10.03.2023 r., Krakow

Sylwia Skoczylas-Śniaz, M. Sc.

Malacofauna of Holocene slope sediments as an indicator of microhabitat diversity in the southern part of the Krakow-Czestochowa Upland

The material used in the presented analyses was collected from three areas located in the southern part of the Krakow-Częstochowa Upland, namely, the Mnikowska Valley, the Zimny Dół Valley and the Jerzmanowice area. In the case of Jerzmanowice, materials were collected from the following sites: Wielka Hill, Grodzisko Hill, Mazurkowa Hill and Łysa Hill. The study was based on material gathered from 46 sediment profiles representing fills of small karst formations. As far as the research area is concerned, 18 profiles came from the Mnikowska Valley, 15 from the Zimny Dół Valley and 13 from the Jerzmanowice. A total number of 157 samples were taken, of which 119 contained remains of malacofauna.

The aim of this study was: I) to show that the natural environment, both nowadays and in the geological past, is a mosaic of microhabitats which differ in terms of conditions and that regional environmental trends are significantly modified by local factors acting there. II) to reconstruct the environmental conditions and time of sediment deposition at the site in terms of the composition of mollusk assemblages in slope sediments. III) to characterise the natural factors shaping the environment, with particular reference to short- and medium-term climatic variations, on the basis of the malacocenoses analysed. IV) to assess the degree of environmental transformation, changes in land use and the intensity of anthropopressure in areas of varying relief, based on malacological studies.

The analysis of the profiles and their malacological content indicates that there is a considerable variation in the malacofauna within the individual study areas. The exposure of the slopes should be considered the main reason for this diversity since the direction of the slopes has a decisive influence on insolation, and consequently, moisture conditions, ground thermal, length of the growing season and snow cover. This contributes to the differentiation in the characteristics of microhabitats between southern/southeastern slopes and northern/western slopes. The former type of slopes is dominated by dry, usually open biotopes

and/or exposed rocky walls often almost completely lacking any vegetation cover. Completely different conditions prevail on slopes with northern and western exposures. The weaker insolation favours more humid habitats and creates more conducive conditions for the development of forest communities. Even slight differences in the shape of slopes affect the appearance of microhabitat diversity, thus even on closely spaced sites a diverse malacofauna can appear.

Based on the significant similarity between malacofauna occurring in the fills and the assemblages described contemporarily in the southern part of the Kraków-Częstochowa Upland, it can be concluded that the analysed fills of small karst forms represent the late Holocene period (mainly the last millennium). This fact is confirmed by the conducted radiocarbon studies. Moreover, the shells of cold-loving taxa identified in the analysed material are unknown in the contemporary fauna of the southern part of the Kraków-Częstochowa Upland. They are undoubtedly allochthonous elements which came from older sediments. The shells of these species were probably redeposited from older sediments or are remnants of older fills of the studied formations.

During the last millennium period, especially in its warm phase (Medieval Warm Period), significant environmental changes in the Krakow-Częstochowa Upland occurred. This was mainly caused by the following factors: demographic growth, increased settlement and intensification of anthropopressure. At that time, vast tracts of the Upland were deforested (Ojcowski Plateau), with the exception of zones unfavourable for agricultural activity which have more varied relief (Mnikowska Valley, Zimny Dół Valley). This generated a significant differentiation in malacocenoses. In areas used for agriculture, a drastic depletion of malacofauna was marked, and species of open and xerophilous environments began to play a dominant role. In contrast, areas without intensive anthropopressure have largely retained their original forest character, and shade-loving taxa have remained the main component of malacocoenoses.

Fillings of small karst forms occurring on limestone outcrops in the southern part of the Kraków-Częstochowa Upland constitute a prospective direction for malacological research. The commonness of the sites in the region, the abundance of material which can be collected and the ease of its acquisition are of particular importance. This type of research may supplement malacological analyses conducted in large caves, as well as be used for independent interpretations.