis* (Lartet, 1851), Talpini indet. Dimylidae: *Plesiodimylus* sp. Soricidae: *Dinosorex sansaniensis* (Lartet, 1851), Soricinae indet.

Taxonomic descriptions – Heissig (1989) gave a faunal list.

Storage of material – BSP.

Gisseltshausen 1b

Location – Gravel pit, c. 1 km north of the church, about 75 km north-east of Munich [N 48°11'48.938" E 12°01'48.971"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Early Astaracian.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp., *Lantanotherium sansaniense* (Lartet, 1851). Talpidae: *Proscaparus sansaniensis* (Lartet, 1851), Talpini indet. Soricidae: *Dinosorex sansaniensis* (Lartet, 1851).

Taxonomic descriptions – A faunal list was given in Heissig (1989).

Storage of material – BSP.

Goldberg

Location – Freshwater tufas in the western part of the Nördlinger Ries, Bavaria, South Germany [N 48°54'24.550" E 10°21'46.021"].

Stratigraphy – Early Astaracian.

Literature – Bolten (1977).

Insectivores – Erinaceidae: *Galerix exilis* (Blainville, 1839).

Taxonomic descriptions – *Galerix exilis* has been described in detail, including the post-cranial skeleton, by Ziegler (1983).

Storage of material – BSP (mainly), SMNS (small share).

Remarks – The glirids (Mayr, 1979), the erinaceids (Ziegler, 1983) and the bats (Rachl, 1983) from the Goldberg have been published in detail.

Laimering 2

Location – Clay pit, c. 1 km north-west of Laimering, about 15 km east of Augsburg [N 48°23'43.734" E 11°05'42.433"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Early Astaracian.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp., *Lantanotherium sansaniense* (Lartet, 1851). Talpidae: *Proscaparus sansaniensis* (Lartet, 1851).

Taxonomic descriptions – Heissig (1989) gave a faunal list.

Storage of material – BSP.

Steinberg

Location – Freshwater tufa in the south-eastern part of the Nördlinger Ries, Bavaria, South Germany [N 48°49'36.944" E 10°37'22.305"].

Stratigraphy – Early Astaracian.

Literature – Heizmann & Fahlbusch (1983).

Insectivores – Erinaceidae: *Galerix exilis* (Blainville, 1839), Erinaceinae gen. et sp. indet. Talpidae: *Proscapanus sansaniensis* (Lartet, 1851). Soricidae: *Lartetium dehmi* (Viret & Zapfe, 1952), Soricidae gen. et sp. indet.

Taxonomic descriptions – *Galerix exilis* has been described in detail, including the postcranial skeleton, by Ziegler (1983), *Proscapanus sansaniensis* by Ziegler (1985).

Storage of material – BSP (mainly), SMNS (small share).

Remarks – The glirids (Mayr, 1979), erinaceids and talpids (Ziegler, 1983, 1985) and bats (Rachl, 1983) from the Steinberg have been published in detail.

Unterneul 1a

Location – C. 15 km east of Ausgburg, Bavaria, South Germany [N 48°24'22.102" E 11°04'40.963"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Early Astaracian.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp. Talpidae: *Proscapanus sansaniensis* (Lartet, 1851).

Taxonomic descriptions – Heissig (1989) gave a faunal list.

Storage of material – BSP.

Unterzolling 1a

Location – Gravel pit, c. 1 km north of the locality, about 40 km north-east of Munich [N 48°27'37.487" E 11°46'19.715"].

Stratigraphy – Upper Freshwater Molasse, Middle Series, Early Astaracian.

Literature – Heissig (1989, 1997).

Insectivores – Erinaceidae: *Galerix* sp. Talpidae: *Proscapanus sansaniensis* (Lartet, 1851). Soricidae: cf. *Miosorex* sp.

Taxonomic descriptions – A faunal list was given in Heissig (1989).

Storage of material – BSP.

MN 7/8**Öhningen**

Location – Former quarry at the western slope of the Schiener Berg, c. 2 km north of Weil am Rhein near the western bank of Lake Constance [N 47°40'18.323" E 8°52'42.515"].

Stratigraphy – Middle/Late Astaracian.

Literature – Rutte (1956). Stehlin (1914) lists six Miocene mammal species, *Erinaceus oeningensis* being the only insectivore.

Insectivores – Erinaceidae: *Atelerix oeningensis* (Lydekker, 1886) (type locality).

Taxonomic descriptions – Butler (1948) established the genus *Mioechinus* for the Öhningen specimen. Mein & Ginsburg (2002) synonymised *Mioechinus* with *Atelerix*.

Storage of material – NHML (including the type of *Erinaceus oeningensis*), TM, SMNK.

Petersbuch 6

Location – Upper Jurassic quarry, c. 10 km north of Eichstätt, Bavaria, South Germany [N 48°59'278" E 11°11'940"].

Stratigraphy – Middle/Late Astaracian.

Literature – Bolliger & Rummel (1994), Rummel (2000).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865, *Atelerix* sp., Erinaceinae indet. Talpidae: *Mygalea antiqua* (Pomel, 1848), *Leptoscaptor bavaricum* Ziegler, 2003 seu *robustior* Ziegler, 2003, *Talpa minuta* Blainville, 1838, ?*Urotrichus dolichochir* (Gaillard, 1899), *Desmanella stehlini* Engesser, 1972. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Paenelimnoecus crouzei* Baudelot 1972, *Petenyia* aff. *dubia* Bachmayer & Wilson, 1970, *Paenesorex bicuspis* Ziegler, 2003 (type locality), *Dinosorex* aff. *pachygnathus* Engesser, 1972.

Taxonomic descriptions – Descriptions of the insectivore fauna were given by Ziegler (2003a, 2003b, 2005). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – The illustrated specimens are stored in NMA, the remainder in CRW.

Petersbuch 10

Location – Upper Jurassic quarry, c. 10 km north of Eichstätt, Bavaria, South Germany [N 48°59'284"E 11°11'937"].

Stratigraphy – Middle/Late Astaracian.

Literature – Bolliger & Rummel (1994), Rummel (2000).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865, *Atelerix* sp., Erinaceinae indet. Talpidae: *Leptoscaptor bavaricum* Ziegler, 2003 (type locality), *Proscapanus sansaniensis* (Lartet, 1851), *Talpa minuta* Blainville, 1838, *Myxomygale gracilis* Ziegler, 2003 (type locality), Urotrichini gen. et sp. indet. I. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Paenelimnoecus crouzeli* Baudelot, 1972, *Miosorex grivensis* (Depéret, 1892), *Petenya* aff. *dubia* Bachmayer & Wilson, 1970, *Paenesorex bicuspis* Ziegler, 2003, *Dinosorex* aff. *pachygnathus* Engesser, 1972.

Taxonomic descriptions – Descriptions of the insectivore fauna are given by Ziegler (2003a, 2003b, 2005). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – The illustrated specimens are stored in NMA, the remainder in CRW.

Petersbuch 18

Location – Upper Jurassic quarry, c. 10 km north of Eichstätt, Bavaria, South Germany [N 48°59'277" E 11°11'943"].

Stratigraphy – Middle/Late Astaracian.

Literature – Bolliger & Rummel (1994), Rummel (2000).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865, *Atelerix* sp., Erinaceinae indet. Talpidae: *Leptoscaptor bavaricum* Ziegler, 2003 seu *robustior* Ziegler, 2003, *Talpa minuta* Blainville, 1838, *Desmanella stehlini* Engesser, 1972. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Paenelimnoecus crouzeli* Baudelot, 1972, *Petenya* aff. *dubia* Bachmayer & Wilson, 1970, *Paenesorex bicuspis* Ziegler, 2003, *Paenesorex* aff. *bicuspis* Ziegler, 2003.

Taxonomic descriptions – Descriptions of the insectivore fauna are given by Ziegler (2003a, 2003b, 2005). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – The illustrated specimens are stored in NMA, the remainder in CRW.

Petersbuch 31

Location – Upper Jurassic quarry, c. 10 km north of Eichstätt, Bavaria, South Germany [N 48°59'431" E 11°12'049"].

Stratigraphy – Middle/Late Astaracian.

Literature – Bolliger & Rummel (1994), Rummel (2000).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865, *Atelerix* sp., Erinaceinae indet. Talpidae: *Proscapanus sansaniensis* (Lartet, 1851), *Proscapanus* sp., Scalopini gen. et sp. indet., *Talpa minuta* Blainville, 1838, *Tenuibrachiatum storchi* Ziegler, 2003 (type locality), *Desmanella stehlini* Engesser, 1972, Urotrichini gen. et sp. indet. II. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Paenelimnoecus crouzei* Baudelot, 1972, *Miosorex grivensis* (Depéret, 1892), *Alloblarinella* aff. *europaea* (Reumer, 1984), *Deinsdorfia* cf. *kordosi* Reumer, 1984, *Dinosorex* aff. *pachygnathus* Engesser, 1972.

Taxonomic descriptions – Descriptions of the insectivore fauna were given by Ziegler (2003a, 2003b, 2005). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – The illustrated specimens are stored in NMA, the remainder in CRW.

Petersbuch 35

Location – Upper Jurassic quarry, c. 10 km north of Eichstätt, Bavaria, South Germany [N 48°59'380" E 11°12'027"].

Stratigraphy – Middle/Late Astaracian.

Literature – Bolliger & Rummel (1994), Rummel (2000).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865, *Atelerix* sp., Erinaceinae indet. Talpidae: *Leptosaptor robustior* Ziegler, 2003 (type locality), *Proscapanus sansaniensis* (Lartet, 1851). Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Paenesorex bicuspis* Ziegler, 2003, *Dinosorex* aff. *pachygnathus* Engesser, 1972.

Taxonomic descriptions – Ziegler (2003a, b, 2005) gave descriptions of the insectivore fauna. Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – The illustrated specimens are stored in NMA, the remainder in CRW.

Petersbuch 48

Location – Upper Jurassic quarry, ca. 10 km north of Eichstätt, Bavaria, South Germany [N 48°59'385" E 11°12'021"].

Stratigraphy – Middle/Late Astaracian.

Literature – Bolliger & Rummel (1994), Rummel (2000).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865, *Atelerix* sp., Erinaceinae indet. Talpidae: *Leptosaptor robustior* Ziegler, 2003, *Proscapanus sansaniensis* (Lartet, 1851), *Talpa minuta* Blainville, 1838. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Paenesorex bicuspis* Ziegler, 2003, *Dinosorex* aff. *pachygnathus* Engesser, 1972.

Taxonomic descriptions – Descriptions of the insectivore fauna were given by Ziegler (2003a, b; 2004). Here *Mioechinus* sp. is changed into *Atelerix* sp. following the suggestion of Mein & Ginsburg (2002).

Storage of material – The illustrated specimens are stored in NMA, the remainder in CRW.

Steinheim am Albuch

Location – Sandpit at the south-western slope of the central hill of the Steinheim impact crater, c. 30 km north of Ulm, Baden-Württemberg, South Germany [N 48°41'11.197" E 10°03'43.995"].

Stratigraphy – Middle/Late Astaracian.

Literature – Heizmann & Hesse (1985).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865 (type locality), "*Amphelichinus intermedius*" (Gaillard, 1899). Plesiosoricidae: *Plesiosorex* sp. Talpidae: ?*Proscapanus sansaniensis* (Lartet, 1851), Talpidae indet. Soricidae: *Dinosorex sansaniensis* (Lartet, 1851), Heterosoricinae indet., Soricidae indet.

Taxonomic descriptions – Ziegler (1983) designated a lectotype for *Galerix socialis*. Van den Hoek Ostende (2001b) revalidated the genus *Parasorex*, which is accepted here.

Storage of material – SMNS.

MN 9

Aumeister and Grosslappen

Location – Bavaria, Munich, left Isar riverbank.

Stratigraphy – Flinz, Upper Freshwater Molasse, Vallesian.

Literature – Stromer (1928, 1940), Ziegler (1999).

Insectivores – Erinaceidae: *Parasorex socialis* von Meyer, 1865. Plesiosoricidae: *Plesiosorex germanicus* (Seemann, 1938). Talpidae: *Proscapanus sansaniensis* (Lartet, 1851), "*Scaptonyx*" *edwardsi* Gaillard, 1899, *Talpa minuta* Blainville, 1838. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Dinosorex zapfei* Engesser, 1975.

Taxonomic descriptions – Stromer (1928, 1940) described the vertebrate faunas, including the insectivores. Engesser & Ziegler (1996) and Ziegler (1999) listed the species according to the current taxonomic status. „*Scaptonyx*“ *edwardsi* appears to represent a waste basket for taxa with dentitions roughly similar to La Grive specimens (Ziegler 1999). Van den Hoek Ostende (2001b) re-assigned the species *socialis* to *Parasorex* von Meyer, 1865.

Storage of material – BSP.

Hammerschmiede

Location – Bavaria, 6 km N of Kaufbeuren, brick earth pit Hammerschmiede.

Stratigraphy – Upper Freshwater Molasse, Vallesian.

Literature – Mayr & Fahlbusch (1975).

Insectivores – Plesiosoricidae: *Plesiosorex schaffneri* Engesser, 1972. Talpidae: „*Desmanella*“ *quinquecuspidata* Mayr & Fahlbusch, 1975. Soricidae: *Crusafontina exculpta* (Mayr & Fahlbusch, 1975).

Taxonomic descriptions – Mayr & Fahlbusch (1975) described the insectivores, carnivores, and rodents. Franzen *et al.* (2003) referred the *Plesiosorex* specimens without reservation to the species *schaffneri* (originally *P. aff. schaffneri*), Rzebik-Kowalska (1998) and Franzen & Storch (1999) transferred *exculpta* to *Crusafontina* (originally *Angustidens exculptus*), and various authors removed *quinquecuspidata* from *Desmanella* and assigned it to the Desmaninae (see discussion in Dahlmann, 2001).

Storage of material – BSP.

MN 9/10

Eppelsheim

Location – Rheinland-Pfalz, Rheinhessen, Kreis Alzey-Worms.

Stratigraphy – Dinotheriensande („sands with *Deinotherium*“), Vallesian.

Literature – Franzen (2000), Franzen *et al.* (2003).

Insectivores – Plesiosoricidae: *Plesiosorex roosi* Franzen, Fejfar & Storch, 2003 (type locality). Talpidae: *Talpa vallesensis* Villalta & Crusafont, 1944. *Talpa* sp. Soricidae: *Crusafontina kormosi* (Bachmayer & Wilson, 1970).

Taxonomic descriptions – Franzen *et al.* (2003) described the above insectivores from a new fossil site, excavated since 1996 by the Forschungsinstitut Senckenberg and the Naturhistorisches Museum Mainz/Landessammlung für Naturkunde Rheinland-Pfalz. Previous collecting (since 1817) at the classic Eppelsheim localities had not produced any insectivore remains.

Storage of material – MNHM.

MN 11

Dorn-Dürkheim 1

Location – Rheinland-Pfalz, Rheinhessen, Kreis Mainz-Bingen.

Stratigraphy – Dorn-Dürkheim-Schichten (Dorn-Dürkheim beds), Turolian.

Literature – Franzen & Storch (1975), Storch (1978), Franzen (1997).

Insectivores – Erinaceidae: *Lantanothereum sanmigueli* Villalta & Crusafont, 1944, *Schizogalerix* sp. Talpidae: *Desmanella rietscheli* Storch & Dahlmann, 2000 (type locality). *Talpa gilothei* Storch, 1978 (type locality), *Talpa vallesensis* Villalta & Crusafont, 1944. *Archaeodesmana vinea* (Storch, 1978) (type locality), *Storchia* sp. Dimylidae: *Plesiodimylus chantrei* Gaillard, 1897. Soricidae: *Dinosorex* sp., *Asoriculus* sp., *Crusafontina kormosi* (Bachmayer & Wilson, 1970), *Paenelimoecus repenningi* (Bachmayer & Wilson, 1970), *Petenya dubia* Bachmayer & Wilson, 1970.

Taxonomic descriptions – Storch (1978) described the insectivores. Engesser (1980) referred *Galerix* sp. to *Schizogalerix*. Storch & Qiu (1991) referred *kormosi* (originally „*Anourosorex*“ *kormosi*) to the genus *Crusafontina* Gibert, 1975. Storch & Dahlmann (2000) described *Desmanella rietscheli*, and Dahlmann (2001) added *Storchia* to the Dorn-Dürkheim fauna. *Paenelimoecus*, *Petenya*, and *Asoriculus* are listed herein for the first time.

Storage of material – SMF, MNHM.

MN 15

Gundersheim-Findling

Location – Rheinland-Pfalz, Rheinhessen, Landkreis Alzey-Worms, c. 1800 m SW of Gundersheim.

Stratigraphy – Isolated block of calcified red loam from fissure fill (Rosengarten quarry), Ruscian.

Literature – Heller (1936), Tobien, (1980a, b), Fejfar & Storch (1990), Dahlmann & Storch (1996), Dahlmann (2001).

Insectivores – Erinaceidae: *Erinaceus* sp. Talpidae: *Archaeodesmana acies* Dahlmann, 2001, *Talpa minor* Freudenberg, 1914, *Talpa* sp. Soricidae: *Alloblarinella europaea* (Reumer, 1984), *Asoriculus gibberodon* (Petényi, 1864), *Blarinoides mariae* Sulimski, 1959, *Beremendia fissidens* (Petényi, 1864), *Beremendia minor* Rzebik-Kowalska, 1976, *Deinsdorfia fallax* (Heller, 1936), *Paenelimoecus pannonicus* (Kormos, 1934), *Petenya hungarica* Kormos, 1934, *Sorex minutus* Linnaeus, 1766, *Sulimskia kretzoi* (Sulimski, 1959), „*Zelceina soriculoides* (Sulimski, 1959)“.

Taxonomic descriptions – Dahlmann & Storch (1996) gave descriptions of the insectivores. *Sorex fallax* Heller 1936 was included in *Deinsdorfia* by Dahlmann & Storch (1996). *Archaeodesmana* sp. in Dahlmann & Storch (1996) was included in *Archaeodesmana acies* by Dahlmann (2001). The description of the type material of *Zelceina soriculoides* from Węzè 1 (Sulimski 1959, 1962) appears to differ from the description of material from Csarnóta 2, also designated as *Zelceina soriculoides* by Reumer (1984). The specimens from Gundersheim-Findling correspond with the material from Csarnóta 2 and therefore probably do not represent *Zelceina soriculoides*.

Storage of material – SMF.

Wölfersheim

Location – Hessen, Wetteraukreis, 30 km NNE of Frankfurt am Main [N 50°24'30" E 8°51'25"].

Stratigraphy – “Bone layer” at floor of former lignite mine Römerstrasse, Ruscinian.

Literature – Tobien (1953, 1977), Dahlmann (2001).

Insectivores – Talpidae: *Desmanella woelfersheimensis* Dahlmann, 2001 (type locality), “*Scalopoides*” *agrarius* (Skoczen, 1980), “*Scalopoides*” cf. *copernici* (Skoczen, 1980), *Talpa fossilis* Petényi, 1864, *Talpa gilothei* Storch, 1978, *Talpa minor* Freudenberg, 1914, Talpinae, gen. et sp. indet., *Archaeodesmana acies* Dahlmann, 2001 (type locality), *Desmana* cf. *amutriensis* Radulescu, Samson & Stiuca, 1989, *Desmana nehringi* Kormos, 1913, *Storchia wedrevis* Dahlmann, 2001 (type locality). Soricidae: *Alloblarinella europaea* (Reumer, 1984), *Blarinoides* cf. *mariae* Sulimski, 1959, *Beremendia fissidens* (Petényi, 1864), *Deinsdorfia hibbardi* (Sulimski, 1962), *Deinsdorfia kordosi* Reumer, 1984, *Petenya hungarica* Kormos, 1934, cf. *Petenya dubia* Bachmayer & Wilson, 1970, *Sorex minutus* Linnaeus, 1766, *Sorex* sp., “*Zelceina soriculoides* (Sulimski, 1959)”, Soricinae gen. et sp. indet.

Taxonomic descriptions – Dahlmann (2001) gave descriptions of the micromammals, including the insectivores. *Desmana nehringi* Kormos, 1913 was listed by Tobien as *Desmana* (Tobien, 1953) and *Desmana* cf. *nehringi* (Tobien, 1977) and *Archaeodesmana acies* was listed as *Galemys* (Tobien, 1953). “*Zelceina soriculoides*” is accepted only with reservation for the Wölfersheim specimens for the same reasons as given for the Gundersheim-Findling sample.

Storage of material – SMF.

MN 16

Frechen

Location – Open air lignite mine (“Tagebau Frechen”), some 16 km W of Cologne between the towns of Frechen and Kerpen, Land Nordrhein-Westfalen.

Stratigraphy – Reuverian substage B, correlated to the Gauss-Matuyama boundary.

Literature – Strauch (1994), Reumer (1995), Van Kolfschoten *et al.* (1998).

Insectivores – Talpidae: *Talpa* cf. *T. minor* Freudentberg, 1914, *Galemys* cf. *G. kormosi* (Schreuder, 1940). Soricidae: *Blarinoides mariae* Sulimski, 1959, *Deinsdorfia hibbardii* (Sulimski, 1962), *Sorex* cf. *S. minutus* Linnaeus, 1766.

Taxonomic descriptions – Short descriptions of the material were provided by Reumer (1995).

Storage of material – IvAU, temporarily in NMR.

Hambach 11

Location – Open air lignite mine ('Tagebau Hambach'), some 35 km W of Cologne between the towns of Jülich and Elsdorf, Land Nordrhein-Westfalen.

Stratigraphy – Reuverian.

Literature – Mörs *et al.* (1998).

Insectivores – Talpidae: *Talpa minor* Freudentberg, 1914, *Talpa europaea* Linnaeus, 1758, Talpinae indet.: *Galemys kormosi* (Schreuder, 1940), *Desmana thermalis* Kormos, 1913, *Desmana nehringi* Kormos, 1913. Soricidae: *Deinsdorfia* sp., *Blarinoides mariae* Sulimski, 1959, *Beremendia fissidens* (Petényi, 1864).

Taxonomic descriptions – Mörs *et al.* (1998) gave preliminary identifications of the insectivores. Kersting & Mörs (2004) gave more precise identifications for the desmans, and commented on the remarkable co-occurrence of three species of Desmaninae.

Storage of material – IPB.

MN 16/17

Gundersheim fissure fillings

Location – Rheinland-Pfalz, Rheinhessen, Landkreis Alzey-Worms, c. 1800 m SW of Gundersheim.

Stratigraphy – Several fissure fillings, Rosengarten and Gemeinde quarries, Villyan.

Literature – Heller (1936), Tobien (1980a, b), Fejfar & Storch (1990).

Insectivores – Talpidae: "*Scalopoides*" *agrarius* (Skoczen, 1980), *Talpa fossilis* Petényi, 1864, *Talpa minor* Freudentberg, 1914, *Desmana* sp., Desmaninae gen. et sp. indet. Soricidae:

Alloblarinella europaea (Reumer, 1984), *Beremendia fissidens* (Petényi, 1864), *Blarinoides mariae* Sulimski, 1959, *Cokia robusta* (Rzebik-Kowalska, 1989), *Deinsdorfia fallax* (Heller, 1936) (type locality), *Petenya hungarica* Kormos, 1934, *Sorex minutus* Linnaeus, 1766, *Sorex* sp., *Sulimskia kretzoi* (Sulimski, 1959), "*Zelceina soriculoides* (Sulimski, 1959)".

Taxonomic descriptions – Heller (1936) described the mammals, including insectivores, from various fissure fillings. *Sorex fallax* Heller, 1936 was included in *Deinsdorfia* by Dahlmann & Storch (1996). For "*Zelceina soriculoides*" see remarks under Gundersheim-Findling. Heller (1936) referred an isolated M1 to *Galemys semseyi* and a fragment of a tibia to *Desmana nehringi*. However, the specimens appear to correspond in size and may represent a single species of uncertain taxonomic status. A rather large-sized desmanine humerus, not cited by Heller (1936), can be assigned to the genus *Desmana*. The taxa *Alloblarinella europaea*, *Cokia robusta*, *Blarinoides mariae*, *Sorex minutus*, *Sorex* sp., *Sulimskia kretzoi*, "*Zelceina soriculoides*", *Desmana* sp., and "*Scalopoides*" *agrarius* are stated in the present list for the first time. Fejfar & Storch (1990) discussed the biochronology of the micromammalian assemblages.

Storage of material – PIM, SMF.

MN 17

Neuleiningen 11 and I1

Location – Rheinland-Pfalz, Landkreis Bad Dürkheim, 18 km SW of Worms, c. 1500 m N of Neuleiningen.

Stratigraphy – Fissure fillings, quarry Theis, latest Villanyian.

Literature – Malec & Tobien (1976), Tobien (1980b), Maul (1996).

Insectivores – Erinaceidae: *Erinaceus* cf. *lechei* Kormos, 1934. Talpidae: *Talpa fossilis* Petényi, 1864, *Talpa minor* Freudenberg, 1914. Soricidae: *Beremendia fissidens* (Petényi, 1864), *Sorex minutus* Linnaeus, 1766, *Sorex* (*Drepanosorex*) sp., Soricidae gen. et sp. indet.

Taxonomic descriptions – Malec & Tobien (1976) listed from fissure Neuleiningen 11 the taxa *Erinaceus* sp., *Talpa minor*, *T. fossilis*, and Soricidae gen. et sp. indet. The additional species are reported here for the first time. Soricidae gen. et sp. indet. here is not necessarily identical with Soricidae gen. et sp. indet. in Malec & Tobien (1976). Maul (1996) assessed the biochronological position of the various Neuleiningen fissure fillings based on arvicoline rodents.

Storage of material – PIM, SMF.

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