Taxonomic and paleobiological insights into small mammals from the Pliocene of Western Turkey: a comprehensive study of the locality of Afşar

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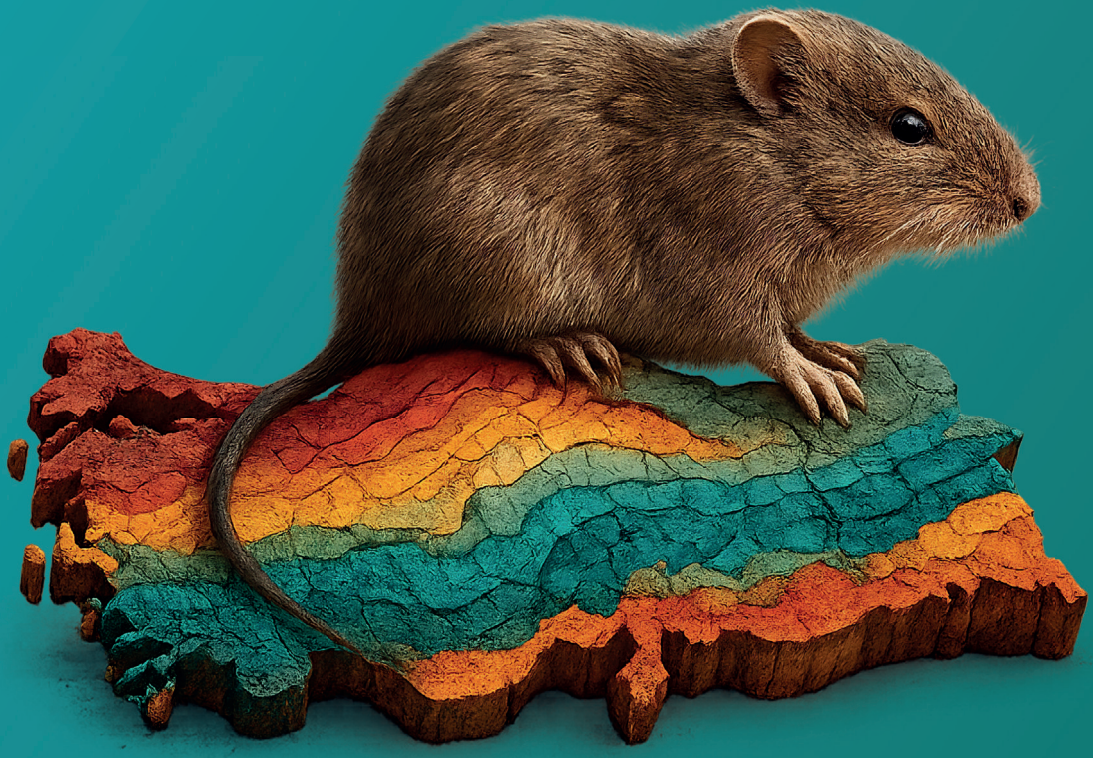

APPENDIX

Thesis Summary

Nederlandse Samenvatting

Acknowledgments

Curriculum Vitae

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Thesis Summary

This dissertation investigates the Pliocene micromammal assemblages from the Afşar section in Western Türkiye, addressing a critical gap in the paleontological record of Anatolia. The research primarily uses fossilized rodent teeth to reconstruct paleoenvironments and establish the biochronology of Anatolia, which served as an important pathway for species between continents. By presenting detailed taxonomic descriptions, introducing a novel methodological approach for analyzing Spalacinae molars, and integrating a robust comparative biochronological analysis. The thesis illuminates the faunal dynamics and paleoenvironmental transitions that characterized the Early to Late Pliocene interval in Anatolia, thereby advancing our understanding of mammalian evolution and regional paleogeography.

The study of fossil micromammals is fundamental for deciphering past ecosystems, climate impact on biodiversity, and evolutionary adaptations. Their rapid evolutionary turnover and distinct dental morphology makes micromammals invaluable biostratigraphic and paleoenvironmental indicators. Despite their usefulness, the Pliocene micromammal record in Anatolia has remained largely underexplored. This thesis directly addresses this gap by focusing on the Afşar section, a site that yielded rich micromammal material. Anatolia's strategic position at the crossroads of Africa, Europe, and Asia highlights the importance of understanding its faunal history for a comprehensive view of mammalian biogeography. The Afşar section provides an unique window into Anatolian Pliocene faunal development, particularly the crucial transition into the Villafranchian Age, suggesting Anatolia as a potential corridor for species adapted to drier, open environments dispersing into Europe.

A significant contribution of this dissertation lies in essential updates in micromammal taxonomy. It provides detailed descriptions for various groups, including Arvicolinae, Cricetinae, Murinae, and Lagomorphs. A particularly innovative aspect is the meticulous approach to Spalacinae (mole rats) taxonomy. Given the challenges posed by their highly crowned molars and wear-dependent morphology, the study introduces an innovative methodology utilizing micro-CT scanning to simulate and document wear-related morphological transformations. This groundbreaking technique allowed for the accurate identification of species such as *Pliospalax macoveii* in Afşar 1 and *Pliospalax tourkobouniensis* in Afşar 2. It provides a promising tool for addressing taxonomic issues in other high-crowned rodents, such as beavers and porcupines. In addition, the research documents the first recovery of *Pseudomeriones tchaltaensis* outside its type locality, expanding its known paleobiogeographic range. The accurate identification and stratigraphic ranges of these species are crucial for dating the Afşar section.

Combining the taxonomic and morphological data, the thesis determines the site's age and reconstructs its past environment. Biochronologically, the integrated faunal evidence firmly positions the Afşar sequence at the critical juncture between the Early and Late Pliocene, making it a crucial locality for understanding the initial establishment and dispersal of Villafranchian faunas. From a paleoenvironmental perspective, the study reveals pronounced shifts in environmental conditions between the two primary

stratigraphic units (Afşar 1 and Afşar 2). Quantitative analyses show a distinct and significant increase in the relative abundance of Arvicolinae (from 32% in Afşar 1 to 64% in Afşar 2), correlated with a decrease in Murinae and Gliridae. This faunal shift strongly indicates a progressive transition from relatively less open conditions in Afşar 1 towards a more open, drier, and potentially cooler environment in Afşar 2, consistent with the known ecological preferences of Arvicolinae. The detailed documentation of this environmental transition from a key Anatolian locality significantly contributes to regional paleoclimatic models.

In conclusion, the current thesis contributes to the paleontological research of the Pliocene in Anatolia through meticulous analysis, innovative methodology, and critical interpretation, the study delivers robust taxonomic data, refines regional biochronology, and provides crucial insights into paleoenvironmental evolution. The compelling evidence from Afşar demonstrates a clear and progressive paleoenvironmental shift during the Early to Late Pliocene transition, enriching the global understanding of Pliocene faunal migrations, climate change, and mammalian adaptive responses. The research underlines Anatolia's importance as a biogeographic bridge and a key area for unraveling Eurasia's intricate paleontological heritage.