

Summary

Węże 2 is a Late Pliocene (MN 16b, i.e. 2.9–2.6 Ma) paleontological site located in the Wieluń Upland, southern Poland. Species belonging to at least seven rodent (Mammalia, Rodentia) families have been detected in the fossil assemblage of the site. These families include Gliridae (dormice), Sciuridae (squirrels), Hystricidae (porcupines), Castoridae (beavers), Anomalomyidae, Cricetidae (hamster-like rodents) and Muridae (mice and rats). All the taxa were identified based on dental specimens and/or jaws as is commonly practiced while dealing with fossil rodents. Anomalomyidae is the only extinct family represented at Węże 2 while all the other families have also extant representatives, including very common species. The fossil rodent fauna of the site is quite typical for the Late Pliocene and similar to the nearby site of Rębielice Królewskie 2 which is also similarly dated.

The dormouse (Gliridae) fauna of Węże 2 is represented by five species – *Glis sackdillingensis*, *G. minor*, *Muscardinus pliocaenicus*, *M. dacicus* and *Glirulus pusillus*. *G. sackdillingensis* and *G. minor* differ only by the dimensions of their cheek teeth and fossil material belonging to *G. ex gr. sackdillingensis-minor* was often fairly arbitrarily assigned to one of the species. Striczky and Pazonyi (2014) elaborated a method of distinguishing some of the cheek teeth as belonging to either *G. minor* or *G. sackdillingensis* based on stronger morphometric grounds. Thus, the presence of both species at the Węże 2 site could be more convincingly shown. Moreover, a taxonomic revision of *G. minor* and *G. sackdillingensis* occurrences from other sites led to reassigning of some material to the other species. The enamel structure in the glirids from Węże 2 was also examined and proved to be formed predominantly by radial enamel. A thin layer of lamellar enamel, occurring close to the enamel-dentine junction, may be also present. Such enamel structure is typical for the Myomorpha, the clade of rodents encompassing the Muroidea (the mouse-like rodents) and the Gliridae. *M. pliocaenicus* is considered to be a direct ancestor of the extant hazel dormouse (*M. avellanarius*). Specimens assigned to *M. dacicus* may represent either the same species as *M. avellanarius* or a sister evolutionary lineage to *M. pliocaenicus* – *M. avellanarius*. Both *M. dacicus* and *G. pusillus* are rare in the fossil record and were not listed on the faunal lists for Węże 2 before.

A striking finding made during the analyses of the enamel of the Gliridae from Węże 2 was the discovery of probable fossil bacterial microflora associated with a cavity caused by caries in a *Glis sackdillingensis* tooth. The described specimen is apparently the only known pre-Holocene example of a pathological condition (dental, osteological or of another type) where the microbes responsible for its development were preserved *in situ* as fossils. However, potential methodological factors that may have caused such cases to be overlooked are also discussed.

The Sciuridae (squirrels) present at Węże 2 include the species *Pliopetaurista dehneli* (material belonging to this species and found at Węże 2 was already described by Sulimski, 1964), *Tamias orlovi*, *Blackia miocaenica* and *Sciurus warthae*. All the species are otherwise relatively rare in the fossil record. Along with another MN 16b site of Frechen, as well as the MN 16 sites of Rębielice Królewskie 1A and Rębielice Królewskie 2, Węże 2 is also one of the youngest occurrences of *B. miocaenica* in the fossil record. The presence of so many species of most probably associated with arboreal environments (*P. dehneli*, *B. miocaenica*, *S. warthae* and five species of glirids) indicates that the fossil assemblage of Węże 2 corresponds to a woodland environment.

The Castoridae (beavers) of Węże 2 include *Trogontherium (Euroxenomys) minus* and *Dipoides ex gr. problematicus-sigmodus*. The genus *Dipoides* and the species

Trogontherium (Euroxenomys) minus have not previously been reported from Poland. As the Węże 2 fossil assemblage is otherwise suggestive of a fauna inhabiting a woodland environment with a constant freshwater source nearby, the presence of these species at the site suggests that these lesser-known and extinct representatives of the Castoridae were adapted to similar conditions as the modern species (*Castor fiber* and *C. canadensis*).

The presence of the porcupine *Hystrix refossa* in Węże 2 is supported by one fragmentary mandible that can be certainly assigned to this species as well as some dental specimens belonging to *Hystrix* sp. The discovery shows that the late Pliocene range of *H. refossa* was wider than previously indicated and that it started to spread across East-Central Europe before the onset of the early Pleistocene. The finding of a *Hystrix* specimen at Węże 2 makes this site (along with the nearby site of Węże 1) one of the northernmost occurrences of fossil porcupines in Europe. Moreover, comparison of hystricid material from several sites, led to establishing a new species, *H. velunensis*, present at the Pliocene (MN 15) site of Węże 1. This specimen was previously assigned either to *H. primigenia* or *H. depereti* but it differs from these species as well as from *H. refossa* by distinct occlusal morphology.

Another rare species present at the site of Węże 2 is *Prospalax priscus* (Anomalomyidae). While the ecology and adaptations of the Anomalomyidae (Muroidea) have been long debated in the scientific literature, the presence of this species at the site agrees with the interpretation of *P. priscus* and the Anomalomyidae in general as adapted to forest environments.

A species that appears frequently at Węże 2 is *Baranomys longidens*, a rodent belonging to the Cricetidae and closely related to voles (Arvicolinae). This species was listed on the faunal lists prepared for this site but the Węże 2 fossil material has not previously been subjected to morphometric studies or illustrated. Examination of the morphology of occlusal surfaces and a morphometric analysis made for the purpose of this work confirmed that the specimens from Węże 2 belong to the same species as the fossil material from Węże 1 which is the type site of *B. longidens*. However, because of the scarcity of published data on the other species within the genus *Baranomys* (*B. loczyi* and *B. kowalskii*), morphometric and morphological differences between them are not well documented. Appearance of new fossil material of *Baranomys* from other sites may help to either understand these differences better or call them into question. Moreover, in the collection of the Institute of Paleobiology are remains of other cricetid rodents from Węże 2, belonging to the genera *Mimomys*, *Germanomys* and *Trilophomys*, as well as some very rare teeth of fossil mice (Muridae). Further examinations are needed to better understand the specific composition of the Węże 2 cricetid and murid material.