hypothesis of a monophyly of amphisbaenians (or worm lizards) and lacertids due its significant implications for the proposed relationship between amphisbaenians and snakes, as well as other limbless squamates. Until recently, however, there was no morphological or fossil support for an amphisbaenian-lacertid grouping, questioning the validity of this new hypothesis. A new genus and species of Eocene lizard from the famous Messel locality, consisting of an almost complete specimen, now sheds new light on this issue. The taxon is characterized by a spatula-like snout with a modified premaxilla and maxilla, notably small and anteriorly positioned orbits, the lack of a tympanic crest, a low tooth count, and reduced manus and pes. Also, it shows several features otherwise found only in amphisbaenians, such as the shape of the frontal suture and the morphology of the subolfactory processes. In a phylogenetic analysis including both morphological and molecular characters as well as extant and fossil taxa, the taxon groups as sister taxon to amphisbaenians within a lacertid-amphisbaenian clade and refutes a relationship between worm lizards and snakes, providing for the first time morphological support for the recently proposed molecular hypothesis. Morphometric analysis of body shape and ecology among squamates places the new taxon in cryptic or opportunistically burrowing habitats, and its distinctive anatomy indicates that head-first burrowing evolved prior to body elongation in Amphisbaenia.

The new taxon is considered to be a remnant of a non-crown group, amphisbaenian-like squamate lineage that occurred together with crown lacertids and amphisbaenians, which both are known from contemporaneous and even older Paleogene strata. Interestingly, many currently known lizards from Messel seem to be related to either Mesozoic squamate lineages or represent stemgroup taxa outside of the crown, suggesting that Europe may have acted as refuge for ancient squamate lineages during the Paleogene. Our study emphasizes that fossils are crucial for testing hypotheses of phylogenetic relationships, because extant taxa often reveal only a restricted picture of their evolutionary history.

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Zukunftspreis

Middle Miocene freshwater gastropods from the Dinaride Lake System: punctuated morphological disparity as result of rapid climate change

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This investigation focuses on evolutionary patterns and processes in Middle Miocene freshwater gastropods from the Dinaride Lake System. The point of study was a c. 100 m thick succession in the Sinj basin, comprising two limestone-coal cycles, which pass from fossil-poor limestone-dominated deposits into highly fossiliferous layers rich in organic matter. Within this section four gastropod lineages of the two unrelated genera *Melanopsis* and *Prososthenia* occur, each encompassing 3 or 4 morphotypes, which differ in size and/or sculpture. The single morphotypes are largely confined to certain intervals. Two periods of enhanced accumulation of organic matter mark distinct steps in the gastropod's shell morphology. During both intervals clear changes towards strongly sculptured and/or larger shells are observed. Both events happen within few meters (< 8 ka) and are accompanied by shifts to more arid conditions evident from the palynological record.

The synchronicity of morphological and environmental shifts suggests extrinsic factors to be responsible for the observed patterns. Probably, the tempo and intensity of the climatic changes exceeded the ecological thresholds of the discussed taxa leading to adaptive evolution. Due to increased aridity, a lowered lake level can be expected having strong influence on habitat segregation and vegetation. Enhanced photosynthetic activity led to chemosynthetically induced carbonate precipitation, which is evident from the section, and thus to over-saturation of the lake water. This might have facilitated the development of larger and sculptured shells.

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