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Wolf-Ekkehard Lönnig

Preliminary article 7 May 2026 – 9 August 2026 (Note please that **almost all highlighting in the typeface of the quotations by W.-E. L.** except italics for genera and species names)
The AI citations have been regularly checked for their correctness. Questionable answers have mostly been critically discussed. The AI results were generated by the Google search engine.

From *Echidna* and *Platypus* to the Entire Australian Marsupial Fossil Record of 2026 as Compared to 1993[1]

Abstract

As is also true for the plant and animal fossil record around the globe, virtually all the animal families here addressed and discussed appear abruptly in the geological record followed by an enormous constancy (stasis) of their typical characteristics, i.e. their fundamental structural body plans or blueprints/Bauplans over vast periods of time – together constituting another piece of the overall mosaic of facts being in utmost contrast/disparity/contradiction to Neo-Darwinian predictions and expectations of continuous evolution over thousands upon thousands of transitional links.

Moreover, the paleontological facts found and described refute ***once and for all*** the false claim of Darwin and his disciples forwarded to this very day of "the extreme imperfection of the geological record". Thus, a rich fossil record, an 'extreme perfection' distinguished by abrupt appearances und stasis, would be, as Darwin himself confessed, the "most obvious and gravest objection which can be urged against my [his] theory"[2].

Now, fact is that all 95 families cited in the following documentation appear abruptly, instantaneously, without evolutionary delay over many of transitional links[3] in the fossil record and ***either*** "persist for some millions of years virtually unchanged, only to disappear abruptly – the 'punctuated equilibrium' pattern of Eldredge and Gould" (Tom S. Kemp)[4] ***or*** persist to this very day as shown here for many families of the Australian marsupials.

The most important result to be emphasized for the present article is: ***All extant Australian marsupial families are also known from the fossil record***. So, instead of an "extreme imperfection of the geological record" we find a ***complete geological record*** **– 100 percent! – for all the living Australian marsupial families!** Adding the number of the extinct families, the percentage is even raised to **166 percent.** See please the details below.

Extrapolating these results for the orders PROTOTHERIA, TRICONODONTA, MULTITUBERCULATA, SYMMETRODONTA, and CLADOTHERIA – which (except the Prototheria) are known exclusively from the fossil record, I would – as a very well-educated guess – estimate that the families of these orders also have a fossil record of, say, around **90 percent** (or more). Yet several more families will probably be discovered in the future.

A somewhat detailed Supplement for this Summary concerning basic methodological questions:

Why the families?

As explained in my article on the fossil record of the angiosperms https://www.weloennig.de/AngiospermsLivingFossils.pdf, p. 25[5] Why families as the basic unit in G/W, C/B/H[6] and many others? "For an answer, see http://www.weloennig.de/Artbegriff.html (for example http://www.weloennig.de/AesIITaEnHu.html, http://www.weloennig.de/AesIIMe.html, http://www.weloennig.de/AesIV3.html etc. – the family level also often showing the limits of variation within a 'kind'). See perhaps also Benton THE FOSSIL RECORD 2, p. 11 on the **validity of families stating that** **"**there is no counter-argument other than practicality." However, G. Ledyard **Stebbins** once commented correctly: "If genera, families, and other higher categories are relatively old, and if many intermediate forms have become extinct [W.-E.L.: or, without neo-Darwinian presuppositions: "and if there were no series of intermediates or any intermediates at all…], **they are well marked and can be delimited in a reasonably objective fashion**." (Process of Organic Evolution." **So, that seems to be essentially the reason why they show practicality**. George Ledyard Stebbins (1906-2000) was "widely regarded as one of the leading evolutionary biologists of the 20th century" (he was also involved on the establishment of botany within the "modern synthesis"). See more https://en.wikipedia.org/wiki/G._Ledyard_Stebbins *Cf*. in this context perhaps also Gould's comment on "oversplitting".[7]

Why Wikipedia, the Paleobiology Database (PBDB), and sometimes AI?

"Globally, **Wikipedia** records roughly 508 million to 850 million pageviews **per day**." And "Wikipedia is accessed by over 1.5 billion unique devices and receives roughly **15 billion page views each month globally**. The platform hosts over 64 million total articles across hundreds of languages, averaging more than 4,500 page views per second on the English version alone"– AI (5 August 2026). Fact is that many people first turn to the Wikipedia (or AI – as I have just practiced)

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[1] Published by Chapman & Hall, London. Charts produced by Rachael J. Walker. Chapter 41: Mammalia by R. K. Stucky and M. C. McKenna. References for the families of this chart: pp. 739-744.

[2] See more on this point in https://www.weloennig.de/GiraffeFossilRecord.1abc.pdf pp. 6/7 to 12/13.

[3] To repeat a verdict of paleontologist Oskar Kuhn: (University of Munich, Germany): "The prejudice that the phylogenetic history of life could only be an accumulation of the smallest variational steps and that a more complete knowledge of the paleontological documents would prove [the assumed] gradual evolution, is deeply rooted and widely accepted. But the paleontological facts have long spoken against this prejudice! Especially German paleontologists such as B e u r l e n, D a c q u é and S c h i n d e w o l f have emphatically pointed out that in many animal groups such a rich, even overwhelming amount of fossil material exists (foraminifers, corals, brachiopods, bryozoans, cephalopods, ostracods, trilobites etc.), that **the gaps between the types and subtypes must be viewed as real**" https://www.weloennig.de/GiraffeFossilRecord.1abc.pdf p.6

[4] https://www.weloennig.de/GiraffeFossilRecord.1abc.pdf p. 12

[5] Now slightly altered and abbreviated.

[6] Abbreviations for the 5 paleontologists regularly cited in (https://www.weloennig.de/AngiospermsLivingFossils.pdf For G/W see that link, p. 24, for C/B/W Benton 1993, p. 809.

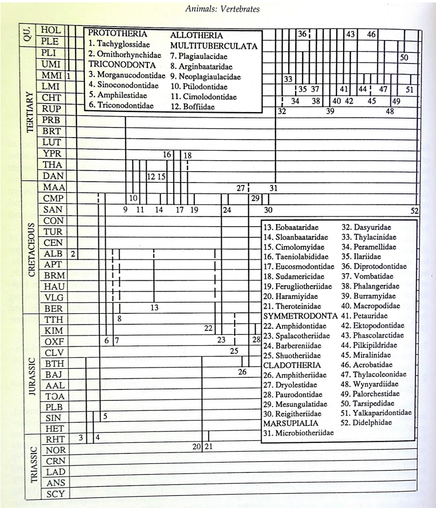
[7] https://www.weloennig.de/ElephantEvolution.pdf p. 15 Note please: "…the genus has traditionally been regarded as the lowest unit of **rough** comparability]W.-E. L.: **better is the family**] in paleontological data (see Newell, 1949). Sepkoski (1982) therefore compiled his two great compendia – the basis for so much research in the history of life's fluctuating diversity – **at the family**, and then at the genus, level (but explicitly not at the species level in recognition of frequent oversplitting and extreme imbalance in practice of research among specialists on various groups." Example: The great Haeckel, the leading biologist who established Darwinian evolutionary theory in the German speaking countries, justified his system of Human species (twelve species in four genera of contemporary human beings), among other things, by pointing out: "that our progressive knowledge of animal forms **always leads to an ever-increasing division of the groups**. Related species united by Linné in one genus, by Cuvier in a family, now form an extensive order with several families and many genera" (1911, p. 754)

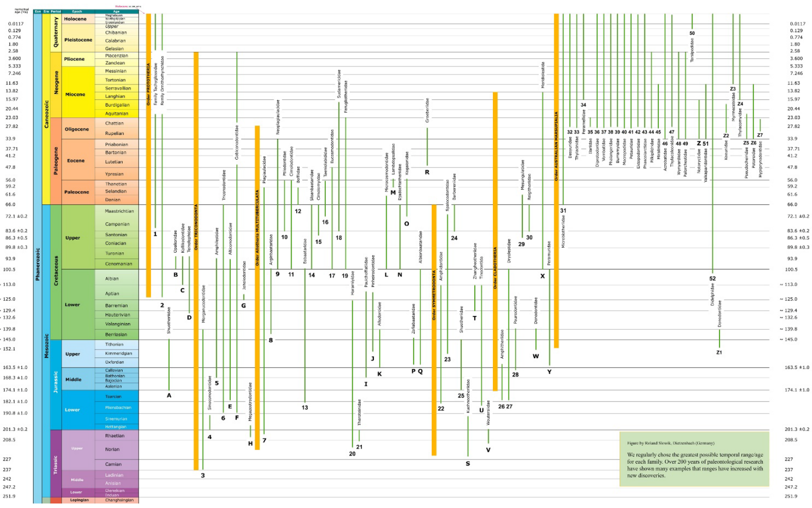
to obtain at least tentative answers to both general and specific questions, often including scientific and medical ones. Despite my own critique[8] concerning Wikipedia's imperfections, critically assessing its scientific data has been worthwhile also for me. **Moreover, its articles are regularly updated** and – what is especially important for the following article – the reader **can directly check it for photographs of the extant families** and often also of reconstructions of forms only detected as fossils or of the remains/relics themselves – to get a first impression of how the animals look(ed) or may have looked like.

"The **Paleobiology Database** is a public database of paleontological data that anyone can use, maintained by an international non-governmental group of paleontologists. You can explore the data online in the Navigator, which lets you filter fossil occurrences by time, space, and taxonomy, and displays their modern and paleogeographic locations; or you can download the data to your own computer to do your own analyses." So far, it is the best paleontological database known to me – which **is also regularly updated** (https://paleobiodb.org/#/ https://paleobiodb.org/#/faq). However, my hope that one could directly come from the its links given in my article did not realize. To check the data, we must always start again from the family name. Nevertheless, I hope that most of the data presented in the present article will also be up to date in the future. As for **AI**, see my comment at https://www.weloennig.de/PLATYPUS.pdf, p. 1.

MAIN TEXT

In the article https://www.weloennig.de/PLATYPUS.pdf I have already referred to the platypus fossil record several times: Pp. 3, 4 (footnote), 6 (footnote), 7 text (and footnote), 18, and 20.
Now a comparison of the data presented in Benton 1993 (left) and Slowik and Lönnig 2026 (right):





Left: Figure 41.1 p. 740 of THE FOSSIL RECORD 2. Edited by M. J. Benton 1993: 845 pp. Right: Update 2026 by R. Slowik and W.-E. Lönnig according to the recent data as presented below.
Figure on the Right by Roland Slowik, Dietzenbach. Link to **high resolution**.

PROTOTHERIA[9]

Starting with the sequence given in Benton, I begin with the family Tachyglossidae (ant eaters):

No. 1 in Benton: Tachyglossidae: First in Benton: "UMI" (1993, p. xii) **11.63 Ma,** which is Tortonian and Messinian (Upper Miocene/UMI). Now Wikipedia and further sources:

Tachyglossidae (Spiny Anteaters) (2026): **Temporal range**: **5.33 Ma – Recent** ("Pliocene–Recent")

https://en.wikipedia.org/wiki/Echidna[10]

PBDB: https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39743&is_real_user=1 Entry only for the **genus** *Echidna*/*Tachyglossus*:

> "Age range: Maximum range based only on fossils: base of the Late/Upper Pleistocene to the top of the Holocene or **0.12900 to 0.00000 Ma.** Minimum age of oldest fossil (stem group age): 0.0117 Ma – Collections (17 total)"

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[8] For example: Posts that critically question the theory of evolution or present scientific arguments for intelligent design are systematically deleted, blocked, or disparaged as pseudoscience. See more on this topic at https://www.weloennig.de/AngiospermsLivingFossils.pdf, p. **21** including also some positive notes and several very informative footnotes.

[9] "**Prototheria** (/ˌproʊtəˈθɪəriə, -toʊ-/, *PROH-toh-THEER-ee-ə*;[1] from Ancient Greek πρῶτος *prōtos* "first" and θήρ *thḗr* "wild animal") is an obsolete subclass of mammals… … some taxonomists (e.g. McKenna & Bell 1997) [and G. G. Simpson 2000] prefer to maintain the name Prototheria as a fitting contrast to the other group of living mammals, the Theria.[8] In theory, the Prototheria is taxonomically redundant, since Monotremata is currently the only order which can still be confidently included, but its retention might be justified if new fossil evidence, or a re-examination of known fossils, enables extinct relatives of the monotremes to be identified and placed within a wider grouping." https://en.wikipedia.org/wiki/Prototheria ("This page was last edited on 14 September 2025") (Retrieved 23 July 2026)

https://grokipedia.com/page/Prototheria: "In strict cladistic taxonomy, Prototheria is considered obsolete. However, the term is retained in some formal resources, such as the IUCN Red List and the **Mammal Diversity Database (as of 2024), for consistency in nomenclature**.[4] Living monotremes (order Monotremata) are classified directly as the basal clade within class Mammalia, sister to the subclass Theria. **Alternative monophyletic groupings**, such as Australosphenida, have been proposed to encompass monotremes and certain Jurassic relatives without including more distant lineages."

[10] Last update 10 July 2026.

Rowe et al. (2008): "Strict molecular clock estimates of the platypus-echidna divergence time **range from 17 Ma to 80 Ma** (1–11), with most opinions favoring the younger end of the spectrum (Table 1). Recent discoveries of Mesozoic and earliest Cenozoic fossils hint at a far deeper geological history for monotremes (12, 13);…" https://pmc.ncbi.nlm.nih.gov/articles/PMC2234122/

Musser 2003: "Analysis of recent fossil monotreme material strongly suggests that monotremes are an ancient group more closely allied with Late Triassic and Early Jurassic mammals than with Late Jurassic–Early Cretaceous mammals (in particular, therian mammals)." https://www.sciencedirect.com/science/article/abs/pii/S1095643303002757?via%3Dihub

As for the **family**: PBFB: "No matching results for Tachyglossidsae" (Retrieved 20 July 2026)
AI (20 July 2026): "…the oldest definitive fossil found for an echidna dates back about **17 million years**. Wikipedia **+4**

Three page insert: A general remark on the origin of just the spines of that family[11]:

If "Evolution not only is a gradual process as a matter of fact; it has to be gradual if it is to do any explanatory work" (Dawkins in full agreement with the dominant evolutionary theory, Neo-Darwinism: See more on its doubtful basics at https://www.weloennig.de/PLATYPUS.pdf pp. 4-5), the spines evolved from hair…

> …by selection of "infinitesimally small changes", "infinitesimally slight variations" and "slow degrees" and hence imagined "steps not greater than those separating fine varieties", "insensibly fine steps" and "insensibly fine gradations", "for natural selection can act only by taking advantage of slight successive variations; she can never take a leap, but must advance by the shortest and slowest steps" or "the transition [between species] could, according to my theory, be effected only by numberless small gradations" (Darwin ad well is virtually the same by the leading Neo-Darwinists today like Barton, B. and D., Charlesworth, Coyne, Dawkins, Futuyma, Kutschera, Mayr, Moran, Muller and many others).

Now let's have a closer look at the origin of just that one feature of the spiny ant eater – The following figures according to Wikipedia (https://en.wikipedia.org/wiki/Echidna):




Left above: "Short-beaked echidna in Australian National Botanic Gardens, Canberra." Autor: Gunjan Pandey (2018)
Right above: "Onkapringa River NP echidna spines" and "Onkaparinga River National Park, within a few km from the Old Noarlunga entrance. An echidna walking among olive trees, or hiding under one of them." Author: Vmenkov (2010)
Left below: "Short-beaked Echidna Skeleton Articulated by Skulls Unlimited International." Author: 'Skimska' (2004)
Right below: "A short-beaked echidna curled into a ball; a foot is visible on the right." Author: 'Nachoman-au' (2003)
For more details see the original article (link above)

Origin of the spines by "infinitesimally small changes", "insensibly fine steps" and "insensibly fine gradations" etc.? – each of the thousands of the additional "slight or even invisible"[12] small steps finally deciding over life and death of the entire ancestral population so affected? Until the present lengths and functions have been achieved?

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[11] which excursion into an evolutionary question you may skip, of course, to simply follow the Fossil Record
[12] See Ernst Mayr cited in https://www.weloennig.de/PLATYPUS.pdf

Let us have a closer look at Mayr's assertions that "Darwin's theory of gradualism … makes more sense the more clearly we recognize that evolution is a ***process involving populations***." And: "***The smaller the effect of a mutation, the greater the probability that it will be advantageous***." In part further reminiscences from some of my earlier articles[44]:

> **First the ensuing basic question**: "Can the struggle for existence create? It can and must eradicate, hence kill. But it can't create anything. ***Just as a sieve cannot create new grains, but can only sift the existing ones***."
>
> **Population Genetics and small effects of mutations**: "Even a new mutation that is slightly favorable will usually be lost in the first few generations after it appears in the population, a victim of genetic drift. If a new mutation has a selective advantage of *S* in the heterozygote in which it appears, then the chance is only 2*S* that the mutation will ever succeed in taking over the population. So, a mutation ***that is 1 percent better in fitness than the standard allele in the population will be lost 98 percent of the time by genetic drift***."
>
> **Small populations**: "The calculations are invalid for small populations where most of the evolutionary novelties are said to have arisen according to the neo-Darwinian theory of evolution and punctuated equilibrium alike [references]. In a small population the rate of advantageous mutations is extremely low (if they appear at all; eons of time are needed to obtain the average 50 identical advantageous dominant mutations for one success) and genetic drift is almost totally substituting natural selection. Also, it is not possible in nature to raise mutation rates indefinitely since error catastrophe occurs when the mutation rate is too high, thereby terminating the existence of the population."

On the question: From which structures do evolutionists derive the spines of the echidna? AI (21 July 2026) answers:

"Evolutionists derive the spines of an echidna from **hair**. Zoologists classify echidna spines as highly modified hairs that consist of keratin—the exact same fibrous protein that makes up fur, claws, and fingernails. [1]
Embryological development and microscopic studies have shown that echidna spines and hairs share a similar morphogenesis and developmental pathway. [1, 2]

- **Ontogeny:** In baby echidnas, **the *initial* skin appendages**[13] produced from birth **form large, sharp spines**. [1]
- **Hair Production:** **After** the initial generations of spines, true hairs with narrower shafts emerge from smaller bulbs to form a fur coat underneath. [1]
- **Evolutionary Link:** Because spines and hairs follow similar developmental sequences, many scientists hypothesize that ancient mammalian fur may have evolved **from the reduction of protective large spines** in ancient mammal-like ancestors. []"

Seems to be a *circulus vitiosus* : "Evolutionists derive the spines of an echidna **from hair**" and "many scientists hypothesize that ancient mammalian **fur [i.e. hair]** may have evolved ***from the reduction of protective large spines*** in ancient mammal-like ancestors" (*cf.* for example Dollo's law).

As to the question "from which structure do evolutionists derive the scales of pangolins (also living fossils – "temporal range 47. 8 – 0 Ma") displaying 'large, protective keratin scales'[14]?" the answer (retrieved 21 July 2026) was:

> "Evolutionists derive the scales of pangolins **from hair**. Pangolin scales are fundamentally large, thick, and overlapping clumps of **fused hairs**. Like mammalian hair, nails, and claws—and very different from reptile scales—they are made entirely of keratin. Research indicates that the genetic and developmental pathways governing scale formation in pangolins are closely linked to those responsible for regular mammalian hair growth. Rather than being inherited from ancient scaly ancestors[15], these specialized scales evolved independently as a unique adaptation (a process of **convergent evolution**) to protect the mammals against predators and environmental stress."[16]

Concerning the question "from which structures derive evolutionists the hair of mammals?" the answer (same date as above) is:

[13] L. Alibardi and G. Rogers (2015): Observations on fur development in echidna (Monotremata, Mammalia) indicate that spines precede hairs in ontogeny: ("In the primitive mammal echidna, ***the initial 2-3 generations*** **of skin appendages produced from birth forms spines and only later true hairs appear.** …the primitive mammalian characteristics of echidnas has also inspired **new speculations** on the evolution of the mammalian hair from mammalian-like reptiles with a spiny coat. **The resemblance** in the morphogenesis between spines and hairs has suggested some hypothesis on hair evolution, in particular that hairs might be derived from the reduction of protective large spines present in ancient mammalian-like reptiles possibly derived from the reduction of pre-existing pointed scales."
https://www.mdpi.com/2076-2615/15/3/457
K. B. Holthaus et al. (2025): "…This review provides an overview of the protein components of skin appendages characterized so far and identifies gaps of knowledge that need to be addressed by future studies. In particular, keratins and proteins encoded by genes of the so-called epidermal differentiation complex are highlighted as critical contributors to the architecture of feathers, scales and claws. As many skin appendage proteins have been predicted but not fully characterized yet with regard to their three-dimensional structure, interactions with other proteins and distribution in skin cells, they are important topics of ongoing research. …. **Spines** of **hedgehogs and echidnas and quills of porcupines** have defensive functions. Their relation to hair is not fully understood [76]. **A transcriptomic analysis of developing hair and spines showed differences in gene expression that need further investigations** [77]. Scales of different morphologies cover large body parts of armadillos [78] and pangolins [79] and the tails of rodents [80], opossums and desmans [4]. The horns of ungulates are cornified epithelial sheaths over a bony outgrowth on the head, whereas horns of rhinos are purely of epithelial origin [81]. Whales of the genus Mysticeti develop a unique cornified skin appendage, namely baleen [82]. Notably, whales and dolphins (cetaceans) lack claws and hair with the exception of rudimentary vibrissae on facial skin [83].
https://www.mdpi.com/2076-2615/15/3/457 base of the Middle Eocene to the top of the Holocene or 48.07000 to 0.00000 Ma
J. Steinbinder et al. (2026): "Studies of skin appendages in a broad range of species have revealed examples of conservation of ancient features **and innovation** of lineage-specific traits as drivers of skin appendage evolution10,11,12,13 https://www.nature.com/articles/s42003-026-10519-y_reference.pdf
[14] https://en.wikipedia.org/wiki/Pangolin Or PBDB: base of the Middle Eocene to the top of the Holocene or **48.07000 to 0.00000 Ma** (22 July 2026)
[15] AI (German edition) Lange Zeit wurde vermutet, dass sie den Hornschuppen von Reptilien ähneln. Moderne genetische und entwicklungsbiologische Untersuchungen zeigen jedoch, dass die Schuppen aus eng miteinander verklebten, keratinisierten Haaren bestehen. Strukturell ähneln sie damit eher den Krallen oder Fingernägeln von Säugetieren."
[16] https://dnascience.plos.org/2016/10/20/how-the-pangolin-got-its-scales-a-genetic-just-so-story/ https://pubmed.ncbi.nlm.nih.gov/39801299/

"Evolutionary biologists trace the origin of mammalian hair to ancestral epidermal skin appendages shared by ancient amniotes (the common ancestors of mammals, reptiles, and birds). Because fossilized soft tissues like hair are incredibly rare, scientists rely on both paleontology and evo-devo (evolutionary developmental biology) to understand its evolutionary history. **Three main precursor structures are heavily debated in evolutionary science**:

1. **Reptilian Scales and Scutes**: Molecular and embryological research highlights deep homologies between hair, avian feathers, and reptilian scales. During embryonic development, all three begin with identical micro-anatomical structures called placodes and use the same signaling molecules. This suggests hair evolved from **ancestral epidermal scales** as a mechanism for endothermic thermoregulation.

2. Glandular Structures (Sebaceous & Sweat Glands)

Another prominent evolutionary theory proposes that hair follicles evolved in tandem with or directly out of **apocrine (sweat) or sebaceous glands**. Early synapsids (mammal-like reptiles) may have possessed glandular skin secretions, **with hairs** growing alongside or evolving from the duct apparatus to help spread these secretions, provide sensory feedback, and keep early ancestors warm at night. [1, 2, 3, 4, 5]

3. Tactile Sensory Hairs (Whiskers)

The very first hairs to appear in the fossil record were likely specialized tactile organs (**whiskers**) used by the ancestors of mammals (therapsids and cynodonts) to navigate their environments. Because many early mammal ancestors were nocturnal, **these sensory hairs** gave them a major evolutionary advantage over diurnal, sight-reliant predators. [1, 2, 3]

And from what feature and how did the **hair(s)** in 2. ("with **hairs**") and 3. ("whiskers" "these sensory **hairs**") originate?

As for the protective large, sharp spines of the ***Echidna*** species one should keep in mind that this is **just one feature** being coordinated/co-adapted/synorganized with hundreds of further complex anatomic, physiologic characters and instincts/inborn behaviors and corresponding DNA sequences and probably also membrane patterns that carry ontogenetic information that is specified independently of DNA (Jonathan Wells[17]).

I have often cited excellent biologists – from Georges Cuvier to a series of present authors[18] emphasizing such statements as just given above. Here I would like to quote a famous astronomer, namely Allan Sandage showing that one must not be a specialist in biology to grasp the following basic fact:

> "The world is too complicated in all parts and interconnections to be due to chance alone. I am convinced that the existence of life with all its order in each of its organisms is simply too well put together. Each part of a living thing depends on all its other parts to function. How does each part know? How is each part specified at conception? The more one learns of biochemistry the more unbelievable it becomes unless there is some type of organizing principle - **an architect**."[19]

End of Insert

And back to the fossil record of the prototheria

No. 2 in Benton: Ornithorhynchidae (including the *Platypus*): In Benton: Cretaceous: ALB (Albian) **113 Ma to Recent**
According to Wikipedia: Temporal range: Oligocene to Present, **26–0 Ma**
https://en.wikipedia.org/wiki/Ornithorhynchidae

PBDB: "No matching results for "Ornithorhynchidae" (23 July 2026)
However, under *Platypus*:

"**Age range**: Maximum range based only on fossils: base of the Late/Upper Miocene to the top of the Middle Pleistocene or **11.63000 to 0.12900 Ma**. [To Recent!] Minimum age of oldest fossil (stem group age): 5.333 Ma" – Collections (5 total)

AI (23 July 2026) on the question: Which are the oldest dates given for the fossil record of the Ornithorhynchidae?
"The oldest accepted fossils definitively belonging to the platypus family (Ornithorhynchidae) date back approximately **61 million years ago to the Paleocene epoch**."

Moreover: "Here are the specific, oldest dates in the record [demonstrating the tremendous constancy of the basic forms]:

"61-63Million Years Ago (Paleocene): The oldest widely accepted ornithorhynchid fossil is ***Monotrematum sudamericanum*,** which was discovered in Patagonia, Argentina. Finding a platypus ancestor in South America highlights that these mammals lived across the supercontinent Gondwana before the continents separated.
70 Million Years Ago (Late Cretaceous): Recently discovered fragmentary fossils in southern Argentina, such as ***Patagorhynchus pascuali,*** represent some of the oldest known egg-laying mammal relatives in South America. [1, 2, 3, 4]
112-121 Million Years Ago (Early Cretaceous): In Australia, the ancient genus ***Teinolophos*** (specifically *Teinolophos trusleri*) from Victoria's Flat Rocks locality is often cited as ***the oldest basal platypus***. While some paleontologists classify this as an early stem-group monotreme, **CT scans showing bill-like nerve canals suggest it sits *close to or within the modern platypus family tree***. [1, 2, 3]"

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[17] See literature reference in https://www.weloennig.de/PLATYPUS.pdf p. 30.
[18] *Cf.* the articles at my homepage https://www.weloennig.de/internetlibrary.html
[19] https://www.azquotes.com/author/28127-Allan_Sandage (retrieved 22 July 2026)

Now the additional families of the prototheria suggested in the interim

A) Shuotheriidae[20]: **Temporal range: Middle-Late Jurassic: 174 to 145 Ma**
https://en.wikipedia.org/wiki/Shuotheriidae[21]
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=64366&is_real_user=1
"**Age range**: base of the Bathonian to the top of the Callovian *or* **168.20000 to 161.50000 Ma**"
Collections (3 total)
(Retrieved 15 June 2026.)

B) Opalionidae ("new monotypic family", Flannary et al. 2024): **Temporal range: Cenomanian 100.5 to 93.9 Ma**[22]
https://en.wikipedia.org/wiki/Dharragarra
Neither in PBDB nor in Mindat.org[23]**, but in** https://extinctworld.in.ua/tag/opalionidae/
(Retrieved 15 June 2026.)

C) **Kollikodontidae**: **Temporal range: Cretaceous** (**Albian–Cenomanian**): **~113–96 Ma**
https://en.wikipedia.org/wiki/Kollikodon[24]
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=166571&is_real_user=1
Monotremata - Kollikodontidae
"**Age range**: base of the Early/Lower Albian to the top of the Middle Cenomanian or **113.20000 to 93.90000 Ma**"
Collections (2 total)
https://www.mineralienatlas.de/lexikon/index.php/FossilData?fossil=Kollikodon:
"Early/Lower Albian **113.2 - 110.1** Australia (Victoria) *Sundrius ziegleri* (118946) Early/Lower Cenomanian - Middle Cenomanian **100.5 - 93.9** Australia (New South Wales) *Kollikodon ritchiei* (95861)
"Monotremata (Ordnung), Kollikodontidae (Familie), *Kollikodon* (Gattung), *Kollikodon ritchiei* (Art)"
(Retrieved 15 June 2026.)

D) Teinolophidae: Temporal range: Late Cretaceous (Cenomanian): 100.5 to 93.9 Ma
Order Monotremata, Family †Teinolophidae (?)
https://en.wikipedia.org/wiki/Stirtodon[25] "This page was last edited on 26 September 2025."
PBDB: "No matching for "Teinolophidae".
AI: **126 - 130 Ma**[26] (Retrieved 15 June 2026.)

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[20] "…often controversially includes monotremes… https://en.wikipedia.org/wiki/Shuotheriidae
[21] "Shuotheriidae is a small family of Jurassic mammaliaforms whose remains are found in China, Great Britain and possibly Russia. They have been proposed to be close relatives of Australosphenida (which often controversially includes monotremes), together forming the clade Yinotheria. However, some studies suggest shuotheres are closer to therians than to monotremes,[3][4][5] or that australosphenidans and therians are more closely related to each other than either are to shuotheres,[6] with a 2024 study suggesting that **shuotheriids were closely related to Docodonta** outside of the Mammalia crown group.[7] https://en.wikipedia.org/wiki/Shuotheriidae." - "This page was last edited on 24 May 2025, at 18:53 (UTC)." (Retrieved 17 Juni 2026.)
[22] *Opalios* (meaning "opal") is an extinct genus of **monotreme** mammal from the Late Cretaceous (Cenomanian) Griman Creek Formation of Australia. The genus contains a single species, O. splendens, known from a fragmentary left dentary.
[23] https://en.wikipedia.org/wiki/Mindat.org
[24] "This page was last edited on 23 December 2025, at 08:44 (UTC)": *Kollikodon* is an extinct species of mammal, considered to be **an early monotreme**.[2] It is known only from an opalised dentary fragment, with one premolar and two molars in situ, as well as a referred maxillary fragment containing the last premolar and all four molars. The fossils were found in the Griman Creek Formation at Lightning Ridge, New South Wales, Australia. *Kollikodon* lived in the **Late Cretaceous** period, during the **Cenomanian age (99–96 million years ago).** Several other monotremes are known from the Griman Creek Formation, including *Dharragarra*, *Opalios*, *Parvopalus*, *Steropodon*, and *Stirtodon*.[3]
[25]"*Stirtodon* is an extinct genus of **monotreme** mammal from the Late Cretaceous (Cenomanian) Griman Creek Formation of Australia. The genus contains a single species, *S. elizabethae*, known from a large isolated premolar. *Stirtodon* **may be the largest toothed monotreme discovered**.[1][2] Several other monotremes are known from the Griman Creek Formation, *including Dharragarra, Kollikodon, Opalios, Parvopalus, and Steropodon*.[3] https://en.wikipedia.org/wiki/Stirtodon
[26] Teinolophidae is an extinct family of extremely early egg-laying mammals **(monotremes)** from what is now Australia. Weighing an estimated 40 grams, they lived approximately **126 to 130 million years ago** in the dark, freezing polar regions of the Early Cretaceous.
The most notable characteristics and historical facts regarding these prehistoric animals include:
Oldest known monotreme: The type genus *Teinolophos trusleri* represents the **oldest evidence of the monotreme group** discovered to date.
Cretaceous survivors: Despite the extreme conditions of the Southern Hemisphere during the Cretaceous (near the South Pole, with at least three months of total darkness and freezing temperatures), these small mammals survived.
Specialized senses: Researchers hypothesize that the animals possessed an electrosensitive mechanism in their beaks, similar to that of the modern platypus. This allowed them to hunt for insects they could not see amidst the cold moss and snow.
Genera: The family comprises two officially described genera: *Teinolophos* and *Stirtodon*.
Discovery: The fossil remains—mostly consisting of tiny lower jawbones—were discovered at sites including the Wonthaggi Formation near Flat Rocks in southern Victoria, Australia.
Their classification as a distinct family, Teinolophidae, **was formally established by an international team of researchers**, notably in the scientific journal Alcheringa.
Original German Text: "Teinolophidae ist eine ausgestorbene Familie extrem früher eierlegender Säugetiere (Kloakentiere) aus dem heutigen Australien. Mit einem geschätzten Gewicht von nur rund 40 Gramm lebten **sie vor etwa 126 bis 130 Millionen** Jahren in den dunklen, frostigen Polargebieten der Unterkreide.
Die bemerkenswertesten Merkmale und historischen Fakten dieser urzeitlichen Tiere umfassen:
Ältestes bekanntes Kloakentier: Die Typusgattung *Teinolophos trusleri* ist der bisher älteste nachgewiesene Beleg für die Gruppe der Kloakentiere.
Überlebenskünstler der Kreidezeit: Trotz der extremen Bedingungen der südlichen Hemisphäre zur Kreidezeit (nahe dem Südpol, mit mindestens drei Monaten völliger Dunkelheit und eisigen Temperaturen) überlebten diese kleinen Säuger.
Besondere Sinne: Forscher vermuten, dass die Tiere über einen elektro-sensitiven Mechanismus in ihrem Schnabel verfügten, ähnlich dem des heutigen Schnabeltiers. Damit konnten sie im kalten Moos und Schnee nach Insekten jagen, die sie nicht sehen konnten.
Gattungen: Die Familie umfasst zwei offiziell beschriebene Gattungen: Teinolophos und Stirtodon.
Entdeckung: Die fossilen Überreste, meist nur winzige Unterkieferknochen, wurden unter anderem in der Wonthaggi-Formation bei Flat Rocks im Süden Victorias, Australien, entdeckt.
Die Einstufung als eigenständige Familie Teinolophidae wurde unter anderem im Fachjournal Alcheringa durch ein internationales Forscherteam formell etabliert." AI: 15 June 2026.

After the Prototheria with *Echidna* and *Platypus* and several 'new' families the following orders are covered in Benton: Triconodonta, Allotheria: Multituberculata, Symmetrodonta, Cladotheria and Marsupialia (Figure 41.1 p. 740 and the following text to p.744).

Thus, all together 6 families for the Prototheria

TRICONODONTA

So, let's turn to the Triconodonta. Now, instead of simply continuing directly with the sequence shown in Benton, we will first turn to the data presented at AI:

AI (13 July 2026) on the question: How many and which families belong to the Triconodonta?

"The order **Triconodonta** (commonly referred to as eutriconodonts) consists of **four to five** primary fossil families of early Mesozoic mammals: [1, 2, 3]

- **Triconodontidae**
- **Amphilestidae**
- **Gobiconodontidae**
- **Repenomamidae**
- **Austrotriconodontidae** (sometimes grouped separately or within broader subgroups) [1, 2, 3, 4, 5, 6]"

AI continued: "Some paleontological classifications also include primitive[27] families like the **Morganucodontidae** and **Megazostrodontidae**, though these are often reclassified into their own distinct orders or placed as mammaliaforms just outside true crown mammals. [1, 2, 3, 4]. **Primary Characteristics & Background**: These early mammals lived from the **Late Triassic to the Late Cretaceous** periods. They are primarily defined by their distinctive molar teeth, which featured three main conical cusps arranged in a row (giving them the name "three conical teeth"). Many were small, nocturnal insectivores or carnivores, though some groups (like Gobiconodon and Repenomamus) **grew to larger sizes** and are known to have occasionally preyed on small dinosaurs."

According to the **German AI version** (same day/here translated): "Triconodonts (often also referred to as Eutriconodonts) are an extinct group of Mesozoic mammals that lived from the **Middle Jurassic to the Late Cretaceous**. Their classification varies depending on the source; however, they are traditionally divided into the following **five to seven** main families [1, 2, 3, 4] [28]:

Triconodontidae: Die namengebende, bekannteste Familie (z.B. *Triconodon*), charakterisiert durch drei fast gleich große Höcker auf den Backenzähnen. [1, 2, 3]

- **Amphilestidae:** Eine weitere wichtige und artenreiche Gruppe, bei der der mittlere Höcker deutlich größer ist. [1]
- **Gobiconodontidae:** Eine Familie, die einige der damals größten bekannten Säugetiere hervorbrachte (z.B. *Repenomamus*). [1, 2]
- **Jeholodentidae:** Bekannt durch bemerkenswert gut erhaltene Skelettfunde aus China (z.B. *Jeholodens*), die wichtige Einblicke in die Entwicklung des Säugetierohrs liefern. [1]
- **Alticonodontidae:** Häufig als eigene Familie innerhalb der Gruppe geführt, oft im Zusammenhang mit den *Triconodontidae* betrachtet. [1, 2]"

Thus, the following families are added here:

Jeholodentidae: Bekannt durch bemerkenswert gut erhaltene Skelettfunde aus China (z.B. *Jeholodens*), die wichtige Einblicke in die Entwicklung des Säugetierohrs liefern. [1]

Alticonodontidae: Häufig als eigene Familie innerhalb der Gruppe geführt, oft im Zusammenhang mit den *Triconodontidae* betrachtet. [1, 2]

So, instead of the Repenomamidae and Austrotriconodontidae of the English AI Version the Jeholodentidae and Alticonodontidae are mentioned in the German edition.

In Benton (see above) only the following four families are listed for the Triconodonta
Under the following numbers:

No. 3: Morganucodontidae
No. 4: Sinoconodontidae
No. 5: Amphilestidae
No. 6 Triconodontidae

Hence, comparing the family names, the Morganucodontidae and Sinoconodontidae are only mentioned in Benton's THE FOSSIL RECORD 2.

[27] See footnote below.

[28] Original German text: Die **Triconodonta** (oft auch als Eutriconodonta bezeichnet) sind eine ausgestorbene Säugetiergruppe des Mesozoikums, die vom mittleren Jura bis zur Oberkreide lebte. Die Systematik variiert je nach Quelle; klassisch werden sie jedoch in folgende **5 bis 7 Hauptfamilien** unterteilt: [1, 2, 3, 4]

Now let's check Wikipedia and the PBDB (Paleobiology Database) of 2026 beginning with the sequence provided in Benton followed by the recent discoveries and corrections.

No. 3 in Benton: Morganucodontidae: **Temporal range**: **Late Triassic – Lower Cretaceous 210–140 Ma**
In Wikipedia under
https://de.wikipedia.org/wiki/Morganucodonta and https://de.wikipedia.org/wiki/Morganucodon
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39748&is_real_user=1
"**Age range**: base of the Carnian to the top of the Late/Upper Bathonian *or* **237.00000 to 165.30000 Ma**
Collections (22 total) (Retrieved 15 July 2026.)

No. 4 in Benton: Sinoconodontidae: **Temporal range: Only** "in the fossil record of the Lufeng Formation of China in the Sinemurian stage of the Early Jurassic period, about **193 million years ago**"
In Wikipedia under https://en.wikipedia.org/wiki/Sinoconodon
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39748&is_real_user=1
According to PBDB: "Sinoconodontidae (disused)" and "No collection or age range data are available"
However, there is a long (strongly evolutionary minded [geprägter]) article on *Sinocodon* in https://grokipedia.com/page/Sinoconodon "…approximately **199–190 million years ago"** ("early Jurassic"). See perhaps also AI under the family name ("…die zu Beginn des Jura vor **etwa 193 bis 200 Millionen** Jahren lebten.") (Retrieved 15 July 2026.)

No. 5 in Benton: Amphilestidae: **Temporal range: 168–93 Ma**
https://en.wikipedia.org/wiki/Amphilestidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=203411&is_real_user=1
"Age range: base of the Late/Upper Bathonian to the top of the Aptian or **168.20000 to 113.20000 Ma**
Collections (12 total)." (Retrieved 15 July 2026.)

No. 6 in Benton: Triconodontidae: **Temporal range**: **Middle Jurassic - Late Cretaceous, 190–66 Ma**
https://en.wikipedia.org/wiki/Triconodontidae (Retrieved 15 July 2026.)
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39760&is_real_user=1
"**Age range**: base of the Pliensbachian to the top of the Late/Upper Santonian or **192.90000 to 83.60000 Ma**
Collections (49 total)" (Retrieved 15 July 2026.)

Additional families suggested in the interim up to August 2026:

E) **Alticonodontidae:** AI: **190–66 Ma** (AI: "Often classified as a separate family within the group, frequently considered in conjunction with the Triconodontidae. [1, 2]
However not in Wikipedia or PBDB ("no matching results for Alticonodontidae"). (Retrieved 15 July 2026))

F) **Gobiconodontidae:** Temporal range: **184–94 Ma** [AI (from German): "A family that produced some of the largest known mammals of that time (e.g., *Repenomamus*). [1, 2]" Retrieved 15 July 2026]]
https://en.wikipedia.org/wiki/Gobiconodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=67668&is_real_user=1
"Age range: base of the Pliensbachian to the top of the Piacenzian [Pliocene!] or **192.90000 to 2.58000 Ma**
Collections (21 total)." (Retrieved 15 July 2026.)

G) **Jeholodentidae**: Temporal range: Early Cretaceous, **125–122 Ma**
https://en.wikipedia.org/wiki/Jeholodentidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=109001&is_real_user=1
"Age range: base of the Late/Upper Barremian to the top of the Early/Lower Aptian or **125.77000 to 119.57000 Ma**
Collections: one only." (Retrieved 15 July 2026.)

H) **Megazostrodontidae:** Temporal range: Rhaetian–Hettangian: **~205.7–199.5 Ma**
https://de.wikipedia.org/wiki/Megazostrodon
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=208885&is_real_user=1
"Age range: base of the Sinemurian to the top of the Bathonian or **199.50000–165.30000 Ma**
Collections (7 total)." (Retrieved 15 July 2026.)

Thus, all together 8 families for the Triconodonta

Allotheria

MULTITUBERCULATA

AI (26 July 2026): "Multituberculata are an extinct order of successful, rodent-like mammals named for the multiple cusps on their molars. They lived from the Middle Jurassic to the Oligocene epoch, boasting the longest fossil history of any mammalian lineage with no living descendants.

Key Characteristics

- **Teeth:** Characterized by complex molars featuring multiple rows of cusps and specialized, blade-like lower premolars.
- **Lifestyle:** Ranging **from mouse-sized to beaver-sized**, they occupied diverse ecological niches including burrowing, arboreal, and hopping habits as plant-eaters and seed-crushers.

- **Timeline:** **Flourished during the dinosaur era** and survived the Cretaceous-Paleogene extinction event before eventually declining. [1, 2, 3, 4]"

AI (15 July 2026): "… classification can vary depending on the specific scientific study or taxonomic revision used. Paleontologists generally recognize between **14 and 18 distinct families within the order**." 26 July 2026: "…includes approximately 14 recognized families…"

UCMP: "Multituberculates first appeared in the Late Jurassic, and went extinct in the early Oligocene, with the appearance of true rodents. Over 200 species are known, ***some as small as the tiniest of mice, the largest the size of beavers***" (https://ucmp.berkeley.edu/mammal/multis/multis.html). Retrieved 17 July 2026.

In Benton the authors have mentioned **15 families** for the **Multituberculata** in the ensuing sequence:

7. **Plagiaulacidae**
8. **Arginbaataridae**
9. **Neoplagiaulacidae**
10. **Ptilodontidae**
11. **Cimolodontidae**
12. **Boffiidae**
13. **Eobaataridae**
14. **Sloanbaataridae**
15. **Cimolomyidae**
16. **Taeniolabididae**
17. **Eucosmodontidae**
18. **Sudamericidae**
19. **Ferugliotheriidae**
20. **Haramiyidae**
21. **Theroteinidae**

According to AI (15 July 2026) altogether) **17 families** (see below)**.** Moreover, **AI** distinguishes between so-called "primitive lines" and phylogenetically "derived lines" (according to its evolutionary sources – see links in the footnote on the presuppositions and problems of (especially) the term "primitive" as well as several other important points like gradualism, the meaning of morphological similarity and convergence[29]).
"Primitive Lines (formerly Plagiaulacida)":

- **Paulchoffatiidae:** One of the best-known early lineages, predominantly found in the Late Jurassic of Europe.
- **Plagiaulacidae:** The namesake family of the primitive lines, known from the Late Jurassic to Early Cretaceous.
- **Pinheirodontidae:** A family defined largely by distinct, specialized lower incisors, found in the Lower Cretaceous **Allodontidae:** Early Mesozoic omnivores recognized for their multicuspid tooth patterns.
- **Allodontidae:**
- **Eobaataridae:** Early Cretaceous family known from well-preserved Asian and European fossil beds.
- **Arginbaataridae:** A transitional, Early Cretaceous family from Asia exhibiting mixed primitive and derived traits. [1, 2, 3, 4, 5]

"Derived Lines (***Cimolodonta***)"

This monophyletic suborder contains the more advanced, highly specialized multituberculates that thrived during the Cretaceous and survived into the Cenozoic. [1, 2, 3, 4, 5]

Ptilodontoidea (Arboreal/Small forms) [1]

- **Ptilodontidae:** Highly adapted, squirrel-like climbers from the Late Cretaceous and Paleocene.
- **Neoplagiaulacidae:** A successful family of small, chipmunk-sized climbers that were remarkably among the last surviving multituberculates.
- **Microcosmodontidae:** Tiny, shrew-sized multituberculates. [1, 2, 3, 4, 5]

Taeniolabidoidea (Large/Burrowing forms) [1, 2, 3]

- **Taeniolabididae:** Included some of the largest, ground-dwelling, beaver-sized multituberculates of the Paleocene.
- **Lambdopsalidae:** A specialized, Asian Paleocene family adapted for leaf-grazing and burrowing. [1, 2, 3]

Djadochtatherioidea (derived Asian forms) [1, 2]

- **Djadochtatheriidae:** A prominent family from the Gobi Desert, notable for their unique, trapezoid-shaped snouts and specialized ankle joints.
- **Sloanbaataridae:** Small, Late Cretaceous Asian group. [1, 2, 3, 4]

Other Notable Cimolodont Families:

- **Cimolodontidae:** A widespread North American family.
- **Cimolomyidae:** Late Cretaceous group including forms like *Meniscoessus*.

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[29] See please my scientific critique concerning these terms in **https://www.weloennig.de/Hunderassen.Bilder.Word97.pdf**, especially **pp. 286 to 292, 295, 297, 298 etc. *cf.* also pp. 363, 390** ("The multituberculates … apparently evolved separately – as did the Monotremata [….]." https://www.weloennig.de/KoalaPart2.pdf especially p.7, https://www.weloennig.de/GiraffeFossilRecord.1abc.pdf pp. 12, 13, 15 to 18.

- **Kogaionidae:** Highly endemic, island-dwelling family found in the Late Cretaceous of Europe.
- **Eucosmodontidae:** Late Cretaceous to Paleocene group including taxa known for their specialized incisors. [1, 2, 3, 4]

INSERT: https://en.wikipedia.org/wiki/List_of_multituberculate_species lists **26 families** including **3 families "Incerta sedis"** and altogether **93 Genera** (about a dozen with question mark) ("article last edited 30 March 2025")[30].

As already practiced above for the Triconodonta, I'm now going to start with the sequence presented in Benton for the Multituberculata followed by the families determined and added during the last (more than) three decades in different data bases.

No. 7 in Benton: Plagiaulacidae: Temporal range: 165.5-100.5 Ma
https://en.wikipedia.org/wiki/Plagiaulacidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39802&is_real_user=1
"Age range: base of the Rhaetian to the top of the Torrejonian or **205.70000 to 60.90000 Ma**"
Collections (18 total) (Retrieved 18 July 2026)

No. 8 in Benton: Arginbaataridae: Temporal range: 143.1 – 100.5 Ma ("Early Cretacious")
https://en.wikipedia.org/wiki/Arginbaatar
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39791&is_real_user=1
"Age range: base of the Late/Upper Aptian to the top of the Early/Lower Albian or 119.57000 to 110.10000 Ma"
Collections: one only (Retrieved 18 July 2026)

No. 9 in Benton: Neoplagiaulacidae: Temporal range: 100.5-33.9 Ma ("Late Cretaceous–Early Oligocene")
https://en.wikipedia.org/wiki/Neoplagiaulacidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=67560&is_real_user=1
"Age range: base of the Early/Lower Cenomanian to the top of the Middle Chadronian *or* **100.50000 to 33.90000 Ma**"[31]
Collections (344 total)." (Retrieved 18 July 2026)

No. 10 in Benton: Ptilodontidae: Temporal range: 100.5-56 Ma ("Late Cretaceous–Paleocene")
https://en.wikipedia.org/wiki/Ptilodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39810&is_real_user=1
"Age range: base of the Late/Upper Campanian to the top of the Clarkforkian or **83.60000 to 56.00000 Ma**
Collections (131 total)" (Retrieved 18 July 2026)

No. 11 in Benton: Cimolodontidae: Temporal range: 100.5–56 Ma ("Late Cretaceous–Paleocene")
https://en.wikipedia.org/wiki/Cimolodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39823&is_real_user=1
"Age range: base of the Middle Cenomanian to the top of the Ti1 or **100.50000 – 57.50000 Ma**
Collections (133 total)" (Retrieved 19 July 2026)

No. 12 in Benton: Boffiidae: Temporal range: ~65 – 62 Ma (Danian)
https://en.wikipedia.org/wiki/Boffius (redirected from Boffiidae)
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39808&is_real_user=1
"Age range: Danian or **66.00000 – 61.66000** Ma
Collections: one only"
AI (19 July 2026): "…related species grew to be about the size of a red kangaroo."
"…Early Paleocene (around **66 to 56** million years ago)…"

No. 13 in Benton: Eobaataridae: Temporal range: 154–100 Ma
https://en.wikipedia.org/wiki/Eobaataridae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=106762&is_real_user=1
"Age range: base of the Toarcian to the top of the Aptian or **184.20000 to 113.20000 Ma**
Collections (19 total)" (Retrieved 19 July 2026)

No. 14 in Benton: Sloanbaataridae: Temporal range: 100.5 – 66 Ma ("Late Cretacious")
https://en.wikipedia.org/wiki/Sloanbaataridae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39850&is_real_user=1
"Age range: Late/Upper Campanian or **83.60000 – 72.20000 Ma**
Collections (3 total)" (Retrieved 19 July 2026)

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[30] Similarly: https://eol.org/pages/4471922 "Multituberculata is an order of Mammal. There are **203 species of Multituberculata, in 93 genera and 20 families**. It includes groups like Cimolomyidae, Ptilodontidae, and Eucosmodontidae." Encyclopedia of Life (Smithonian). Retrieved 17 July 2026.
Wikipedia again: "The structure of the pelvis in the Multituberculata suggests that they gave birth to tiny helpless, underdeveloped young, similar to modern marsupials, such as kangaroos.[2][7] However, a **2022 study reveals that they might actually have had long gestation periods like placentals**.[12] However, **in 2024, all Allotheria (including multituberculates) fell outside the crown group of Mammalia, implying that cimolodonts developed *placental-like gestation (and viviparity in general) independently***, rather than multituberculates and therians having a common viviparous ancestor.[13] ("This page was last edited on 25 April 2026")

[31] AI: Middle Chadronian: "36.5 to 34.0 million years ago (Ma), though recent radioisotopic recalibrations suggest parts of the age may extend slightly older, around **37.5 Ma**. (Retrieved 18 July 2026)

No. 15 in Benton: Cimolomyidae: Temporal range:, 85.8 – 66 Ma (Late Santonian to Late Maastrichtian)
https://en.wikipedia.org/wiki/Cimolomyidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39853&is_real_user=1

"Age range: base of the Santonian to the top of the Late/Upper Maastrichtian or **85.70000 – 66.00000 Ma**#
Collections (186 total)" (Retrieved 19 July 2026

No. 16 in Benton: Taeniolabididae: Temporal range: 66 – 63 Ma
https://en.wikipedia.org/wiki/Taeniolabididae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39828&is_real_user=1

"Age range: base of the Late/Upper Maastrichtian to the top of the Tiffanian or **72.20000 to 57.50000 Ma**
Collections (54 total)" (Retrieved 20 July 2026)

No. 17 in Benton: Eucosmodontidae: Temporal range: 100.5 – 48 Ma ("Late Cretaceous - early Eocene")
https://en.wikipedia.org/wiki/Eucosmodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39836&is_real_user=1

"Age range: base of the Late/Upper Campanian to the top of the Wasatchian or **83.60000 to 51.10000 Ma**
Collections (113 total)"
AI: ca **75 – 50 Ma** (All retrieved 21 July 2026)

No. 18 in Benton: Sudamericidae: Temporal range: 70.6 – 17.5 Ma (Late Cretaceous to Miocene)
https://en.wikipedia.org/wiki/Sudamericidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=57604&is_real_user=1

"Age range: base of the Late/Upper Campanian to the top of the Rupelian or **83.60000 to 27.30000 Ma**
Collections (17 total)" (Retrieved 21 July 2026)

No. 19 in Benton: Ferugliotheriidae: Temporal range: 100.5 – 23 Ma (Late Cretaceous; Paleogene?)
https://en.wikipedia.org/wiki/Ferugliotheriidae

PBDB: "No collection or age range data are available" (Retrieved 21 July 2026)
AI: about **84 - 66 Ma** (Also retrieved 21 July 2026)

No. 20 in Benton: Haramiyidae: Temporal range: 216.5 –125 Ma (Late Triassic–Early Cretaceous)
https://en.wikipedia.org/wiki/Haramiyida
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39857&is_real_user=1

"Age range: base of the Rhaetian to the top of the Sinemurian or **205.70000 – 192.90000 Ma**
Collections (17 total)" (Retrieved 21 July 2026)

No. 21 in Benton: Theroteinidae: Temporal range: Rhaetian [**ca.208 – 201 Ma**]
Only under: https://en.wikipedia.org/wiki/Theroteinus
https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=txn:65493: Rhaetic AI: **205 – 201 Ma**
Geologic Time Table (2023/2026): ca. **208. 5 – 201.4**

Also **PBDB:** "Theroteinidae (disused)" and "No collection or age range data are available"
AI (21 July 2026): **210 bis 201 Ma**

Additional families suggested in the interim up to August 2026:

I) Paulchoffatiidae: Temporal range: 154.8 – 121.4 (Kimmeridgian–Barremian)
https://en.wikipedia.org/wiki/Paulchoffatiidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39793&is_real_user=1

Age range: base of the Late/Upper Bathonian to the top of the Late/Upper Barremian or **168.20000 to 121.40000 Ma**
Collections (14 total) (Retrieved 24 July 2026)

J) Pinheirodontidae:
No entry in Wikipedia.
KI: Temporal range: 154.8 – 121.4 (Kimmeridgian–Barremian)
https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=txn:106753

Age range: base of the Late/Upper Kimmeridgian to the top of the Early/Lower Barremian or
152.21000 to 121.40000 Ma
Collections (8 total) (Retrieved 24 July 2026)

K) Allodontidae: Temporal range 161.5 – 143.1 Ma: (Late Jurassic)
https://en.wikipedia.org/wiki/Allodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=54218&is_real_user=1

Age range: base of the Early/Lower Tithonian to the top of the Middle Berriasian or **149.20000 to 139.10000 Ma**
Collections (8 total) (Retrieved 24 July 2026)

L) Microcosmodontidae Temporal range: 100.5 – 61.6 Ma (Late Cretaceous - early Paleocene [Danian])
https://en.wikipedia.org/wiki/Microcosmodontidae
PBDB: "No matching for "Microcosmodontidae""

AI: "…lived from Late Cretaceous period (around **73 million years ago) through the Paleocene epoch**,
surviving the Cretaceous–Paleogene mass extinction": **73 – 56 Ma** (Retrieved 24 July 2026)

M) Lambdopsalidae: Temporal range: 59–55 Ma (Thanetian/Late Paleocene)
https://en.wikipedia.org/wiki/Lambdopsalidae
PBDB: No matching for "Lambdopsalidae"
German **AI**: about **59 - 55 Ma** (Retrieved 24 July 2026)

N) Djadochtatheriidae: Temporal range: 100.5 – 66.0 Ma (Late Cretaceous)
https://en.wikipedia.org/wiki/Djadochtatheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=57339&is_real_user=1
"Age range: base of the Late/Upper Campanian to the top of the Campanian or **83.60000 to 72.20000 Ma**
Collections (14 total)
AI: **75 - 71 Ma** (All retrieved 24 July 2026)

O) Kogaionidae: Temporal range: 66–55 Ma (Late Cretaceous-Eocene)
https://en.wikipedia.org/wiki/Kogaionidae
https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=txn:106769
Age range: base of the Late/Upper Maastrichtian to the top of the Thanetian or **72.20000 to 56.00000 Ma**
Collections (27 total) (Retrieved 24 July 2026)

Additional families according to https://en.wikipedia.org/wiki/List_of_multituberculate_species

P) Zofiabaataridae: Temporal range: 161.5 – 143.1 Ma (Late Jurassic)
https://en.wikipedia.org/wiki/Zofiabaatar
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=57639&is_real_user=1
Age range: Tithonian or **149.20000 to 143.10000 Ma**
Collections: one only
(Retrieved 24 July 2026)

Q) Albionbaataridae: Temporal range: 161.5 – 100.5 (Late Jurassic - Early Cretaceous)
https://en.wikipedia.org/wiki/Albionbaataridae#References
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=106759&is_real_user=1
Age range: base of the Kimmeridgian to the top of the Albian or **154.80000 to 100.50000 Ma**
Collections (5 total)
AI: "…around **157.3** million years ago) through the Early Cretaceous period: **157.3 – 100.5 Ma**
(All retrieved 24 July 2026)

R) Groeberiidae: Temporal range: 45–28 Ma (Eocene – Oligocene)
https://en.wikipedia.org/wiki/Groeberiidae PBDB: DISUSED
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40079&is_real_user=1
"No collection or age range data are available"
AI: ca. 40 - 30 Ma ("vom späten Eozän bis zum frühen Oligozän (vor etwa 40 bis 30 Millionen Jahren")

So, all together 35 families are currently counted in the order Multituberculata.

SYMMETRODONTA

Symmetrodonta: Temporal range: Early Cretaceous–Campanian https://en.wikipedia.org/wiki/Symmetrodonta

https://www.spektrum.de/lexikon/biologie/symmetrodonta/64944: Symmetrodonta [from Greek symmetros = symmetrical, odontes = teeth] (Simpson 1925): an extinct order of early mammals **comprising 5 families and 22 genera**; known only from teeth and jaw fragments, and characterized by symmetrically constructed molars in the upper and lower jaws that produce a cutting, shearing bite upon occlusion. **Some authors** regard them as ancestral forms and as an order within the Pantotheria. Best-known European genus: *Spalacotherium* (Spalacotheriidae). According to **some authors**, the Kuehneotheriidae are no longer classified as Symmetrodonta but instead constitute a **separate order or superlegion, Kuehneotheria (McKenna 1975).** Distribution: Late Jurassic to Late Cretaceous of North America; Late Cretaceous of South America; Middle Jurassic to Early Cretaceous of Europe; Early Jurassic to Early Cretaceous of East Asia. *Zhangheotherium*.[32]

For the latter see the ensuing Figures:

Left: *Zhangheotherium quinquecuspidens* fossil displayed in Hong Kong Science Museum.
https://en.wikipedia.org/wiki/Symmetrodonta#/media/File:Zhangheotherium_quinquecuspidens.jpg
Right: “Reconstitution du squelette de *Zhangheotherium quinquecuspidens*. https://fr.wikipedia.org/wiki/Symmetrodonta[33]

According to AI (27 July 2027: “Traditionally, **Symmetrodonta** includes around 4 to 6 main fossil families, though modern paleontology views it as an artificial or paraphyletic group rather than a single true clade.”

“Traditional and Historical Families“

- **Kuehneotheriidae**: Late Triassic to Early Jurassic forms with obtuse molar cusps.
- **Spalacotheriidae**: Cretaceous acute-angled symmetrodonts.
- **Zhangheotheriidae**: Early Cretaceous Asian group now often placed with spalacotherioids.
- **Tinodontidae**: Jurassic-Cretaceous taxa with primitive triangular molar patterns.
- **Amphidontidae**: Early classification group by G.G. Simpson.
- **Woutersiidae**: Late Triassic micro-mammal group. [1, 2, 3, 4, 5, 6, 8]

However, in Benton in the following series numbers are shown:

22. **Amphidontidae**
23. **Spalocodontidae**
24. **Barbereniidae**
25. **Shuotheriidae**

So, No 22 in Benton: Amphidontidae: Temporal range: ~184–125 Ma (Early Jurassic-Early Cretaceous)
https://en.wikipedia.org/wiki/Amphidontidae (“It contains most of the species previously belonged to Amphilestidae [1] ”)
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39874&is_real_user=1

“Age range: base of the Toarcian to the top of the Aptian or **184.20000 to 113.20000 Ma**”
Collections (6 total)” (Retrieved 27 July 2026)

[32] Original German text, translated into English by DeepL: Symmetrodonta [von griech. symmetros = gleichmäßig, odontes = Zähne], (Simpson 1925), zu den ältesten Säugetieren gehörende ausgestorbene Ordnung mit 5 Familien und 22 Gattungen, nur durch Zähne und Kieferfragmente belegt, gekennzeichnet durch symmetrisch gebaute Backenzähne in Ober- und Unterkiefer von schneidend-scherendem Biß bei Okklusion. Manche Autoren sehen in ihnen die Ahnformen und eine Ordnung der Pantotheria. Bekannteste europäische Gattung: Spalacotherium (Spalacotheriidae). Die Kuehneotheriidae gehören nach Ansicht einiger Autoren nicht mehr zu den Symmetrodonten, sondern bilden eine eigene Ordnung oder Superlegion Kuehneotheria Mc Kenna 1975. Verbreitung: Oberjura bis Oberkreide von Nordamerika, Oberkreide von Südamerika, Mitteljura bis Unterkreide von Europa, Unterjura bis Unterkreide von Ostasien. *Zhangheotherium*. Retieved 27 July 2026.
[33] All retrieved 27 July 2026

No. 23 in Benton: Spalacotheriidae: **Temporal range: 145–70 Ma** (Early Cretaceous - Late Cretaceous)
https://en.wikipedia.org/wiki/Spalacotheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39869&is_real_user=1

"Age range: base of the Kimmeridgian to the top of the Early/Lower Campanian or **154.80000 to 72.20000** Ma
Collections (54 total)" (Retrieved 27 July 2026)

No. 24 in Benton: Barbereniidae: No entry in Wikipedia

PBDB: Age Range and Collections: "Barbereniidae (disused)". "No collection or age range data are available"

AI (31 July 2026): "Barbereniidae are an extinct family … traditionally classified within the Symmetrodonta and described based on fossil teeth. The group was named in 1990 by paleontologist José Bonaparte.
Classification: Considered part of the Spalacotheroidea or Symmetrodonta. **Research history:** Recent studies suggest that some of these taxa (such as Barberenia) may not be distinct adult symmetrodonts, but rather represent the deciduous dentition of known dryolestids."[34] According to entry in Benton: CMP (Cretaceous, Argentina). **83.6 -72.2 Ma**
AI: 83.6 - 66 Ma.

According to https://es.wikipedia.org/wiki/Symmetrodonta also:

No. 25 in Benton: Shuotheriidae: Temporal range: 174.7[35] or 174.1[36] – ca. 145.0 Ma (Middle-Late Jurassic)
https://en.wikipedia.org/wiki/Shuotheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=64366&is_real_user=1

"Age range: base of the Bathonian to the top of the Callovian or **168.20000 - 161.50000 Ma**
Collections (3 total)"

Additional families suggested in the interim up to August 2026:

S) Kuehneotheriidae: Temporal range: 220–195 Ma (Late Triassic - Early Jurassic)
https://en.wikipedia.org/wiki/Kuehneotheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39863&is_real_user=1

"Age range: base of the Rhaetian to the top of the Sinemurian or **205.70000 to 192.90000 Ma**
Collections (11 total)" (Retrieved 27 July 2026)

T) Zhangheotheriidae: Temporal range: **129.4–113 Ma** (Barremian-Aptian)
https://en.wikipedia.org/wiki/Zhangheotheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=156658&is_real_user=1

"Age range: base of the Aptian to the top of the Early/Lower Aptian or **121.40000 to 119.57000 Ma**
Collections (9 total)" (Retrieved 27 July 2026)

U) Tinodontida: Temporal range: ~184–125 Ma (Early Jurassic - Early Cretaceous)
https://en.wikipedia.org/wiki/Tinodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39867&is_real_user=1

"Age range: base of the Callovian to the top of the Aptian or **165.30000 to 113.20000 Ma**
Collections (5 total) (Retrieved 27 July 2026)

V) Woutersiidae: Temporal range: ~210–201 Ma (Rhaetian)
https://en.wikipedia.org/wiki/Woutersia
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=212342&is_real_user=1

"Age range: Rhaetian or **205.70000 to 201.40000 Ma**
Collections (2 total)" (Retrieved 27 July 2026)

Note please also: AI (27 July 2027): "**Spalacolestidae** is an extinct taxonomic group of small Mesozoic mammals, **usually classified as a subfamily** (Spalacolestines) or family within the extinct order Symmetrodonta (family Spalacotheriidae)."

In other words: "Spalacolestidae is an extinct family of small Mesozoic mammals belonging to the group Symmetrodonta, **often treated alternatively as a subfamily (Spalacolestinae) within the family Spalacotheriidae**". Reminds me of a comment by H. K. Airy Shaw "Taxonomy is very much a matter of personal opinion."

So, now all together 8 families are currently counted in the order Symmetrodonta.

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[34] Original German text: Barbereniidae sind eine ausgestorbene Familie … die traditionell zu den Symmetrodonta gezählt und durch fossile Zähne beschrieben wurden. Die Gruppe wurde im Jahr 1990 vom Paläontologen José Bonaparte benannt. Zuordnung: Gilt als Teil der Spalacotheroidea oder Symmetrodonta. Forschungsgeschichte: Neuere Untersuchungen deuten darauf hin, dass einige dieser Taxa (wie Barberenia) möglicherweise keine eigenständigen erwachsenen Symmetrodonten sind, sondern es sich dabei um das Milchgebiss bekannter Dryolestiden handeln könnte."
[35] According to the Geologic Time Scale.
[36] According to AI
(Both retrieved 27 July 2027)

CLADOTHERIA[37]

Infraclass CLADOTHERIA McKenna, 1975, new rank, McKenna, this volume

Legion DRYOLESTOIDEA Butler, 1939, new rank, McKenna, this volume

Order AMPHITHERIIDA Prothero, 1981, new rank, McKenna, this volume

F. AMPHITHERIIDAE Owen, 1846 J. (BTH) Terr.

First and Last: *Amphitherium* De Blainville, 1838, Stonesfield Slate, Oxfordshire, England, UK

Order DRYOLESTIDA Prothero, 1981, new rank, McKenna, this volume

F. DRYOLESTIDAE Marsh, 1879
J. (BTH)–K. (CMP/MAA) Terr.

First: Upper Bathonian, Forest Marble, Oxfordshire, England, UK (Freeman, 1976).
Last: *Leonardus* Bonaparte, 1990, and *Groebertherium* Bonaparte, 1986, both Los Alamitos Formation, Argentina. Lillegraven and McKenna (1986) report a dryolestid from CMP or MAA strata of the Mesa Verde Formation, Wyoming, USA.

F. PAURODONTIDAE Marsh, 1887 J. (KIM) Terr.

First and Last: *Paurodon* Marsh, 1887, *Archaeotrigon* Simpson, 1927, *Tathiodon* Simpson, 1927, *Pelicopsis* Simpson, 1927, *Araeodon* Simpson, 1937, and *Foxraptor* Bakker, 1990, all Morrison Formation, Wyoming, USA.

F. MESUNGULATIDAE Bonaparte, 1986
K. (CMP) Terr.

First and Last: *Mesungulatum* Bonaparte and Soria, 1985, Los Alamitos Formation, Argentina.

F. REIGITHERIIDAE Bonaparte, 1990
K. (CMP) Terr.

First and Last: *Reigitherium* Bonaparte, 1990, Los Alamitos Formation, Argentina.

Legion THERIA Parker and Haswell, 1897, new rank, McKenna, this volume

Supercohort MARSUPIALIA Illiger, 1811, new rank, McKenna, this volume

In the **Fossil Record 2** (*cf.* excerpt from p. 842 on the left) edited by Michael J. Benton the following five families are mentioned for the Cladotheria:

Amphitheriidae
Dryolestidae
Paurodontidae
Mesungulatidae
Reigitheriidae

AI (28 July 2026) cites the ensuing "**Key Families and Clades within Cladotheria**":

- **Amphitheriidae:** An extinct family of primitive middle-Jurassic cladotherians.
- **Donodontidae:** An extinct family of early dryolestoid-related cladotheres.
- **Dryolestidae:** A major extinct family belonging to the order Dryolestida.
- **Paurodontidae:** Often grouped closely with or within dryolestoids in traditional and cladistic frameworks.
- **Meridiolestida:** A South American clade/family-level radiation of dryolestoid-grade mammals.
- **Peramuridae:** An extinct family placed just outside or near the crownward transition to Zatheria.

And AI adds: "Taxa such as Arguimuridae and Mozomuridae are frequently included as primitive family-level branches in broader cladotherian relative trees."

On the question "Which families belong to the oldest Cladotheria?" the following 3 families are alluded to as the:

Early Cladotherian Groups

- **Amphitheriidae:** Middle Jurassic basal cladotherians featuring early pretribosphenic molars.
- **Dryolestidae:** Middle Jurassic to Cretaceous mammal family represented by early forms like *Anthracolestes sergeii* from Siberia.
- **Peramuridae:** Mesozoic stem-group Zatherians closely tied to the lineage leading to modern marsupials and placentals. [1, 2, 3, 4]

So, let's start with the most ancient families according to the Geological Time Scale:

No. 26 in Benton: Amphitheriidae: Temporal range: 174.7–161.5 Ma (Middle Jurassic)
https://en.wikipedia.org/wiki/Amphitheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39879&is_real_user=1

"Age range: base of the Late/Upper Bathonian to the top of the Callovian or **168.20000 to 161.50000 Ma**
Collections (7 total)."
AI (28 July 2026): "They lived during the Middle Jurassic period around **165 to 170** million years ago." "Classified as stem cladotherian mammals. Known **almost entirely from lower jaw fragments and teeth**."
Interestingly this family was first described by the arch critic of Darwin: Richard Owen 1846.
https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=txn:39879 (All retrieved 28 July 2026)

[37] Note please below that https://en.wikipedia.org/wiki/Cladotheria gives three contradictory phylogenies.
https://nl.wikipedia.org/wiki/Cladotheria "Early Cladotheria can be distinguished from other mammals by a number of derived characteristics (apomorphies). Their teeth differed from those of the symmetrodonts due to the evolution of a talonid fossa (hypoflexid) on the lower molars, which occluded with the paracoon of the corresponding upper molars." Please be aware that the term "evolution" conceals our absence of any exact knowledge of what has really happened on the levels of genetics and populations.

Wikipedia (reflecting the Zeitgesist) is again entirely evolutionary dominated – in the Neo-Darwinian sense – when it comments on the Cladotheria

"Cladotheria is a clade (sometimes ranked as a legion) of mammals. It contains modern therian mammals (marsupials and placental mammals) and several extinct groups, such as the "dryolestoids", amphitheriids and peramurids. The clade was named in 1975 by Malcolm McKenna. In 2002, it was defined as a node-based taxon containing "the common ancestor of dryolestids and living therians, plus all its descendants" [W.-E. L.: Just evolutionary speculation!]. ***A different, stem-based definition was given in 2013***, in which Cladotheria contains all taxa that are closer to *Mus musculus* (the house mouse) than to the "symmetrodont" *Spalacotherium tricuspidens* [W.-E. L.: Again simply evolutionary speculations! – as mostly also in the following text].

Cladotheria incorporates a set of nested mammal clades culminating in Tribosphenida (also known as Boreosphenida), mammals with fully tribosphenic teeth such as therians and a few of their closest relatives. The clade Prototribosphenida [W.-E.L.: An evolutionary interpreted group displaying different grades of increasing teeth complexities. However – as I have repeatedly pointed out in several of my articles and books – paleontologist Oskar Kuhn correctly noted: "The similarity of forms was explained by evolution, and evolution in turn was proven by the various grades of similarities. It was hardly noticed that here one has fallen victim to **circular reasoning**; the very point that one set out to prove, namely that similarity was based on evolution, **was simply assumed**, and then the different degrees in the gradation of the (typical) similarities, were used as evidence for the truth of the idea of evolution. [Zoologist] Albert Fleischmann has repeatedly pointed out the lack of logic in the above thought process. The same idea, according to him, was used interchangeably as assertion and as evidence. However, **similarity can also be the result of a plan**, and ...morphologists such as Louis Agassiz, one of the greatest morphologists that ever lived, attributed the similarity of forms of organisms to a creation plan, not to evolution." – Dozens of further highly qualified researchers have principally come to the same conclusion.] includes "the common ancestor of Vincelestes and living therians, plus all of its descendants". Apart from tribosphenids, Prototribosphenida also includes amphitheriids and peramurids, as well as a few isolated genera such as Vincelestes. It excludes the various basal cladotherian groups which have been combined under the label "dryolestoids". The clade Zatheria is even more exclusive, restricted to solely peramurids and tribosphenids. Zatheria is defined as "the common ancestor of Peramus and living marsupials and placental mammals, plus all of its descendants". – Followed by a "Description" and the three **phylogenies** contradicting each other in several points. For the references see the original article. (Retrieved 28 July 2026)

No. 27 in Benton: Dryolestidae: Temporal range: 174.7– 100.5 (Middle Jurassic–Early Cretaceous)
https://en.wikipedia.org/wiki/Dryolestidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39890&is_real_user=1
“Age range: base of the Bathonian to the top of the Late/Upper Maastrichtian or **168.20000 to 66.00000 Ma**
Collections (39 total).” (Retrieved 28 July 2026)

Back to the sequence presented in Benton followed by the rest of the families mentioned above.
No. 28 in Benton: Paurodontidae: Temporal range: 154.8 – 139.8[38] (“Late Jurassic - Early Cretaceous Kimmeridgian–Berriasian”)
https://en.wikipedia.org/wiki/Paurodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39885&is_real_user=1
“Age range: base of the Callovian to the top of the Middle Berriasian or **165.30000 to 139.10000 Ma**
Collections (10 total). (Retrieved 28 July 2026)

No. 29 in Benton: Mesungulatidae

Not in Wikipedia, but hint to Meridiolestida
https://www.mineralienatlas.de/lexikon/index.php/FossilData?fossil=Mesungulatidae
Startalter: **70.6 Ma -** Endalter: **66 Ma**
AI (28 July 2026): “…is an extinct family of South American mammals from the **Late Cretaceous and early Paleocene** epochs. They belonged to the clade Meridiolestida. Early scientists mistook their specialized, plant-crushing teeth for those of early placental ungulates.”
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=67614&is_real_user=1
“Age range: base of the Santonian to the top of the Danian or **85.70000 to 61.66000 Ma**
Collections (10 total)” (Retrieved 28 July 2026)

No. 30 in Benton: Reigitheriidae: Temporal range: 83.6 – 66 Ma[39] (“Late Cretaceous, Campanian–Maastrichtian”)
https://en.wikipedia.org/wiki/Reigitherium (However, not entry under the family name)
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=56524&is_real_user=1
“Age range: Early/Lower Maastrichtian or **72.20000 to 66.00000 Ma**
Collections: one only” (Retrieved 29 July 2026)

Additional families suggested in the interim up to August 2026:

W) Donodontidae: Temporal range: ca. 149.2 – 139.8 Ma[40] (“Tithonian–Berriasian”)
https://en.wikipedia.org/wiki/Donodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=212376&is_real_user=1
“Age range: base of the Late/Upper Tithonian to the top of the Early/Lower Berriasian or 145.06000 to 141.00000 Ma
Collections (4 total)”
AI: “Alter… (vor etwa **145 bis 140** Millionen Jahren)“ (Retrieved 29 July 2026)

X) Meridiolestida: “Is an extinct **clade** of mammals…” **Temporal range: 100.5 – 14? Ma**[41] (“Late Cretaceous–Miocene”)
https://en.wikipedia.org/wiki/Meridiolestida
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=204732&is_real_user=1
“Age range: base of the Early/Lower Cenomanian to the top of the Santacrucian or **100.50000 to 16.30000 Ma**
Collections (19 total)
AI: “Ranged from tiny, shrew-sized insectivores **to dog-sized** herbivores…” (Retrieved 29 July 2026)

Y) Peramuridae: Temporal range: 161.5 – 100.5 (“Late Jurassic–Early Cretaceous”)
https://en.wikipedia.org/wiki/Peramuridae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=39881&is_real_user=1
“Age range: base of the Late/Upper Bathonian to the top of the Middle Berriasian or **168.20000 to 139.10000 Ma**
Collections (6 total).” (Retrieved 28 July 2026)

So, data for 7 families and 1 clade have been shown here for the ‘order’/clade Cladotheria.

[38] According to the Geologic Time Scale.
[39] Also according to the Geologic Time Scale.
[40] Likewise according to the Geologic Time Scale. https://en.wikipedia.org/wiki/Donodontidae: “Donodontidae is one of several mammal groups informally described as "dryolestoids", a term applied to a probable grade of basal cladotherians. Other "dryolestoids" include the Laurasian Dryolestida, and the South American Meridiolestida. A few studies in the 1990s suggested that Donodon was an early meridiolestidan.”
[41] Likewise according to the Geologic Time Table. https://en.wikipedia.org/wiki/Donodontidae: “Donodontidae is one of several mammal groups informally described as "dryolestoids", a term applied to a probable grade of basal cladotherians. Other "dryolestoids" include the Laurasian Dryolestida, and the South American Meridiolestida. A few studies in the 1990s suggested that Donodon was an early meridiolestidan.”

AUSTRALIAN MARSUPIALIA

Also for this Order the serial numbers shown in Benton have been added to facilitate comparisons of the most recent data of 2026 with those given in Benton 1993 (see please the corresponding Figures)

No. 31 in Benton: Microbiotheriidae: Temporal range: 66 Ma - Recent ("Early Paleocene–Recent")
https://en.wikipedia.org/wiki/Microbiotheriidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40002&is_real_user=1
"Age range: Maximum range based only on fossils: base of the Danian to the top of the Laventan or **66.00000 to 11.00000 Ma**
Minimum age of oldest fossil (stem group age): 61.66 Ma
Collections (34 total)"
AI: "Microbiotheriidae family lived from the Early Paleocene epoch (around **66 million** years ago) up to the Present day (as an extant lineage)." (Retrieved 29 July 2026)

No. 32 in Benton: Dasyuridae: Temporal range: 27 Ma – Recent ("Oligocene–present")
https://en.wikipedia.org/wiki/Dasyuridae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40086&is_real_user=1
"Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000** Ma. Minimum age of oldest fossil (stem group age): 23.04 Ma
Collections (71 total)" (Retrieved 29 July 2026)

No. 33 in Benton: Thylacinidae: Temporal range: Holocene **28 Ma – 0.00008 Ma** (Temporal range: Late Oligocene – Recent)
https://en.wikipedia.org/wiki/Thylacinidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40102&is_real_user=1
"Age range: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000 Ma**
Collections (50 total)" (Retrieved 29 July 2026)

No. 34 in Benton: Peramellidae: Temporal range: 14 Ma - Recent ("Miocene – Recent" (MM1 (LM1?)
Miocene: Serravallian/Langian (LM1: Burdigalian/Aquitanian)
https://en.wikipedia.org/wiki/Peramelidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40108&is_real_user=1:
"Age range: Maximum range based only on fossils: base of the Middle Miocene to the top of the Holocene or **15.98000** to **0.00000 Ma**
Minimum age of oldest fossil (stem group age): 11.63 Ma" (Retrieved 29 July 2026)
Collections (50 total)" (Retrieved 29 July 2026)

No. 35 in Benton: Ilariidae: Temporal range: 27 – 23 Ma ("Spätes Oligozähn"/Late Oligocene)
https://de.wikipedia.org/wiki/Ilariidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=247559&is_real_user=1
"Age range: Late/Upper Oligoceneor **27.30000 to 23.04000 Ma**
Collections (7 total) (Retrieved 29 July 2026)

No. 36 in Benton: Diprotodontiae: Temporal range: 28–0 Ma ("Late Oligocene – Recent")
https://en.wikipedia.org/wiki/Diprotodontia
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=66275&is_real_user=1
"Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000 Ma**
Minimum age of oldest fossil (stem group age): 23.04 Ma
Collections (439 total)" (Retrieved 29 July 2026)

(Wikipedia: Family is now an **order**: "Diprotodontia (/daɪˌproʊtəˈdɒntiə/) is the largest extant order of marsupials, with about 155 species,[2] including the kangaroos, wallabies, possums, koala, wombats, and many others. Extinct diprotodonts include the hippopotamus-sized Diprotodon, and Thylacoleo, the so-called "marsupial lion". …The earliest known fossil of Diprotodontia dates back to the Late Oligocene (**23.03 - 28.4 million years ago**).[4]"

No. 37 in Benton: Vombatidae: Temporal range: 28–0 Ma ("Late Oligocene – Recent")
https://en.wikipedia.org/wiki/Wombat
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40179&is_real_user=1
"Age range: Maximum range based only on fossils: base of the Burdigalian to the top of the Holocene or **20.45000 to 0.00000 Ma**
Minimum age of oldest fossil (stem group age): 15.98 Ma.
Collections (62 total)" (Retrieved 29 July 2026)

No. 38 in Benton: Phalangeridae: Temporal range: No entry in Wikipedia
https://en.wikipedia.org/wiki/Phalangeridae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40120&is_real_user=1
Phalangeridae:
"Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000 Ma**. Minimum age of oldest fossil (stem group age): 23.04 Ma
Collections (35 total) (Retrieved 29 July 2026)
AI: "…vor rund **25 Millionen Jahren** bis heute
(Retrieved 29 July 2026)

No. 39 in Benton: Burramyidae: Temporal range: 2.5 Ma – Recent ("Pleistocene–Recent")
https://en.wikipedia.org/wiki/Pygmy_possum
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40134&is_real_user=1 Diprotodontia – Burramyidae:
"Age range: Maximum range based only on fossils: base of the **Late/Upper Oligocene** to the top of the Holocene or **27.30000 to 0.00000 Ma** Minimum age of oldest fossil (stem group age): 23.04 Ma.
Collections (30 total) (Retrieved 29 July 2026)

No. 40 in Benton: Macropodidae: Temporal range: 27.82 Ma[42] – Present ("Late Oligocene–Present")
https://en.wikipedia.org/wiki/Macropodidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40140&is_real_user=1 Diprotodontia – Macropodidae:
"Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000 Ma**. Minimum age of oldest fossil (stem group age): 23.04 Ma.
Collections (170 total)
Late Oligocene epoch, approximately **25 to 30 million years ago**
(Retrieved 29 July 2026)

No. 41 in Benton: Petauridae:
No entry on Temporal range in Wikpedia
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40128&is_real_user=1
Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000 Ma**. Minimum age of oldest fossil (stem group age): 23.04 Ma.
Collections (19 total)
AI: "The family Petauridae (which includes gliding and striped possums) first appeared in the fossil record during the late Oligocene epoch, approximately **20 to 30 million years ago**"
(Retrieved 29 July 2026)

No. 42 in Benton: Ektopodontidae: Temporal range: 27.82 – 2.58 Ma[43] ("Late Oligocene–Early Pleistocene")
"The fossil record of Ektopodontidae spans from the **upper Oligocene to the Pliocene**, with molars that exhibit unique adaptations."
https://en.wikipedia.org/wiki/Ektopodon
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40126&is_real_user=1
"Age range: base of the Late/Upper Oligocene to the top of the Calabrian or **27.30000 to 0.77400 Ma**.
Collections (12 total)"
AI: "lebte…vor etwa **28 Millionen** Jahren bis zu ihrem Aussterben vor rund 781.000 Jahren."
(Retrieved 29 July 2026)

No. 43 in Benton: Phascolarctidae: Temporal range: 28.1 Ma – Recent ("Late Oligocene–Recent")
https://en.wikipedia.org/wiki/Phascolarctidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40173&is_real_user=1
"Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Holocene or **27.30000 to 0.00000 Ma**. Minimum age of oldest fossil (stem group age): 23.04 Ma.
Collections (46 total).
AI: "…existieret seit etwa **25 Millionen** Jahren.
(Retrieved 29 July 2026)

No. 44 in Benton: Pilkipildridae:
No family of this name in Wikipedia.
In https://www.mindat.org/taxon-P247817.html: "First Recorded Appearance **28.4 - 16.0 Ma** Cenozoic" - "Last recorded Appearance **5.33 – 2.59 Ma.**
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=247817&is_real_user=1
"Age range: base of the Late/Upper Oligocene to the top of the Serravallian or **27.30000 to 11.63000 Ma.**
Collections (8 total)
AI: "…lebte vor etwa **28,4 bis 5,3 Millionen** Jahren." (All retrieved 29 July 2026)

No. 45 in Benton: Miralinidae: No entry for this family in Wikipedia.
https://www.mindat.org/taxon-4825969.html "First Recorded Appearance **28.4 – 23.0 Ma** Cenozoic"
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=247658&is_real_user=1 Diprotodontia – Miralinidae:
"Age range: Maximum range based only on fossils: base of the Late/Upper Oligocene to the top of the Middle Miocene or **27.30000 to 11.63000 Ma**. Minimum age of oldest fossil (stem group age): 23.04 Ma.
Collections (9 total)
(Retrieved 30 July 2026)

No. 46 in Benton: Acrobatidae: Temporal range: 28.1 Ma – Recent ("Late Oligocene – recent")
https://en.wikipedia.org/wiki/Acrobatidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=66276&is_real_user=1: Diprotodontia – Acrobatidae[44].
"Age range. Maximum range based only on fossils: Late/Upper Pleistocene or **0.12900 to 0.01170 Ma**
Minimum age of oldest fossil (stem group age): 0.0117 Ma.

[42] According to the Geological Time Scale
[43] According to the Geological Time Scale
[44] https://en.wikipedia.org/wiki/Acrobatida: "The Acrobatidae are a small family of gliding marsupials containing two genera, each with a single species, the feathertail glider (*Acrobates pygmaeus*) from Australia and feather-tailed possum (*Distoechurus pennatus*) from New Guinea." (Retrieved 30 July 2026)

Collections (8 total)"
AI: "The first deep-time fossils of the feathertail possum family (Acrobatidae) appeared during the Late Oligocene to Middle Miocene epochs." " ...(roughly **23 to 33 million years** ago)."
(Retrieved 30 July 2026)
Astonishing differences in the timings![45]

No. 47 in Benton: Thylacoleonidae:

Temporal range: 28.1 Ma - 11,700 years ago[46] ("Late Oligocene–Late Pleistocene")
https://en.wikipedia.org/wiki/Thylacoleonidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40138&is_real_user=1 Diprotodontia - Thylacoleonidae:

"Age range: base of the Late/Upper Oligocene to the top of the Late/Upper Pleistocene or **27.30000 to 0.01170 Ma**"
Collections (49 total)
https://www.mindat.org/taxon-4826091.html "First Recorded Appearance: **28.4 - 16.0 Ma**
Cenozoic. Last Recorded Appearance: **0.13 Ma** Pleistocene"
(Retrieved 30 July 2026)

No. 48 in Benton: Wynyardiidae:

Temporal range: "Oligocene–Miocene" (Oligocene ca. **33.9** - 23.04 **Ma**) **– (**Miocene ca. 23 **– 5.3 Ma**)[47]
https://en.wikipedia.org/wiki/Wynyardiidae:
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40205&is_real_user=1
Diprotodontia – Wynyardiidae:

"Age range: base of the Late/Upper Oligocene to the top of the Aquitanian or **27.30000 to 20.45000 Ma**
Collections (9 total)"
https://www.mindat.org/taxon-3240148.html "First Recorded Appearance **33.9 - 23.0 Ma**
Cenozoic. Last Recorded Appearance: **5.33 - 2.59 Ma** Cenozoic"
AI: Wynyardiidae first appeared during the Late Oligocene epoch, approximately **28.4 to 23** million years ago..."
Last: "...approximately 5.33 to 2.59 million years ago."
(Retrieved 30 July 2026)

No. 49 in Benton: Palorchestidae: Temporal range: 27,3 – 11700 years[48] ("Late Oligocene–Late Pleistocene")

https://en.wikipedia.org/wiki/Palorchestidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40201&is_real_user=1
Diprotodontia – Palorchestidae:

"Age range: base of the Late/Upper Oligocene to the top of the Late/Upper Pleistocene or **27.30000 to 0.01170 Ma**"
Collections (30 total)
https://www.mindat.org/taxon-3240148.html: First Recorded Appearance: **33.9 – 23.0 Ma** - ...Last: **5.33 - 2.59 Ma**
(Retrieved 30 July 2026)

No. 50 in Benton: Tarsipedidae

No Temporal range in Wikpedia
But Mindat.org: "First Recorded Appearance 0.01 Ma Pleistocene"
https://www.mindat.org/taxon-2440055.html
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40208&is_real_user=1
Diprotodontia – Tarsipedidae.

Age range: "Maximum range based only on fossils: Holocene or **0.01170 - 0.00000 Ma**.
Minimum age of oldest fossil (stem group age): 0.0 Ma
Collections: one only
AI: Late Pleistocene: **129.000 years 11.700 years.**
(Retrieved 30 July 20

ORDER: NOTORYCTEMORPHIA

No number in Benton: Notoryctidae: "Only Extent"

Notoryctidae: Temporal range: **33.9±0.1 - 23.04±0.05 Ma**[49] ("Oligocene – Recent")
https://en.wikipedia.org/wiki/Notoryctidae:
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40106&is_real_user=1

"Age range: Maximum range based only on fossils: base of the Aquitanian to the top of the Burdigalian or **23.04000 to 15.98000 Ma**
Minimum age of oldest fossil (stem group age): 15.98 Ma
Collections (2 total)
(Retrieved 30 July 2026)

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[45] "The earliest fossils of this family are teeth from the Riversleigh World Heritage Area [Late Oligocene], assigned to both extant genera (Acrobates and Distoechurus). These fossils suggest that both genera have rather early origins,..." (Again https://en.wikipedia.org/wiki/Acrobatida) (Retrieved 30 July 2026)
[46] According to AI (Retrieved 30 July 2026)
[47] According to AI (Retrieved 30 July 2026)
[48] According to AI (Retrieved 30 July 2026)
[49] https://en.wikipedia.org/wiki/Oligocene

ORDER: YALKAPARIDONTIA

No. 51 in Benton: Yalkaparidontidae:

No family of this name in Wikipedia
However on Yalkaparidon:

Yalkaparidon: Temporal range: 33.9±0.1 - 23.04±0.05 Ma ("Oligocene[50] – Recent")
https://en.wikipedia.org/wiki/Yalkaparidon "Yalkaparidon is currently placed in its own family, Yalkaparidontidae, and order, Yalkaparidontia" etc. (see the original article).
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=247029&is_real_user=1
Yalkaparidontia – Yalkaparidontidae:
Age range: base of the Burdigalian to the top of the Serravallian **or 20.45000 to 11.63000 Ma**
Collections (3 total)
(Retrieved 30 July 2026)

ORDER: DIDELPHIFORMES

No.52 in Benton: Didelphidae: Temporal range: 83.6 Ma - Recent (Campanian: 83.6 Ma plus/minus 0.2)
https://en.wikipedia.org/wiki/Didelphinae
https://paleobiodb.org/classic/basicTaxonInfo?taxon_no=txn:57522:

Didelphimorphia: Age range: Maximum range based only on fossils: base of the Uintan to the top of the Holocene or 45.90000 to 0.00000 Ma
Minimum age of oldest fossil (stem group age): 39.7 Ma

Didelphidae according to Mindat.Org: https://www.mindat.org/taxon-5455.html
First Recorded Appearance: **Paleocene: 66.0 – 61.6 Ma**
However, for **Didelphimorphia:** "First Recorded Appearance": Cretaceous **105 – 94 Ma**:
https://www.mindat.org/taxon-P67664.html
(Retrieved 30 July 2026)

On the page after the next four: No.1 in Benton of **Fig. 41.2, p. 745**:
Sparassocynidae: In Benton (p. 744): 11,6 bis 2,58 Ma (Upper Miocene to Upper Pliocene)
This (Sparassocynidae) and the following 15 families in Benton of Marsupials (Fig 41.2, p. 745) are from South America (Argentina, Bolivia, Brasil, Columbia, and USA). In the Present Article I have Focused Mainly on the Australian Marsupialia

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Additional Australian families suggested in the interim up to August 2026:

Z1) Donodontidae: Temporal range: ca. 149.2 – 139.8 Ma[51] ("Tithonian–Berriasian")
https://en.wikipedia.org/wiki/Donodontidae
https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=212376&is_real_user=1
"Age range: base of the Late/Upper Tithonian to the top of the Early/Lower Berriasian or 145.06000 to 141.00000 Ma
Collections (4 total)"
AI: "Alter… (vor etwa **145 bis 140** Millionen Jahren)" (Retrieved 29 July 2026)

Z2) Keeunidae: Temporal range: 27.3 – 23.04 Ma ("Late Oligocene"). Keeunamorphia: "Early Eocene–Early Miocene"
https://en.wikipedia.org/wiki/Keeuna
https://en.wikipedia.org/wiki/Keeunamorphia
PBDB: https://paleobiodb.org/classic/quickSearch
"No matching results for "Keeunaidae""
AI: "…lebten **30 bis 18 Millionen** Jahren im Zeitraum vom Späten Oligozän bis zum Frühen Miozän."
(Retrieved 1 August 2026)
https://www.sciencedaily.com/releases/2026/07/260715083546.htm (19 July 2026):
"Fossils from Queensland suggest a newly recognized marsupial order may have survived in Australia for around **35 million years**, rewriting part of the story of how the continent's unique mammals evolved. The discovery challenges the idea that Australia's marsupials all came from a single straightforward ancestral lineage."

Z3) Myrmecobiidae
https://en.wikipedia.org/wiki/Numbat **(? – Recent**. Only one species: "*Myrmecobius fasciatus*), also known as the noombat or walpurti" - no entry on the temporal range)
AI on the question: "Are there any fossils of the numbat *Myrmecobius*?" Answer: "Yes, very few subfossil and Pleistocene records exist for the numbat (Myrmecobius fasciatus), with remains recovered from sites such as

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[50] https://en.wikipedia.org/wiki/Oligocene
[51] Likewise according to the Geologic Time Scale. https://en.wikipedia.org/wiki/Donodontidae: "Donodontidae is one of several mammal groups informally described as "dryolestoids", a term applied to a probable grade of basal cladotherians. Other "dryolestoids" include the Laurasian Dryolestida, and the South American Meridiolestida. A few studies in the 1990s suggested that Donodon was an early meridiolestidan."

Madura Cave in Western Australia.

Age: The oldest known records date back to the late Pleistocene epoch (roughly **11,700 to 2.58** million years ago).

See also p. 3 of https://www.dcceew.gov.au/sites/default/files/env/pages/1c03035d-b594-4386-bd3e-0d2b0ddfa2be/files/consultation-document-numbat.pdf

(Retrieved 1 August 2026)[52]

Z4) Thylacomyidae: No direct entry on "Temporal range", but in the text a sentence (see after the link)

https://en.wikipedia.org/wiki/Macrotis#

"The bilby lineage extends back **15 million years.**"

https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=40115&is_real_user=1

Maximum range based only on fossils: base of the Middle Miocene to the top of the Pleistocene or **15.98000 to 0.01170 Ma**. Minimum age of oldest fossil (stem group age): 11.63 Ma

Collections (9 total)

(Retrieved 1 August 2026)

Z5) Pseudocheiridae: Temporal range: 33.9 – 22.04 ("Late Oligocene to Recent")

https://en.wikipedia.org/wiki/Pseudocheiridae

https://paleobiodb.org/classic/quickSearch

"No matching results for "Pseudocheiridae""

AI: "Pseudocheiridae (ringtail possums and greater gliders) first appeared in the fossil record during the late Oligocene epoch, about **26 million years ago**."

https://www.mindat.org/taxon-9374.html

"First Recorded Appearance: **33.9 - 23.0 Ma** Cenozoic"

Z6) Potoroidae: Temporal range: 33.9 – 22.04 (Late Oligocene–Present)

https://en.wikipedia.org/wiki/Potoroidae

https://paleobiodb.org/classic/checkTaxonInfo?taxon_no=53069&is_real_user=1

"Age range: base of the Burdigalian to the top of the Middle Miocene or **20.45000 to 11.63000 Ma**

Collections (11 total)"

AI: "Time Period: Late Oligocene (roughly **23 to 28** million years ago".

(Retrieved 1 August 2026)

Z7) In different spellings: Hypiprynodontidae/Hypsiprynodontidae/Hypsiprymnodontidae:

https://en.wikipedia.org/wiki/Musky_rat-kangaroo No entry on "temporal range".

PBDB: "No matching results for "Hypsiprymnodontidae "" or Hypsoprymnodon

AI: "Oligocene epoch (approximately **25 to 30 million years** ago), with both main subfamilies—Hypsiprymnodontinae and Propleopinae—having established fossil representatives from that era."

(Retrieved 1 August 2026). Addition 13 August 2026: Oligocene — **Recent**

Thus, all together data for 30 Australian marsupial families have been shown above

SUMMARY

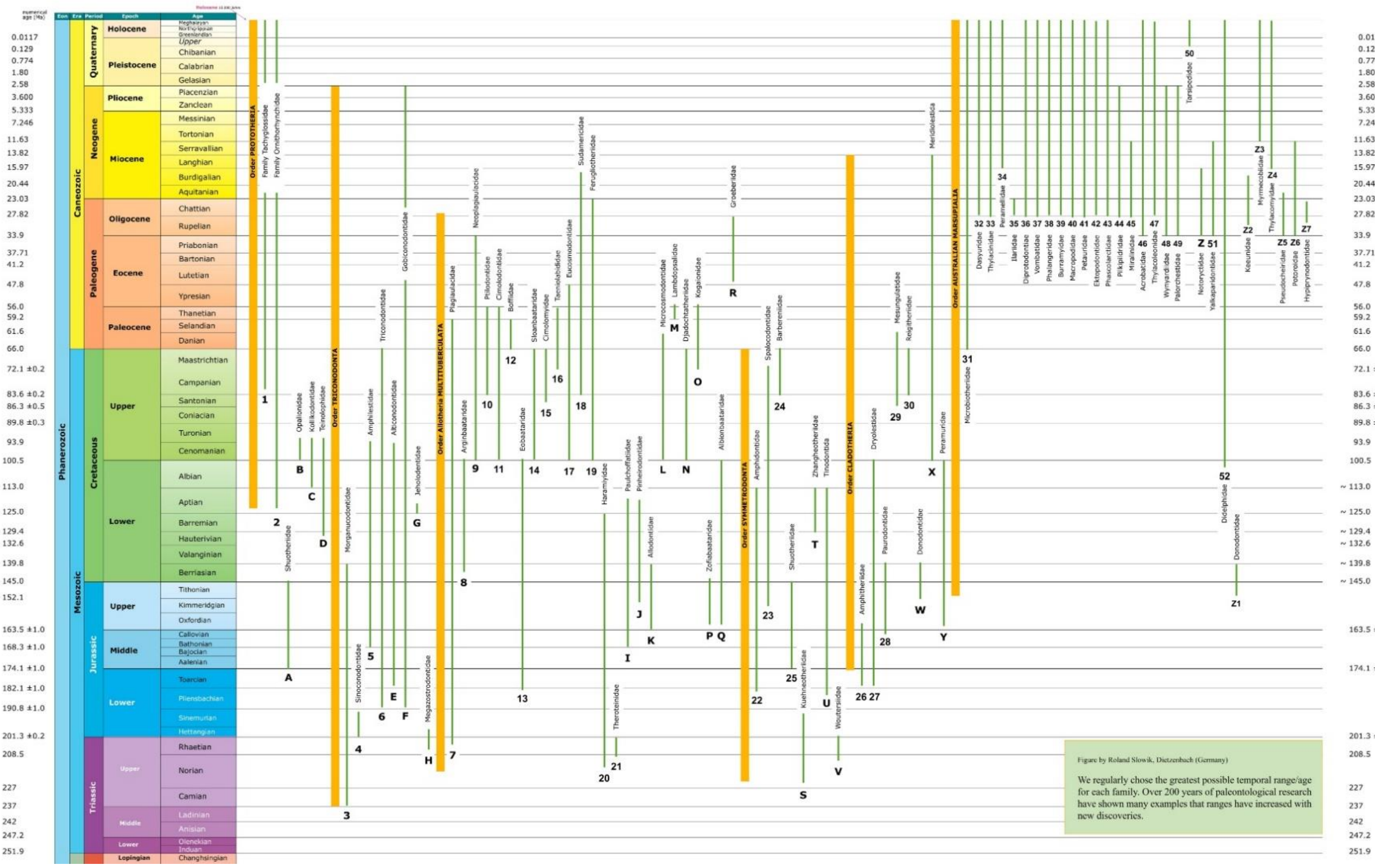
The key finding that is crucial for the current article is: All currently existing families of Australian marsupials are represented in the fossil records as well. Therefore, rather than observing an "extreme imperfection in the geological record," what we actually see is a comprehensive geological record – **a complete 100 percent!** – for every living Australian marsupial family! When we include the count of the families that have gone extinct, this percentage increases to an impressive 166 percent.

Expanding these findings to the fossil record of the orders PROTOTHERIA, TRICONODONTA, MULTITUBERCULATA, SYMMETRODONTA, and CLADOTHERIA – which are (with one exception} exclusively documented through geological evidence, I would – to present an informed estimation – suggest that the families belonging to these orders also possess a fossil record that could be estimated, at least, of around 90 percent.

[52] Zemann et al. (2023): https://academic.oup.com/mbe/article/30/5/1041/998610: "The Australian numbat, *Myrmecobius fasciatus*, is the only marsupial that feeds almost exclusively on termites and that has a life following the diurnally restricted and dynamic geographical distribution of termites. The millions of years of this adaptation [W.-E. L.: "The millions of years" of Neo-Darwinian evolution explain nothing at all and are regularly employed to conceal the absence of any knowledge of the factors that were really involved in the past, totally excluding ID: https://bio-complexity.org/ojs/index.php/main/article/view/BIO-C.2026.4/BIO-C.2026.4] led to **unique morphological and anatomical features, especially basicranial and dental characteristics**, that make it difficult to identify a clear phylogenetic affiliation to other marsupials. From DNA sequence analyses, the family Myrmecobiidae is placed within the dasyuromorph marsupials, but the exact position varies from study to study, and support values are mostly rather modest."

In their peer-reviewed paper https://bio-complexity.org/ojs/index.php/main/article/view/BIO-C.2026.4/BIO-C.2026.4 of 2026 on ***The Broad Utility of the Theory of Intelligent Design to Guide Scientific Research*** by Casey Luskin, Emily Reeves, Brian Miller, and Jonathan McLatchie, the authors state in their Table 4 on one of the seven different Fields, which they have addressed there, the following points concerning Paleontology (2026, p. 11):

Paleontology (9)	Observation	Intelligent agents often rapidly infuse large amounts of information into systems, yielding new systems that are different and discontinuous from other systems.
	Hypothesis / expectation	Novel biological forms requiring large amounts of new genetic information will often appear abruptly in the fossil record, "fully formed" and discontinuous from previous designs.
	Experiment (data collection)	Discontinuity is prevalent in biology. Biological novelty commonly appears in the fossil record abruptly in a pattern of "explosions" [60, 81, 105–107]. The Cambrian explosion is a prime example wherein most of the major animal phyla appear "fully formed" in a geologically abrupt manner [58, 60, 81, 108, 109], but there are other examples in the fossil record, including a bird explosion [110–113], the abrupt appearance of angiosperms [114, 115], a mammal explosion [110, 116–119], and the abrupt appearance of the genus *Homo* [120, 121].
	Conclusion	Many higher taxa appear suddenly, without similar direct precursors, indicating design.



Some supplementary points:

The perceptive reader will have noticed that the information on the "temporal ranges" (Wikipedia) or "age ranges" (PBDB) or further data bases (like mindat.org) given for the fossil families sometimes differ dramatically, even when plus/minus specifications are provided, which latter create and convey the appearance of scientific accuracy and certainty. In part, the simplest reason may be that not all the data bases are fully up to date (there is no perfect database), but there could also be a series of problems on a deeper level (you may check AI or other data bases for the question "What are the problems of age determinations of geological strata?"[53]). As far as the data bases referred to in the article above, copy from each other, they are, of course, in full agreement).

What is more, **I have discussed** in my article https://www.weloennig.de/HumanEvolution.pdf *Homo sapiens*: *The Evolution of Man: What do We Really Know? Testing the Theories of Gradualism, Saltationism and Intelligent Design* **a problem, which is usually/generally not even mentioned**. Below, I have included excerpts from pages 27 ff. – for the **exact references**, see, please, my original article:

"At a symposium held in 1973 at Nairobi, paleo-experts compared all the hominin fossils from the Turkana basin region. Meave Leakey et al. later described how leading paleo-experts at the symposium felt about Richard's findings: "…the 2.6 Ma date attributed to the KBS Tuff was controversial. If the date was accurate, stone artifacts from the KBS Tuff were the oldest known to science and the hominid fossils from below that tuff included the oldest representatives of the genus Homo". **These findings blatantly conflicted with the "group think" of the paleo-community, and so the KBS Tuff was re-dated many, many times** until (with the help of pig's teeth) a **more "comfortable" age of 1.8 million years was finally accepted**", eventually catapulting Lucy onto the throne of human origins in most evolutionary trees and museum displays.

Interestingly, the **first date of 2.6 Ma** was based on **several 'absolute'** (or most probably sure), **age determinations, respectively**: (1) **Argon-argon**, (2) **potassiumargon**, (3) **faunal correlations** (elephant fossils), (4) **paleomagnetism** and (5) **fission track dating**. About two additional samples (one of pumice and one of felspar crystals) sent by R. Leakey for the dating process to Fitch and Miller in London, Fitch declared in a response to Leakey: "Where to proceed from there depended on the choices offered to Leakey, one of which was twice as expensive as the other but, said Fitch, "would result in this tuff being incontrovertibly dated and with age greater accuracy than any other site in Africa or elsewhere"" (emphasis added). Result: **2.61 ± 0. 26 Ma.**

I must admit that I am impressed: If it is possible to re-date 5 independently obtained 'accurate' ages from 2.6 Ma down to 1.8 Ma (**applying the same dating methods**)[54] to accommodate the ages to a preconceived evolutionary hypothesis on the origin of humans – to emphasize: a difference of 0.8 Ma = 800,000 years (!) – ***how sure can we be that such old and new age determinations of all the* Ma *are really correct?*** See also the enormous age differences given for *Homo floresienses* highest numbers: 4,000 years, 92,000 yrs, 190,000 yrs and 700,000 yrs.

For more examples see, please, again my original article.

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[53] AI (7 August 2026): Determining the age of rock layers involves challenges like missing geological records, altered minerals, and varying precision limits. Scientists must combine relative and absolute dating methods to overcome these hurdles, but gaps and contamination often lead to uncertainties in the timeline. [1, 2, 3, 4, 5]

Major Challenges

- **Incomplete Rock Record:** Erosion removes layers of rock over time, creating missing pages in the geological history known as unconformities. [1, 2, 3, 4]
- **Metamorphic Alteration:** Heat and pressure change rock minerals, which can reset radiometric clocks or mix old and new chemical elements. [1, 2]
- **Contamination:** Ground water or new minerals can enter a rock sample and ruin absolute dating results.
- **Index Fossil Limits:** Guide fossils only live during specific times, but they do not exist in every environment or rock type. [1, 2, 3, 4]
- **Reusability Issues:** Sedimentary rocks cannot be dated directly with radiometric methods; scientists must date volcanic ash layers above and below them instead. [1, 2, 3]
- **Statistical Uncertainty:** Laboratory tests for radioactive isotopes always have a margin of error that grows larger with very old samples. [1]

And there is even much more: Check, for example, ChatGPT.

[54] Principally it is assumed that several independently applied dating methods being in agreement with each other lead to sure age results: "Agreement among stratigraphy, fossils, radiometric dates, magnetic reversals, and geochemical markers [etc.] provides much stronger age control than any isolated result" ChatGPT 7 August 2026.

Concerning the Fossil Record in general, I would like to remind my readers of the following citations emphasizing the ***phenomenon of stasis, the constancy of life forms*** equally unexpected from evolutionary gradualism[55]:

Note for August 2026 ff: see please also several articles in https://scienceandculture.com/?s=Stasis&site-current-site=24

Ernst Mayr (2001, p. 195): "The complete standstill or stasis of an evolutionary lineage for scores, if not hundreds, of millions of years **is very puzzling**."

Donald R. Prothero (2007, p. 81): Evolution: what the fossils say and why it matters. "Some biologists tried to explain away stasis with mechanisms such as stabilizing selection (selection against the extremes of a population, reinforcing the mean tendency), **but this does not explain how some fossil populations persist unchanged through millions of years of well-documented climatic change (surely a strong selection pressure)**, as documented by Prothero and Heaton (1996) and Prothero (1999). As Gould (1980a, 2002) pointed out, ***the persistance of fossil species through millions of years of intense selection pressure suggests that they are not infinitely malleable by selection, but instead have an integrety of some sort of internal homeostatic mechanism that resist most external selection***." Prothero betont weiter, dass diese These "still hotly controversial" ist und dass sie von Seiten der Vertreter der Synthetischen Evolutionstheorie zumeist nicht akzeptiert wird ("…many biologists are unconvinced that the fossil record can't be explained by some Neo-Darwinian mechanism (see chapter 4))."

Steven M. Stanley (1981, p. XV): "The record now reveals that **species typically survive for a hundred thousand generations, or even a million or more, without evolving very much**. … After their origins, most species undergo little evolution before becoming extinct."

Stephen Jay Gould (2002, p. 749) "[T]he tale [of the correspondence between Darwin and Falconer] itself illustrates the central fact of the fossil record so well – **geologically abrupt origin and subsequent extended stasis of most species**. …Most importantly, this tale exemplifies what may be called the **cardinal and dominant fact of the fossil record**…: the great majority of species appear with **geological abruptness in the fossil record and then persist in stasis until their extinction**. Anatomy may fluctuate through time, but the last remnants of a species look pretty much like the first representatives. In proposing punctuated equilibrium, Eldredge and I did not discover, or even rediscover, this fundamental fact of the fossil record. Paleontologists have always recognized the longterm stability of most species, but we had become more than a bit ashamed by this strong and literal signal, ***for the dominant theory of our scientific culture told us to look for the opposite result of gradualism as the primary empirical expression of every biologist's favorite subjec***t – evolution itself." (P. 755:) "[...] George Gaylord Simpson, the greatest and most biologically astute paleontologist of the 20th century (and a strong opponent of punctuated equilibrium) **acknowledged the literal appearance of stasis and geologically abrupt origin as the outstanding general fact of the fossil record** and as a pattern which would "pose one of the most important theoretical problems in the whole history of life" if Darwin's argument for artifactual status failed." "...stasis is data... Say it ten times before breakfast every day for a week, and the argument will surely seep in by osmosis: "stasis is data; stasis is data"..." (p. 759.)

> This is what **Simpson** stated in 1960: "It is a feature of the known fossil record that ***most taxa appear abruptly***. They are not, as a rule, led up to by a sequence of almost imperceptibly changing forerunners such as Darwin believed should be usual in evolution. … These peculiarities of the fossil record pose ***one of the most important theoretical problems in the whole history of life***." Simpson GG 1960. The History of Life. pp. 117–180 in: Sol Tax (ed.). Evolution after Darwin. Vol. 1. The Evolution of Life: Its Origin, History, and Future. University of Chicago Press: Chicago (IL), 629 pp. Cited according to paleontologist Günter Bechly (2024): https://scienceandculture.com/2024/05/fossil-friday-discontinuities-in-the-fossil-record-a-problem-for-neo-darwinism/

Niles Eldredge (1998, p. 157): "**It is a simple ineluctable truth that virtually all members of a biota remain basically stable, with minor fluctuations, throughout their duration**.. (Remember that by "biota" we mean the commonly preserved plants and animals of a particular geological interval…)"

Once again: **Donald R. Prothero** (1992, p. 41): "Eldredge and Gould not only showed that paleontologists had been out-of-step with biologists for decades, but also that **they had unconsciously trying to force the fossil record into the gradualistic mode**. The few supposed examples of gradual evolution were featured in the journals and textbooks, but paleontologists had long been silent about their "dirty little trade secret": **most species appear suddenly in the fossil record and show no appreciable change for millions of years until their extinction**. http://chaos.swarthmore.edu/courses/SOC26/PunctEquil.pdf

Tom S. Kemp (1985, pp. 66-67): "As is now well known, most fossil species appear instantaneously in the record, persist for some millions of years virtually unchanged, only to disappear abruptly - the 'punctuated equilibrium' pattern of Eldredge and Gould."

For 2025: See a range of further corroborating statements by evolutionary biologists and others as gathered by Richard William Nelson *Fossil Record by Decade* **up to 2014** and the links above **up to 2025**. See also several revealing points in https://scienceandculture.com/?s=stasis&site-current-site=1 (up to **2026**) https://scienceandculture.com/?s=constancy&from=1991&to=2025&author=&orderby=relevance&site-current-site=1 (up to **2025**) as well as https://scienceandculture.com/?s=Fossil+record (**also up to 2025**).

AI correctly notes: "Stasis in the fossil record refers to extended periods where a species or lineage shows little to no morphological change. ***This pattern is common in the fossil record and contrasts with gradualism***;" … "**Contrast with Gradualism**: It stands in contrast to gradualism, which suggests that evolutionary change is slow and continuous over time." (retrieved 5 October **2025**)[56] – Similarly **2026**.

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[55] https://www.weloennig.de/GiraffeFossilRecord.1abc.pdf pp. 12-14, https://www.weloennig.de/AngiospermsLivingFossils.pdf pp. 8-14.

[56] See also perhaps some revealing points in the *Evolution Encyclopedia* on The Horse Series: https://evolutionfacts.com/Appendix/a23.htm
Gould: "Paleontologists have documented virtually no cases of slow and steady transformation, foot by foot up the strata of a hillslope—not for horses, not for humans."