

# SMALL SAUROPSIDS FROM THE 'TRIAS' DOCUMENTATION SITE (OPOLE VOIVODESHIP)

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## Abstract

Research on vertebrate fossils from the "Trias" Documentation Site in Krasiejów has been going on since the end of the last century. For most of this time, scientists have focused on the fauna of large vertebrates such as temnospondyls (*Metoposaurus*, *Cyclotosaurus*), phytosaurs, pseudosuchians (*Stagonolepis*, *Polonosuchus*) and dinosauriforms (*Silesaurus*). The remains of small vertebrates were recorded from the very beginning of research at the site, but they were never the main object of study and were not described in detail. The first descriptions of the site's fauna reported the presence of small, difficult-to-identify remains of ray-finned fish and small sauropsids. It was not until research began in 2015 focusing specifically on the fossils of small vertebrates that their great richness and diversity were revealed. During the excavations at the site, it was possible to delineate a thin layer of sediment rich in microfossils. This layer was excavated and then subjected to repeated washing and sieving on sieves. The final material obtained, devoid of most of the clay portion, was then searched using a stereoscopic microscope to extract fossils.

At the time of writing this work, the collection of small vertebrate remains (mainly isolated teeth and scales) amounted to more than 3,500 specimens. In the collection collected so far, the remains of the sauropsids described in this work have been recognized, as well as cartilaginous hybodonts, ray-finned fishes, dipnoan fishes, amphibians and synapsids, which are awaiting detailed study. The taxonomic diversity of the small vertebrate fauna from the Krasiejow site exceeded several times the diversity of large vertebrates described so far.

This work aimed to describe and identify based on dentition the fauna of small sauropsids. More than 220 specimens of sauropsid teeth selected for analysis were classified into their two main groups: Lepidosauromorpha and Archosauromorpha. Based on characteristic sets of structural features, 16 distinct morphotypes of lepidosauromorphs and as many as 50 morphotypes of archosauromorphs were described. In separating the morphotypes, several conformational features were taken into account, such as the overall shape of the crown, the size parameters of the crown itself and the base, the degree of bending or curvature, the orientation of the crown top, the presence and structure of the dental edges, the presence and structure of ornamentation, and the type of implantation.

Comparison of the structure of the morphotypes from the Krasiejów site with specimens described at other paleontological sites has made it possible to recognize taxonomically some of them. At least four distinct lepidosauromorph taxa have been distinguished: cf. *Gephyrosaurus*, *Planocephalosaurus*, *Clevosaurus* and *Rebbanosaurus*. Some specimens also show similarities to *Deltadectes* and *Godavarisaurus*. The studied collection also includes specimens with distinctive and unique sets of features that do not match the recognized taxa, suggesting that the diversity among rhynchocephalians was even greater. The genera highlighted above are the first findings of the presence of these taxa in Krasiejów and in Poland. This allows us to expand the previously known range of the geographic and also temporal occurrence of these rhynchocephalians, as most of them were previously described from younger sediments. Based on the analysis of dentition structure, it can be concluded that both basal non-sphenodont rhynchocephalians with more primitive subpleurodont dentition and crown Sphenodontia with fully acrodont dentition occurred side by side. The high diversity of rhynchocephalians at one site most likely must have been related to the division of food niches. The sympatric occurrence of two or three rhynchocephalian taxa side by side is not unusual at other paleontological sites, it is such a high diversity of them in Krasiejów site that is unique. The rhynchocephalian fauna from the Krasiejów site most closely resembles faunas known from western Europe, but also has elements common to India and South America.

Among the distinguished 50 morphotypes of archosauromorphs, several have been able to be assigned to specific groups or even genera described from other sites. One of the most important discoveries is the presence of teeth belonging to primitive theropods of the Coelophysoidae group. At least four distinct morphotypes show strong similarities in structure to the dentition of early and basal Sauropodomorpha. In addition, one morphotype most likely represents the dentition of a basal pterosaur. These are the first reports of the presence of these groups in Krasiejów locality and one of the few from Poland. These discoveries extend the geographical and temporal range of these groups and are of great importance for understanding their early evolutionary history. Morphotypes showing great similarity to the dentition of taxa described from Late Triassic sites in North America were also recognized: *Revueltosaurus*, *Protecovasaurus*, cf. *Pekinosaurus* and cf. *Crosbysaurus*. These sauropsids are mostly known for their characteristically formed isolated teeth and it is difficult to determine their exact systematic position. These are the first findings of them from Poland. In addition, among the morphotypes of archosauromorphs, a number of difficult-to-identify specimens with very distinctive and unique structural features have been distinguished from tooth specimens described from other locations. More precise identification of their systematic position will be the next goal of the research. Paleontological work in Krasiejów site continues and is currently focused precisely on the search for and study of the remains of small animals. Each season brings new discoveries including more new tooth morphotypes. Undoubtedly, our knowledge of the diversity of sauropsids from the Krasiejów site will increase further in the future.