

RADIATION OF EOCENE ADAPIDAE IN EUROPE

by

PHILIP D. GINGERICH

RADIATION OF EOCENE ADAPIDAE IN EUROPE

by

PHILIP D. GINGERICH *

ABSTRACT

The fossil record of European *Adapidae* has been studied locality by locality, and each locality sample integrated into standard European faunal reference levels. It is possible to trace some lineages of species of *Adapidae*, and these show continuous gradual evolution in size and other morphological characteristics. Several examples of diminution in size, evolutionary reversal, and parallelism are discussed. *Adapidae* probably originated from a *Purgatorius*-like ancestor, and ultimately gave rise to both lemuriform and anthropoid primates.

RÉSUMÉ

La documentation fossile des *Adapidae* d'Europe a été étudiée gisement par gisement, et l'échantillon de chaque gisement intégré au sein de l'échelle des niveaux-repères d'Europe. Il est possible de reconstituer quelques lignées évolutives d'espèces d'*Adapidae*, et celles-ci montrent une évolution continue et graduelle de la taille ainsi que d'autres caractères morphologiques. Plusieurs exemples de réduction de la taille, de renversement évolutif, et de parallélisme sont discutés. Les *Adapidae* ont probablement leur origine chez un ancêtre comparable à *Purgatorius*, et pour finir ils donnent naissance à la fois aux lémuriformes et aux primates anthropoïdes.

MOTS-CLÉS : ÉVOLUTION BIOLOGIQUE, PROSIMIEN (ADAPIDAE), ÉOCÈNE, BIOMÉTRIE, PALÉOCLIMAT, EUROPE.

KEY WORDS : BIOLOGICAL EVOLUTION, PROSIMIAN (ADAPIDAE), EOCENE, BIOMETRICS, PALAEOCLIMATE, EUROPE.

* Museum of Paleontology, The University of Michigan Ann Arbor, Michigan 48109 (U.S.A.).

TABLE OF CONTENTS

I. - Introduction	166	V. - Origin of <i>Adapidae</i>	174
II. - Phylogeny reconstruction	167	<i>Purgatorius</i> and paleogene climatic	
Variation and recognition of biological		history	174
species	167	<i>Azibius</i> and adapid paleogeography	175
Biostratigraphy as temporal context	169	VI. - European <i>Adapidae</i> and later pri-	
Phenetic linking	169	mate evolution	176
Hypothesis testing	170	Origin of living Lemuriformes	176
III. - Phylogeny of European <i>Adapidae</i> ..	170	Origin and radiation of higher pri-	
IV. - Evolutionary change in <i>Adapidae</i> ..	171	mates	176
Size changes	171	VII. - Conclusions	179
Evolutionary reversal	171	Acknowledgments	179
Parallelism	172	References	180

I. — INTRODUCTION

The European *Adapidae* are of special interest and importance to the study of primate evolution for several reasons, both historical and phylogenetic: (1) *Adapis* was the first fossil primate genus to be described (although it was not recognized at the time as a primate) — a skull of *Adapis* being figured in G. Cuvier's first edition of the *Recherches sur les ossements fossiles* (1812). (2) *Caenopithecus lemuroides* was the first lemuriform fossil primate to be recognized as such and, interestingly, in describing it Rüttimeyer (1862) called attention also to its resemblance to some anthropoid primates (hence the name *Caenopithecus*). (3) *Adapidae* are common constituents of European Eocene mammal faunas, having a dense and continuous fossil record ideal for detailed evolutionary study. (4) Finally, recent comparisons of Eocene and Oligocene fossil primates have suggested that higher primates probably originated from an adapid ancestry.

The European *Adapidae* are ideal for detailed

evolutionary study because of their abundance in most Eocene stratigraphic intervals. This paper is a preliminary summary of some of the more interesting conclusions of a detailed analysis of the stratigraphic distribution and morphology of European *Adapidae*. Fortunately, it was possible to study virtually all important collections of these fossils, and the conclusions presented here have thus been tested against all of the evidence available to date. This evidence is considerable, and it is unlikely that the main outline of adapid evolution will be altered by future discoveries.

In this paper the methodology used to study phylogenetic history will first be outlined, and then the phylogeny of European *Adapidae* will be discussed. Some interesting examples of evolutionary change in *Adapidae* will be summarized. Finally, the origin of *Adapidae* and the relationship of European *Adapidae* to some Asian, African, and North American paleogene primates will be discussed.

