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**VERTEBRATE ASSOCIATIONS FROM THE UPPER
MIOCENE - UPPER PLEISTOCENE ON THE FORELAND
PLATFORMS OF THE EASTERN CARPATHIANS**

PHD THESIS SUMMARY

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The research for this study falls within the scope of vertebrate palaeontology studies and aims to provide a contribution to the understanding of the evolution of continental faunal assemblages within the Upper Miocene – Late Pleistocene interval of the platforms of the Eastern Carpathians Foreland (the Scythian and Moldavian Platform). It builds and extends previous paleontological research in the area, with the aim of enriching and refining the existing body of knowledge on the region's palaeobiodiversity and palaeoenvironmental conditions.

For the preparation of this study, the selection of the presented palaeontological material was guided by the criteria of faunal diversity and diagnostic relevance. Consequently, only fossiliferous localities that yielded rich and varied assemblages capable of providing significant scientific insights were included. During the field campaigns, both previously documented outcrops referenced in the scientific literature and newly identified fossiliferous sites were systematically monitored. In addition to the selection of sites, a screening of the collected material was carried out, retaining only those fossil remains that preserved sufficient morphological features to allow for meaningful taxonomic identification. A substantial portion of excessively fragmented or non-diagnostic specimens was therefore excluded from the detailed analysis.

Purpose of the Study - To investigate the fossil vertebrate assemblages from the studied region (the foreland platforms of the Eastern Carpathians) in order to reconstruct their palaeoenvironmental context and assess their taxonomic diversity through the following steps:

- Fieldwork aimed at identifying fossiliferous localities with relevance to the research topic, followed by an analysis of their stratigraphical, and palaeontological potential.
- Palaeontological material was collected, prepared in the laboratory, and carried out taxonomic identification of the recovered specimens.
- Through the consultation of scientific literature and examining comparative collections from museums to support taxonomic and palaeoecological interpretations.
- Reconstructed the palaeoenvironmental conditions of the region during the intended time interval, providing a reference point for understanding environmental evolution.

Thesis Structure - The study was organized into seven chapters, followed by the bibliography and annexes, as outlined below:

Introduction. A general overview of the topic, outlining the objectives, scope, and the significance of the study.

Chapter I. *Geomorphological framework*. An analysis of the natural and geographical context, with a concise description of the study area from a geomorphological perspective.

Chapter II. *History of research*. A synthesis of the geological investigations conducted in the region, with particular emphasis on palaeontological contributions and the work of key researchers in the field.

Chapter III. *Survey of past research*. A brief overview of the most recent sedimentation cycle within the Scythian and Moldavian Platforms, along with a description of the lithological features of the investigated localities.

Chapter IV. *Materials and methods*. A detailed account of the field techniques used for the collection of materials, as well as laboratory procedures for cleaning, conservation, measurements, and identification of the osteological remains.

Chapter V. *Systematic palaeontology*. A systematic presentation and taxonomic assessment of the identified fossil taxa, including morphological descriptions, comparisons, and relevant discussions.

Chapter VI. *Palaeoecological considerations*. An attempt to reconstruct the palaeoenvironmental conditions based on the structure and composition of the fossil vertebrate assemblages.

Chapter VII. *Taphonomic considerations*. An analysis of the taphonomic processes affecting fossil preservation, including discussions on sedimentation dynamics, bone size and morphology, fragmentation patterns, and fossil abundance.

Conclusions. A synthesis of the main scientific findings and their implications, as derived from the research presented.

Bibliography. A comprehensive list of the sources and references cited throughout the study.

Annexes. Supplementary materials including plates, additional tables, and other relevant graphical or illustrative content.

The present work examines fossil material predominantly recovered from continental deposits such as gravel lenses, sands of varying granulometry, and interbedded clays which are characteristic of fluvial depositional environments. At sites such as Răcătau de Jos, sedimentological and taphonomic features point to accumulation within a floodplain context. The spatial distribution of the fossils couples with the absence of extensive transport modifications (advanced rounding, pre-depositional fracturing), supports the hypothesis of rapid burial, likely triggered by high-energy flood events. Comparable depositional dynamics are observed at Pogana and Soci outcrops, where skeletal remains were embedded within fluvial channels. In these two localities the bones show varying degrees of fragmentation and weathering, indicating a more complex post-mortem history, shaped by fluvial reworking.

Additional evidence from Gherghești 2 locality reveals a lenticular bone bed found in a sandy channel fill, with fossils encased in a greyish carbonate-rich matrix. For the Cimișlia locality (Râpa Recea), a bone breccia approximately 1-1.5 meters thick has been reported, with articulated elements (limb bones, vertebrae, and skulls with mandibles, dispersed chaotically in sandy and clayey strata. The configuration suggests rapid burial following short-distance fluvial transport.

Pleistocene localities such as Zorleni, Bârlad Sud, and Simila have yielded vertebrate remains from reddish sand and gravels interpreted as ancient river channels. The fossil coloration in these sites reflects differences in sedimentary facies: specimens from gravel layers tend to exhibit darker hues, while those from sandy deposits display lighter, whiteish tones. Pliocene deposits at Țuțcani - Lățești consist of cross-stratified sands interpreted as major fluvial channels and host a diverse vertebrate assemblage.

While assessing the state of preservation, the degree of weathering was evaluated using the classification proposed by Behrensmeyer, ranging from stage 0 (intact) to stage 5 (highly degraded). A considerable portion of the material from Pogana, Soci, and the gravel layers beneath the loess at the Zorleni sand pit falls within stage 5 (indicating severe surface alteration and structural breakdown). Fossils from Bârlad Sud, Simila and some stratigraphic levels at Soci can correspond to stage 4 (cortical exfoliation and internal damage). The locality with the most advanced degree of deterioration was observed in specimens from Răcătau de Jos, where, in spite of the careful excavation and transport, environmental factors – namely humidity and thermal fluctuations, led to extensive cracking and fragmentation of the bone surfaces.

Considering the sedimentological and taphonomic framework, the research also advances the understanding of the vertebrate palaeobiodiversity in the region through systematic field investigations, laboratory preparation and comparative morphological analyses. Several previously unknown fossiliferous sites containing vertebrates of Miocene age were identified and examined in detail: Răcătau de Jos, Soci, and Poienеști. Of particular significance is the Poienеști outcrop, which yielded a rare specimen of *Amphimachairodus*, a hypercarnivorous felid indicative of semi-open environments. Associated taxa, including large herbivores and cervids, further suggest a mosaic habitat structure.

Excavations and sediment screening at Țuțcani also provided quite a productive, rich assemblage of both macro- and microvertebrate fossils; among these are fish (*Acipenseridae*, *Sparidae*, *Percidae*), amphibians (*Pelobatidae*), reptiles (*Macrovipera*, *Amphisbaenia*), and mammals such as *Procapreolus moldavicus*, *Sus* sp., and indeterminate cervids.

In parallel, this study revisited classical Upper Pleistocene sites, including Zorleni, and Simila; while monitoring lesser-known localities as Bârlad Sud and Negrilești. These field investigations led to the identification of a broad spectrum of Pleistocene taxa, including *Coelodonta antiquitatis*, *Megaloceros giganteus*, *Bison priscus*, *Equus* sp., and *Mammuthus* sp.