

An annotated taxonomic list of the Middle Eocene (MP 11) Vertebrata of Messel

Michael MORLO, Stephan SCHAAL, Gerald MAYR & Christina SEIFFERT

Abstract

132 vertebrate species are known from the Messel Fossil Site. In this paper, all species and genera are listed, and for each of them the first report from Messel is cited. Moreover, recent discoveries and current research projects are mentioned. The list thus reflects the state-of-the-art knowledge on the present taxonomic status of all vertebrate species and genera of Messel.

Key words: Faunal list, Vertebrata, Eocene, Messel

Kurzfassung

132 Wirbeltierarten sind derzeit aus der Fossilienfundstelle Grube Messel bekannt. Sie werden hier aufgeführt. Darüber hinaus werden jeweils erste Nachweise aus Messel, neue Funde sowie laufende Forschungsprojekte genannt, wodurch der aktuelle taxonomische Status der einzelnen Arten und Gattungen wiedergegeben wird.

Schlüsselworte: Faunenliste, Vertebrata, Eozän, Messel

Introduction

Comprehensive lists of Eocene organisms known from the World Heritage Messel Pit Fossil Site have been published several times, beginning with TOBIEN (1969 a) and KOENIGSWALD (1979), with updates in KOENIGSWALD (1980 a) and KOENIGSWALD & MICHAELIS (1984). These authors listed all plants and animals known at the time by their taxonomic names. Other authors (FRANZEN 1982, SCHAARSCHMIDT 1988, SCHAAL 1995) gave lists of the German common names. Lists for single groups of organisms have been published since these contributions, but no further synopsis has been given.

Extensive ongoing research on a lot of taxa of the Messel fauna and flora requires up-to-date taxonomic overviews. This paper deals with the vertebrates of Messel, while WILDE (2004) gives an overview of the

flora. The invertebrates will be presented in a separate list (WEDMANN in prep.). A recent overview on the Bacteria of Messel was provided by LIEBIG (1998) after results of biochemical (see KOENIGSWALD & MICHAELIS 1984) and morphological (WUTTKE 1983) analyses had been published. These overviews provide not only quick access to the relevant literature for a specific taxon, but may also serve as a taxonomic basis for the ongoing work on the paleoecology of Messel communities (e.g. MORLO et al. 2001, 2002; RICHTER & BASZIO 2002, FERGUSON 2003).

To achieve these aims, the list of vertebrates given herein includes the genus and species name, first author of a species, and first report from Messel as well as remarks on recent discoveries, current research projects, and as yet unpublished results. It thus reflects the state-of-the-art knowledge on the taxonomy of all vertebrate species and genera of Messel.

Authors' address: Dr. Michael MORLO, Dr. Stephan SCHAAL, Dr. Gerald MAYR & Dipl.-Biol. Christina SEIFFERT, Forschungsinstitut Senckenberg, Senckenberganlage 25, 60325 Frankfurt a.M., Germany, <Michael.Morlo@senckenberg.de>, <Stephan.Schaal@senckenberg.de>, <Gerald.Mayr@senckenberg.de>, <Christina.Seiffert@senckenberg.de>

* Nr. 163: GAUDANT, J. & MEUNIER, F.J. (2004): Un test pour déterminer la position systématique du genre *Thaumaturus* REUSS 1844 (poisson téléostéen): l'approche paléohistologique. – Courier Forschungsinstitut Senckenberg, **252**: 79-93.

Institutional abbreviations	Anguilliformes	
HLMD Me Hessisches Landesmuseum Darmstadt, Germany – Messel collection	Anguillidae	
SMF ME Forschungsinstitut Senckenberg, Frankfurt a.M., Germany – Messel collection	<i>Anguilla ignota</i> MICKLICH 1985	[7]
SMNK-PAL Staatliches Museum für Naturkunde Karlsruhe, Germany – Paleontological collection	Perciformes	
SMNK Me Staatliches Museum für Naturkunde Karlsruhe, Germany – Messel collection	Percichthyidae s.l.	
	<i>Amphiperca multiformes</i> WEITZEL 1933 b	[8]
	Moronidae	
	<i>Palaeoperca proxima</i> MICKLICH 1978	
	<i>Rhenanoperca minuta</i> GAUDANT & MICKLICH 1990	

Taxonomic list of Vertebrata (132 species)

Osteichthyes (8 species)

Lepisosteiformes			Amphibia (5 species)	
Lepisosteidae	[1]		Urodela	
<i>Atractosteus strausi</i> (KINKELIN 1884)	[2]		Salamandridae	
<i>Masillosteus kelleri</i> (MICKLICH & KLAPPERT 2001)	[3]		<i>Chelotriton robustus</i> WESTPHAL 1980	
Amiiformes			Anura	
Amiidae			Pelobatidae	
<i>Cyclurus kehleri</i> (ANDREAE 1893)	[4]		<i>Eopelobates wagneri</i> (WEITZEL 1938)	[9]
Clupeocephala	[5]		Palaeobatrachidae	
Thaumatouridae			<i>Messelobatrachus tobieni</i> nomen nudum	[10]
<i>Thaumaturus intermedius</i> WEITZEL 1933 b	[6]		Anura inc. sed.	
			<i>Lutetiobatrachus gracilis</i> nomen nudum	[11]
			Xenopidae inc. sed.	
			Small species (det. SCHAAL)	[12]

- [1] The lepisosteids of Messel are currently under investigation by several authors (GAUDANT in prep., GRANDE & BEMIS in prep., and KLAPPERT in prep.).
- [2] *Atractosteus strausi*, originally placed in *Lepisosteus*, was recently discussed by WILEY (1976).
- [3] Based on five specimens, this species was recently separated from *A. strausi*.
- [4] *Cyclurus kehleri*, originally assigned to the Recent genus *Amia*, was placed in *Cyclurus* by GAUDANT (1987). It was recently discussed controversially by GRANDE & BEMIS (1998) and GAUDANT (1999).
- [5] Originally erroneously placed into Salmoniformes, *Thaumaturus* was later discussed to belong to Osteoglossiformes. However, according to a small note of MICKLICH (1998), it cannot be assigned to a specific group within Clupeocephala. GAUDANT & MEUNIER (2004, this volume) re-examine its systematic relationship. They invalidate *Thaumaturus* to belong to Osteoglossomorpha, but agree that it is directly related to Haplomi.
- [6] *Thaumaturus intermedius* was recently discussed by MICKLICH (1988) and GAUDANT & MEUNIER (2004, this volume).
- [7] *Anguilla ignota* is hitherto represented by a single specimen only.
- [8] *Amphiperca multiformes* was recently discussed by MICKLICH (1996).
- [9] *Eopelobates wagneri*, originally assigned to *Propelodytes*, was placed in *Eopelobates* by WUTTKE (1988) and MAUS & WUTTKE (2002).
- [10] This taxon was first described in the Ph.D. thesis by WUTTKE (1988), published on microfiche and thus invalid (ICZN 2000 § 9.4). WUTTKE (1989: figs 156-158) depicted some specimens, but gave no diagnostic description that would meet the requirements for the formal erection of a taxon (ICZN 2000 § 13.1.1). *Messelobatrachus tobieni* therefore has to be regarded as a nomen nudum.
- [11] Like *Messelobatrachus*, this taxon also was first and invalidly described by WUTTKE (1988). WUTTKE (1989: fig. 159) depicted the so far only specimen, but no information is given which could serve as a description necessary for the formal erection of a taxon (ICZN 2000 § 13.1.1). *Lutetiobatrachus gracilis* therefore has to be regarded as a nomen nudum.
- [12] The two specimens known, SMF ME 2729 and one from a private collection, are not yet described.

Reptilia (31 species)

Testudines	[13]	Crocodylidae	
Testudinoidea Familia indet.	[14]	<i>Asiatosuchus germanicus</i> BERG 1966	
<i>Francellia messeliana</i> (STAESCHE 1928)	[15]	<i>Allognathosuchus haupti</i> (WEITZEL 1934)	[24]
<i>Euroemys kehreri</i> (STAESCHE 1928)	[16]	Pristichampsidae	
? <i>Juvenemys</i> sp.	[17]	<i>Pristichampsus rollinatii</i> (GRAY 1831)	[25]
Carettochelyidae		Bergisuchidae	
<i>Allaeochelys crassesculptata</i> (HARRASSOWITZ 1922)	[18]	<i>Bergisuchus dietrichbergi</i> KUHN 1968	[26]
Trionychidae		Tomastomidae	
' <i>Trionyx</i> ' <i>messelianus</i> REINACH 1900	[19]	Tomastomidae sp.	[27]
Pelomedusidae		Squamata	
<i>Neochelys franzeni</i> SCHLEICH 1993		Lacertilia	
Crocodylia	[20]	Lacertilia indet.	[28]
Leidyosuchidae	[21]	Anguillidae	
<i>Diplocynodon darwini</i> LUDWIG 1877	[22]	<i>Xestops abderhaldeni</i> KUHN 1940	[29]
<i>Baryphracta deponiae</i> (FREY, LAEMMERT & RIESS 1987)	[23]	<i>Ophisauriscus quadrupes</i> KUHN 1940	[30]
		Necrosauridae	
		Genus A (KELLER & SCHAAL 1988 b: fig. 188)	

- [13] While KELLER & SCHAAL (1988 a) gave a brief overview on the turtles of Messel, SCHLEICH (1993) discussed, at least briefly, their respective taxonomical status.
- [14] According to HERVET (2004), no familial assignment can yet be made for the following three taxa.
- [15] Originally assigned to the Recent genus *Ocadia* by STAESCHE (1928), HERVET (2004) placed the species into the genus *Francellia*.
- [16] Originally assigned to the Recent genus *Ocadia* by STAESCHE (1928), HERVET (2004) founded the new genus *Euroemys* HERVET 2004 on this species.
- [17] HERVET (2004: pl. 2 fig. B) tentatively placed two specimens from Messel into this genus.
- [18] *Allaeochelys gracilis* was originally assigned to the genus *Anosteira*. DE BROIN (1977) placed it in *Allaeochelys*, which was confirmed by SCHLEICH (1993). According to DE BROIN (1977), the species *A. gracilis*, described from Messel by HARRASSOWITZ (1922) also, is conspecific with *A. crassesculptata*.
- [19] According to SCHLEICH (1993), *Trionyx* serves as a 'basket-taxon'. Whether '*Trionyx*' *messelianus* belongs to that genus is not fully proven. Moreover, subspecific names originally given to specimens from Messel were not longer recognized as being valid by SCHLEICH (1993).
- [20] A current overview on the crocodylian fauna of Messel was given by ROSSMANN & BLUME (1999).
- [21] *Diplocynodon* was placed into Leidyosuchidae by RAUHE & ROSSMANN (1995).
- [22] According to RAUHE & ROSSMANN (1995), the species *D. ebertyi*, described from Messel by LUDWIG (1877) also, is conspecific with *D. darwini*.
- [23] *Baryphracta* was considered to belong to *Diplocynodon* by ROSSMANN & BLUME (1999), but was still listed as "*Baryphracta*" in table 1 of this publication.
- [24] *Allognathosuchus haupti*, originally placed in its own genus *Hassiacosuchus*, was assigned to *Allognathosuchus* by BERG (1966).
- [25] Paleobiology and functional morphology of *P. rollinatii* from Messel was recently discussed by ROSSMANN (1999, 2000 a).
- [26] The sebecosuchid *B. dietrichbergi* was recently revised by ROSSMANN et al. (2001) who also introduced the new family Bergisuchidae.
- [27] ROSSMANN & BLUME (1999) mention the only known specimen of a tomastomid in Messel.
- [28] A small, very fragmented lacertid is known from the gut content of a juvenilehyaenodontid *Lesmesodon edingeri* (MORLO et al. 2002). Based on two preserved multicuspoid teeth, which are different from those of known Messel lacertids, the specimen may be close to Iguanidae.
- [29] *Xestops abderhaldeni*, based on material from the Geiseltal, was reported from Messel by KELLER & SCHAAL (1988 b).
- [30] Originally described from the Geiseltal, *O. quadrupes* was recently revised by SULLIVAN et al. (1999), including the Messel specimens.

' <i>Saniwa</i> ' <i>feisti</i> (STRITZKE 1983)	[31]	Aves (43 species)	
Genus C (KELLER & SCHAAL 1988 b: fig. 189)		Palaeognathae	
Lacertidae		Order inc. sed. A	
<i>Eolacerta robusta</i> KUHN 1944	[32]	Palaeotididae	
Small species (KELLER & SCHAAL 1988 b: fig. 190)		<i>Palaeotis weigelti</i> LAMBRECHT 1928	[42]
Iguanidae		Neognathae	
<i>Geiseltaliellus longicaudus</i> KUHN 1944	[33]	Galliformes	
Scincidae		Gallinuloididae	
Scincid species (KELLER & SCHAAL 1988 b: fig. 183 C)		<i>Paraortygoides messelensis</i> MAYR 2000 a	[43]
Lacertilia inc. sed.		Anseriformes	
aff. <i>Scincomorpha</i> sp. (WEBER 2001)	[34]	Gastornithidae	[44]
Serpentes		<i>Gastornis</i> cf. <i>geiselensis</i> (FISCHER 1978)	[45]
Boidae		Phoenicopteriformes	
<i>Palaeopython fischeri</i> SCHAAL 2004	[35]	<i>Juncitarsus merkei</i> PETERS 1987	
<i>Paleryx</i> n. sp. (SCHAAL in prep.)	[36]	Pelecaniformes	
<i>Messelophis variatus</i> BASZIO 2004	[37]	?Sulidae	
<i>Messelophis ermannerorum</i> SCHAAL & BASZIO 2004	[38]	<i>Masillastega rectirostris</i> MAYR 2002 a	[46]
Tropidopheinae sp. (KELLER & SCHAAL 1988 b)	[39]	Order inc. sed. B	
Erycinae sp.	[40]	Threskiornithidae	
Aniliidae		Rhynchaetinae	[47]
Aniliid sp. I (KELLER & SCHAAL 1988 b: 133)		<i>Rhynchaetes messelensis</i> WITTICH 1898	
Aniliid sp. II (KELLER & SCHAAL 1988 b: 133)	[41]	"Gruiformes"	[48]
		Messelornithidae	
		<i>Messelornis cristata</i> HESSE 1988	

- [31] According to KELLER & SCHAAL (1988 b), this species does not belong to *Saniwa*, but to a separate genus ("genus B").
- [32] This taxon was recently revised by MÜLLER (2001).
- [33] *Geiseltaliellus longicaudus* was recently revised by ROSSMANN (1992, 2000 b, 2001).
- [34] This taxon (KELLER & SCHAAL 1988 b: fig. 192) was recently investigated by WEBER (2001). The only known complete skeleton (SMF ME 3516) is part of the public exhibition of the Naturmuseum Senckenberg.
- [35] See SCHAAL 2004, this volume.
- [36] According to SCHAAL (in prep.), the smaller Boinae s.l. of Messel belong to this genus.
- [37] See BASZIO 2004, this volume.
- [38] See SCHAAL & BASZIO 2004, this volume.
- [39] One specimen representing Tropidopheinae is currently under investigation (KLUGE & SCHAAL in prep.).
- [40] All Erycinae are currently under investigation (KLUGE & SCHAAL in prep.).
- [41] According to KELLER & SCHAAL (1988 b), the maximum length of the larger aniliid (species I) is about 50 cm, while the smaller one (species II) reaches only about 25 cm.
- [42] The species was originally described as a bustard (Otididae), see HOUDE & HAUBOLD (1987).
- [43] The genus was only tentatively assigned to the Gallinuloididae in the original description, but this assignment is confirmed by new specimens of *Gallinuloides wyomingensis* (I. WEIDIG, pers. comm.).
- [44] Concerning classification of this family into the Anseriformes, see ANDORS (1992).
- [45] Originally assigned to the genus *Diatryma* which is, however, a junior synonym of *Gastornis* (see BUFFETAUT 1997). The exact specific identity of the species from Messel remains uncertain until direct comparisons with the other European species of *Gastornis* can be made.
- [46] An isolated skull, deposited in the Universität Bonn, Institut für Paläontologie (collection number 140 a + b).
- [47] See MAYR (2002 b).
- [48] The term is used here in the sense of WETMORE (1960), although the traditional order "Gruiformes" probably is polyphyletic, e.g. LIVEZEY & ZUSI (2001).

?Phorusrhacidae		Coliiformes	
<i>Aenigmavis sapea</i> PETERS 1987	[49]	Sandcoleidae	
Salmilidae		<i>Eoglaucidium pallas</i> FISCHER 1978	[58]
<i>Salmila robusta</i> MAYR 2000 c		<i>Eoglaucidium</i> sp.	[59]
Idiornithidae		Sandcoleidae gen. et sp. indet. (cf.	
<i>Idiornis tuberculata</i> PETERS 1995		<i>Anneavis</i> HOUDE & OLSON 1992)	[60]
<i>Idiornis</i> cf. <i>itardiensis</i> MOURER- CHAUVIRÉ 1983	[50]	Coliidae	
Order inc. sed. C		<i>Masillacolius brevidactylus</i> MAYR & PETERS 1998	
Fam. inc. sed.		Fam. inc. sed.	
<i>Pumiliornis tessellatus</i> MAYR 1999 a	[51]	<i>Selmes absurdipes</i> PETERS 1999	[61]
Charadriiformes indet.		Order inc. sed. D	
Fam. inc. sed.		Fam. inc. sed.	
Gen. et sp. indet.	[52]	<i>Fluvioviridavis</i> MAYR & DANIELS 2001 sp.	[62]
?Falconiformes		Order inc. sed. E	
Fam. inc. sed.		Podargidae	
<i>Messelastur gratulator</i> PETERS 1994	[53]	<i>Masillapodargus longipes</i> MAYR 1999 b	
Psittaciformes		Cypselomorphae	[63]
Pseudasturidae	[54]	Nyctibiidae	
<i>Pseudasturides macrocephalus</i> MAYR 2003 a	[55]	<i>Paraprefica kelleri</i> MAYR 1999 b	[64]
<i>Serudaptus pohli</i> MAYR 2000 a		<i>Paraprefica major</i> MAYR 1999 b	
Gen. et sp. indet.	[56]	Archaeotrogonidae	
Fam. nov.	[57]	<i>Hassiavis laticauda</i> MAYR 1998 c	[65]
<i>Psittacopes lepidus</i> MAYR & DANIELS 2001		Apodidae	
Strigiformes		<i>Scaniacypselus szarskii</i> (PETERS 1985)	[66]
Palaeoglaucidae		cf. Jungornithidae	
<i>Palaeoglaux artophoron</i> PETERS 1992		Gen. et sp. indet. (cf. <i>Argornis</i> KARHU 1999)	

- [49] Assignment of this species to the Phorusrhacidae needs further confirmation, and *Aenigmavis* might be a flightless member of the Idiornithidae (see MAYR 2000 b).
- [50] See MAYR (2000 a).
- [51] The systematic relationships of this tiny bird are completely unresolved, see MAYR (1999 a).
- [52] See MAYR (2000 c).
- [53] The species is based on two isolated skulls (PETERS 1994), and its assignment to the Falconiformes needs to be confirmed by postcranial material (the skulls are difficult to distinguish from those of the Pseudasturidae).
- [54] See MAYR (2002 d).
- [55] Originally described as *Pseudastur* MAYR 1998 a, a preoccupied name (see MAYR 2003 a).
- [56] See MAYR (1998 a).
- [57] This as yet unnamed family includes stem-group representatives of the Psittaciformes which lack the typical parrot-like beak of their extant relatives.
- [58] The genus *Eoglaucidium* was originally assigned to the Strigiformes (owls), see MAYR & PETERS 1998.
- [59] See MAYR & PETERS (1998).
- [60] See MAYR (2000 b).
- [61] Originally assigned to the Sandcoleidae by PETERS (1999), see MAYR & PETERS (1998), MAYR (2001 a).
- [62] The species shows greatest overall similarity to some of the “caprimulgiform” birds, see MAYR & DANIELS (2001).
- [63] See (MAYR 2002 e).
- [64] The genus *Paraprefica* was tentatively assigned to the Steatornithidae in the original description by MAYR (1999 b), its classification into the Nyctibiidae was established by MAYR (2001 b).
- [65] The genus was only tentatively assigned to the Caprimulgiformes in the original description, but this assignment is confirmed by a new specimen (MAYR 2004, this volume).
- [66] Originally described as *Aegialornis szarskii* by PETERS (1985), see MAYR & PETERS (1999).

Order inc. sed. F		Order inc. sed. H	
?Leptosomidae		Gracilitarsidae	
<i>Plesiocathartes kelleri</i> MAYR 2002 f	[67]	<i>Gracilitarsus mirabilis</i> MAYR 1998 b	[75]
Coraciiformes sensu stricto	[68]	Order inc. sed. I	
Eocoraciidae		Fam. inc. sed.	
<i>Eocoracias brachyptera</i> MAYR & MOURER-CHAUVIRÉ 2000		<i>Palaeopsittacus cf. georgei</i> HARRISON 1982	[76]
Alcediniformes	[69]		
Fam. nov.	[70]	Mammalia (45 species)	
<i>Quasisyndactylus longibrachis</i> MAYR 1998 b	[71]	Metatheria	[77]
Upupiformes	[72]	?Peradectidae	[78]
Messelirrisoridae		“ <i>Peradectes</i> ”	[79]
<i>Messelirrisor parvus</i> MAYR 1998 b		Herpetotheriidae	[80]
<i>Messelirrisor halcyrostris</i> MAYR 1998 b		<i>Amphiperatherium cf. maximum</i> CROCHET 1979 b	[81]
<i>Messelirrisor grandis</i> MAYR 2000 d		<i>Amphiperatherium goethei</i> CROCHET 1979 b	[82]
Order inc. sed. G		<i>Amphiperatherium</i> FILHOL 1879 or <i>Peratherium</i> AYMARD 1850	[83]
Primobucconidae			
? <i>Primobucco</i> BRODKORB 1970 sp.	[73]	Eutheria	
Piciformes		Proteutheria	[84]
Primoscenidae	[74]	Pseudorhyncocyonidae	
<i>Primozygodactylus danielsi</i> MAYR 1998 a		<i>Leptictidium tobieni</i> KOENIGSWALD & STORCH 1987	
<i>Primozygodactylus major</i> MAYR 1998 a			
<i>Primozygodactylus ballmanni</i> MAYR 1998 a			

- [67] Known from two articulated skeletons (SMF ME 3639, HLMD Me 162), which indicate a possible relationship to the extant Madagassian Cuckoo-rollers (Leptosomidae).
- [68] See MAYR (1998 b).
- [69] See MAYR (1998 b).
- [70] This as yet unnamed family probably is the sister taxon of the four extant alcediniform families (MAYR 2002 b).
- [71] New material of this species is discussed in MAYR (2004, this volume).
- [72] See MAYR (1998 b).
- [73] Known from several as yet undescribed specimens (e.g., SMNK Me 404 a + b).
- [74] The family was originally assigned to the Passeriformes by HARRISON & WALKER 1977, see MAYR (1998 b).
- [75] *Gracilitarsus* shows some resemblance to the equally enigmatic early Tertiary genera *Eutreptodactylus* and *Sylphornis* (MAYR 2001 c).
- [76] Known from a single postcranial skeleton (SMNK-PAL 3834 a + b) (MAYR 2003 b).
- [77] Five more or less complete metatherian specimens (skulls with skeletons) and an isolated lower jaw are known from the Messel pit. They were currently revised by KURZ (2001) and KURZ & HABERSETZER (2004, this volume).
- [78] Originally described as a tribe by CROCHET (1979 a), REIG et al. (1985) raised Peradectini to family rank, while APLIN & ARCHER (1987) mentioned SZALAY (1982) as regarding the taxon as a subfamily of the Pedomyidae.
- [79] This taxon was originally described as *Peradectes* sp. by KOENIGSWALD & STORCH (1988). As the taxonomy is unclear, STORCH (2001) and KURZ (unpublished data) regard the specimens as “*Peradectes*”, in the sense of a primitive didelphimorphian from the Paleocene of Europe.
- [80] REIG et al. (1985) lowered Herpetotheriidae to subfamily rank; later they were regarded as a family of didelphimorphians by KIRSCH et al. (1997).
- [81] STORCH (1993 a) regarded the large specimen as *A. aff. maximum*, but subsequently (STORCH 1993 b) he regarded it as *A. cf. maximum*.
- [82] STORCH (1993 b) described an isolated lower jaw of this species from Messel.
- [83] This specimen does not provide occlusal view on the molars. While it clearly belongs to Herpetotheriidae, it is not possible to decide whether it belongs to *Amphiperatherium* or *Peratherium*.
- [84] This order was applied by STORCH & LISTER (1985) for several groups of plesiomorphic “insectivores” such as, e.g., Pseudorhyncocyonidae. In our view, it refers more precisely to the families under discussion than does Cimolesta MCKENNA & BELL 1997.

<i>Leptictidium nasutum</i> STORCH & LISTER 1985	Creodonta
<i>Leptictidium auderiense</i> TOBIEN 1962	Hyaenodontidae
Pantolestidae	<i>Lesmesodon edingeri</i> (SPRINGHORN 1982) [91]
<i>Buxolestes piscator</i> KOENIGSWALD 1980 b	<i>Lesmesodon behnkeae</i> MORLO
<i>Buxolestes minor</i> PFRETZSCHNER 1999	& HABERSETZER 1999
Paroxyclaenidae [85]	Pholidota
<i>Kopidodon macrognathus</i> (WITTICH 1902) [86]	Manidae
' <i>Paroxyclaenus</i> ' sp. [87]	<i>Eomanis waldi</i> STORCH 1978
Apatemyidae	<i>Eomanis krebsi</i> STORCH & MARTIN 1994
<i>Heterohyus nanus</i> TEILHARD DE CHARDIN 1921 [88]	Xenarthra
Lipotyphla [89]	Myrmecophagidae
Amphilemuridae	<i>Eurotamandua joresi</i> STORCH 1981 [92]
<i>Macrocranion tenerum</i> (TOBIEN 1962) [90]	Rodentia
<i>Macrocranion tupaiodon</i> WEITZEL 1949	Alagomyidae [93]
<i>Pholidocercus hassiacus</i> KOENIGSWALD & STORCH 1983	<i>Ailuravus macrurus</i> WEITZEL 1949 [94]
	Ischyromyridae [95]
	<i>Hartenbergeromys parvus</i> (TOBIEN 1954) [96]
	<i>Masillamys beegeri</i> TOBIEN 1954 [97]

- [85] Placed into Primates (WITTICH 1902), Creodonta (WEITZEL 1933 a) and Condylarthra (RUSSELL & MCKENNA 1961; TOBIEN 1969 b; KOENIGSWALD 1983, 1988), Paroxyclaenidae is now interpreted as the sister group of Pantolestidae based on their dental morphology (RUSSELL & GODINOT 1988) and postcranial anatomy (CLEMENS & KOENIGSWALD 1993). Currently, the skull morphology is under review to verify this assignment (KÖHN & MORLO).
- [86] *Kopidodon macrognathus* was last reviewed by TOBIEN (1969 b), KOENIGSWALD (1983, 1988), and CLEMENS & KOENIGSWALD (1993).
- [87] This taxon refers to a hitherto undescribed specimen (SMF ME 2621) close to *Kopidodon macrognathus*, but differing from that species in several characters. It lacks, e.g., a strong sagittal crest.
- [88] *Heterohyus nanus* was originally described from France. KOENIGSWALD (1987, 1990) reported and discussed it from Messel. A new specimen (SCHAAL 1999: 130) was investigated by KALTHOFF et al. (2004, this volume).
- [89] The most recent overview on systematics and paleobiology of the Messel lipotyphlans was given by STORCH (1996).
- [90] This species was discussed in detail by STORCH (1993 c).
- [91] Originally described as “?Proviverra”, MORLO & HABERSETZER (1999) created the genus *Lesmesodon* on this species.
- [92] The systematic position of this species is still under discussion. SZALAY & SCHRENK (1998) proposed a placement outside of Xenarthra, based on a different interpretation of the middle ear region. However, the original interpretation of STORCH (1981), leading to placement of *Eurotamandua* in Myrmecophagidae, is supported by new x-ray data (HABERSETZER, pers. comm.).
- [93] *Ailuravus* was placed in Alagomyidae DASHZEVEG 1990 by the author of the family.
- [94] An isolated forelimb curated at the Staatliches Museum für Naturkunde in Karlsruhe (SMNK Me 683), depicted in KOENIGSWALD et al. (1988: fig. 325), was originally assigned to *Plesiarctomys* due to its large size, which was larger than forelimbs of any *Ailuravus* specimen known at that time. As more specimens and also larger individuals of *Ailuravus* have been collected, it has become clear that this forelimb belongs to the genus *Ailuravus* as well.
- [95] The small rodents of Messel are currently under description and investigated with respect to their locomotion (SEIFFERT in prep.).
- [96] Described by TOBIEN (1954) as *Masillamys parvus* and transferred to the genus *Microparamys* by HARTENBERGER (1968) and the subgenus *Microparamys* (*Sparnacomyis*) by HARTENBERGER (1971), respectively, the species was placed in *Hartenbergeromys* (*Microparamys*) ESCARGUEL 1999 by the author of this genus.
- [97] Based on differences in tooth morphology of the two individuals available to TOBIEN (1954; HLMD Me 1 and HLMD Me 910), he described two different species (*M. beegeri* and *M. krugi*). The synonymy of *M. beegeri* and *M. krugi* has been suggested by HARTENBERGER (1968, 1993). Today, with more material available for investigation, variation of the particular dental features in this genus clearly indicates that the two individuals belong to one single species (see also ESCARGUEL 1999). The name *M. beegeri* is used by page priority. The holotype of *M. beegeri* is HLMD Me 1.

Gliridae		<i>Godinotia neglecta</i> (THALMANN, HAUBOLD & MARTIN 1989)	[101]
<i>Eogliravus wildi</i> HARTENBERGER 1971	[98]		
Chiroptera	[99]	Carnivora	
Palaeochiropterygidae		Miacidae	
<i>Palaeochiropteryx tupaiodon</i> REVILLIOD 1917		<i>Messelogale kessleri</i> (SPRINGHORN 1982)	[102]
<i>Palaeochiropteryx spiegelii</i> REVILLIOD 1917		<i>Paroodectes feisti</i> SPRINGHORN 1980	
Archaeonycterididae		Perissodactyla	
<i>Archaeonycteris trigonodon</i> REVILLIOD 1917		Equidae	[103]
<i>Archaeonycteris pollex</i> STORCH & HABERSETZER 1988		<i>Propalaeotherium parvulum</i> (LAURILLARD 1849)	[104]
Hassianycterididae		<i>Propalaeotherium hassiacum</i> HAUPT 1925	[105]
<i>Hassianycteris messelensis</i> SMITH & STORCH 1981		<i>Hallensia matthesi</i> FRANZEN & HAUBOLD 1986 a	[106]
<i>Hassianycteris magna</i> SMITH & STORCH 1981		Helaeletidae	
<i>Hassianycteris? revilliodi</i> (RUSSELL & SIGÉ 1970)	[100]	<i>Hyrachyus minimus</i> (FISCHER 1829)	[107]
Emballonuridae		Lophodontidae	
<i>Tachypteron franzeni</i> STORCH, SIGÉ & HABERSETZER 2002		<i>Lophiodon</i> sp.	[108]
Primates		Artiodactyla	
Notharctidae		Dichobunidae	
<i>Europolemur koenigswaldi</i> FRANZEN 1987		<i>Messelobunodon schaeferi</i> FRANZEN 1981 b	
<i>Europolemur kelleri</i> FRANZEN 2000 a		Diacodexidae	
		<i>Aumelasia</i> cf. <i>gabineaudi</i> SUDRE 1980	[109]
		Haplobunodontidae	
		<i>Masillabune martini</i> TOBIEN 1980	[110]

- [98] *Eogliravus wildi* was reported from Messel by STORCH et al. (2000), but a detailed description is still under way (SEIFFERT in prep.).
- [99] Current information on systematics and paleobiology of the Chiroptera of Messel was given by HABERSETZER & STORCH (1987), HABERSETZER et al. (1988, 1994) and SIMMONS & GEISLER (1998).
- [100] This species was originally assigned to *Archaeonycteris* by RUSSELL & SIGÉ (1970), but probably belongs to *Hassianycteris* (STORCH, pers. comm.).
- [101] Originally placed in the genus *Pronycticebus* by THALMANN et al. (1989), FRANZEN (2000 b) created the genus *Godinotia* on this species when reporting it from Messel.
- [102] SPRINGHORN (2001) created the new genus *Messelogale* for this species which originally was assigned to “?Miacis”.
- [103] A monograph dealing with all equoids from Messel is on its way (FRANZEN in prep.).
- [104] This species was firstly reported from Messel as *Lophiotherium messelense* HAUPT (1925). SAVAGE et al. (1965) transferred it to the genus *Propalaeotherium*, while FRANZEN & HAUBOLD (1986 a) regarded *L. messelense* as a subjective junior synonym of *Propalaeotherium parvulum*.
- [105] Based on a juvenile, FRANZEN (1980) at first reported *P. isselanum* from Messel, but later (FRANZEN 1995: fig. 13) identified another similar specimen (SMF ME 1792) as a juvenile of *P. hassiacum*.
- [106] *Hallensia matthesi* was founded on material from the Geiseltal. FRANZEN (1990) reported it from Messel and later placed it into Equidae (FRANZEN 1995).
- [107] This species was reported from Messel by FRANZEN (1981 a).
- [108] Only a single tooth of this large herbivore is published from Messel (TOBIEN 1987), but a complete skeleton of a juvenile (SMF ME 1931) is part of the public exhibition of the Naturmuseum Senckenberg.
- [109] This taxon was firstly reported from Messel by FRANZEN (1988). ERFURT (1995) removed it from Dichobunidae and placed into Diacodexidae.
- [110] A detailed description is given in TOBIEN (1985).

Acknowledgements

The authors thank Dr. Gerhard STORCH (Forschungsinstitut Senckenberg, Frankfurt a.M.), Dr. Conny KURZ (Hessisches Landesmuseum Darmstadt) and Thomas KELLER (Landesamt für Denkmalpflege Hessen, Schloss Biebrich) for additional information regarding single taxa. Dr. Jens FRANZEN and Dr. Gerhard STORCH critically reviewed the manuscript.

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Manuscript submitted 2003 – 01 – 31

Manuscript accepted 2003 – 02 – 12