

Introduction

The present volume provides an overview of Neogene Rodentia and their temporal and spatial distribution in Austria and neighbouring regions. It is based on published and unpublished fossils and introduces the taxonomy and systematics of the represented rodent groups. Dental terminology is explained using sketches of tooth morphology and the main characters of the upper and lower dentition as a basis for taxonomic identification. Descriptions of new taxa and measurements are excluded from this issue. We also excluded detailed descriptions of skulls, lower jaws and postcranials, which will be subject of other planned publications.

The studied fossils mainly are housed in the collections of the Museum of Natural History Vienna, Geological-Paleontological Department. Some fossils stem from other collections, i.e. the University of Vienna (Department of Palaeontology), the Universalmuseum Joanneum Graz (Geology & Palaeontology), the Montanuniversität Leoben, the Bayerische Staatssammlung für Paläontologie und Geologie München, and the private collections of W. Andrä (Wimpassing, Lower Austria), O. Hopfinger (Korneuburg, Lower Austria), J. Kreuzhuber Hohenzell, Upper Austria), G. Penz (Vienna), C. Schebeczek (Gaweinstal, Lower Austria), H. Schwengersbauer (Mannersdorf, Lower Austria), W. Sovis (Stockerau, Lower Austria), P. Ullrich (Vienna) and F. Weichselbaum (Mistelbach, Lower Austria).

The first mammal fossils of Austria were found in the course of coal mining activities, and others were collected in gravel-, sand- and clay pits (HOFMANN 1892, 1893; HOFMANN & ZDARSKY 1904; PIA & SICKENBERG 1934; PAPP & THENIUS 1954; MOTTL 1970). These old collections yielded mostly isolated fossils of large mammals and rarely fossil remains of large-sized rodents such as beavers. The wide variety of small-sized mammal fossils was unknown from Austria up to mid-20th century. The first systematic excavations started when the method of screen washing of fossil-bearing sediments developed; this was adapted in Austria in the late 1960s. In the second half of the 20th century, a range of field activities focused on smaller mammals, among them the excavations of the Kohfidisch fauna conducted by the Museum of Natural History Vienna (1955 to 1984). These excavations yielded a series of publications on small mammals (BACHMAYER & WILSON 1970, 1978, 1980, 1983, 1985, 1990; DAXNER-HÖCK 2004 b; VAN DE WEERS & MONTOYA 1996; DAXNER-HÖCK & HÖCK 2009). During two field seasons (1968-1969) the small mammal fauna from Eichkogel was excavated by the University of Vienna. The investigated small mammal fossils from Eichkogel include rodents, insectivores and bats (DAXNER 1967; DAXNER-HÖCK 1970, 1972a, 1972b, 1975, 1977, 1980, 2004b; DAXNER-HÖCK & RABEDER 1970; DAXNER-HÖCK & DE BRUIJN 1981; RABEDER 1970, 1973; ZIEGLER 2006; DAXNER-HÖCK & HÖCK 2009). The first mammal fossils from the locality Götzendorf were collected by private collectors. In several field seasons from 1988 to 1992, a rich vertebrate collection was excavated by the Museum of Natural History from different fossil layers in Götzendorf

and from neighbouring sandpits in Stixneusiedl and Neusiedl am See. An overview of the faunas (RÖGL et al. 1993) and several taxonomic studies give insight into selected small mammal groups (BACHMAYER & WILSON 1984; RABEDER 1998; DAXNER-HÖCK 2004b; ZIEGLER 2006; DAXNER-HÖCK & HÖCK 2009).

From 1990 to 2006, numerous small mammal localities were excavated from different Neogene basins of Austria (DE BRUIJN 1998; DAXNER-HÖCK 1998a, 1998b, 2003b, 2004a, 2004b, 2010; DAXNER-HÖCK & HÖCK 2009; GROSS et al. 2011; HARZHAUSER et al. 2011; PRIETO et al. 2010, 2014; ZIEGLER 1998, 2006). Screen washing in the field has yielded very important rodent assemblages from the localities Obergänserndorf and Teiritzberg (Korneuburg Basin), Oberdorf (West Styria Basin), Mühlbach and Schernham (North Alpine Foreland Basin), Richardhof-Wald and Richardhof-Golfplatz (Vienna Basin). All these excavations were organized and conducted by the Natural History Museum Vienna, partly supported by other scientific institutions, private collectors and students. Finally, the famous vertebrate fauna of St. Stefan (Gratkorn Basin) was excavated by the Universalmuseum Joanneum Graz in cooperation with the University of München.

The investigated rodent material comprises thousands of fossil remains, i.e. parts of skulls, jaws and mostly isolated cheek teeth and incisors, rarely postcranials. The fossils stem from fifty fossil sites/layers of varying sample size and fossil richness. Only a few teeth were collected from small test samples, whereas large bulk samples of one to ten tons yielded several hundred or thousands of fossil specimens. At least one third of the Austrian Neogene rodent assemblages turned out to be very important concerning species richness, individual numbers, and their biostratigraphic and palaeoecologic input.

Some of these terrestrial assemblages deserve special attention because they were deposited in marine or brackish sediments synchronously with marine organisms. They not only provide insight into various ecosystems, but also allow correlations to be established between continental and marine biozonations (DAXNER-HÖCK 1998a; DAXNER-HÖCK et al. 2004; HARZHAUSER et al. 2002, 2008; ROETZEL 2003; RÖGL & SPEZZAFERRI 2003; STEININGER 1999). Moreover, the biostratigraphic results can be linked with magnetostratigraphic, lithostratigraphic and sequence stratigraphic data and serve as a foundation for an integrated stratigraphy (DAXNER-HÖCK 2001; HARZHAUSER et al. 2004; MAGYAR et al. 1999a, 1999b; MAURITSCH & SCHOLGER 1998; SCHOLGER 1998).

These rich and well-stratified mammal assemblages from different Neogene basins of Austria provide a basis for future small mammal community analyses, phylogenetic studies and palaeoecological interpretations. The present data of Austria suggest major diversifications of small mammal communities in the course the Miocene. Signals resulting from these data will allow conclusions to be drawn on significant changes of palaeoenvironments and fauna over 11 million years.