similar to *Palaeoxyris* but is more bulb-shaped with longitudinal ribs on the surface. Twelve species are described from paralic strata of the Namurian–Westphalian B in Europe, Russia, and USA. The producer may belong to the Holocephali but this relationship is uncertain. (3) *Fayolia* Renault & Zeiller, 1884 is spirally twisted like *Palaeoxyris*, but differs due to a more cylindrical 'screw-like' shape and a collarette-parallel scar-line. The fossil record contains 16 species of Late Devonian to Middle Triassic age from predominantly freshwater successions of Europe, Central Asia, and the USA. Xenacanthid sharks are among the most likely producers. (4) *Scapellites* Pruvost, 1922 consists of spindle-shaped forms with roughly textured surfaces like a ball of wool. Two species are known from probable marine deposits of the Westphalian A–B in Belgium and Germany and its producers remain uncertain. (5) *Chimaerotheca* Brown, 1946 resembles Recent chimaeroid capsules and shows a central fusiform body accompanied by a rugose lateral web on the surface. 12 species are recorded from shallow marine strata of Germany, Russia, Iran, USA, and Canada ranging from Early Triassic to Oligocene in age. This type is referred to rhinochimaerids, chimaerids, and callorhynchids. A superficially chimaeroid capsule-like fossil from the Late Devonian of South Africa has been referred to placoderms bringing into question a phylogenetic relationship of the Holocephali to this group. (6) *Rajitheca* Steininger, 1966 is identical to modern batoid capsules with a square body and lateral pairs of horns, and is therefore referred to rays. Fossil capsules are assigned to three well-known and one unnamed species from Late Jurassic to Miocene, shallow marine deposits of France, Switzerland, Germany, and Hungary. (7) Capsules recently found in Late Eocene deep marine sediments of the USA are similar to those of modern scyliorhinids (catsharks).

The fossil record of egg capsules is a valuable data base that enables an analysis of the oviposition strategies of ancient sharks. An increasing number of studies suggest that some reproductive traits seen in modern forms (e.g., the occupation of nurseries) were acquired well before the advent of neoselachians.

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Freies Thema

Vertebrate diversity across the end-Permian extinction – separating biological and geological signals

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The greatest mass extinction in Earth's history at the end of the Permian had a major impact on ecosystem composition in the oceans and on land alike. The current study focuses on diversity patterns of Permian-Triassic terrestrial vertebrates at the regional scales of the South African Karoo Basin and the Russian fore-Ural region. Previous studies clearly established that specifically the diversity of synapsids, the dominant terrestrial tetrapods of their time, is significantly biased by heterogeneity in the Permian-Triassic terrestrial rock record. This has been demonstrated by revealing a positive correlation between taxonomic diversity estimates (TDEs) and varying sampling proxies: (1) number of formations and (2) outcrop area. Recently, these proxies have been criticized to be non-independent variables and (3) number of localities or (4) number of specimens has been suggested as more reliable proxies. In the present study, I tested the relevance of the latter proxies with respect to vertebrate diversity in South Africa and Russia. On these regional scales, log-transformed and generalized differenced TDEs of vertebrates at varying taxonomic levels are not significantly correlated with the number of localities or specimens for the complete time series. To eliminate the impact of the end-Permian extinction event, the earliest Triassic time intervals were excluded from all data series. Thereafter, vertebrate TDEs show statistically significant strong positive correlations with both the number of localities and specimens. Nonetheless, diversity residuals, resulting from modelled diversity estimates, exhibit clade-specific patterns with varying support for a mid-Permian event and strong support for an end-Permian extinction. The results imply that, although vertebrate diversity patterns in South Africa and Russia are at least partially biased by the Permian-Triassic terrestrial rock record, they still preserve genuine biological signals. Thus, despite the obvious bias, the end-Permian extinction maintains a major impact on vertebrate diversity and its role in shaping the composition and structure of terrestrial ecosystems remains unquestioned.

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