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Yu. O. PUHOLOVOK, A. S. KUSHNIR, Zh. M. MATVIISHYNA

PALEOLANDSCAPE ANALYSIS OF THE EARLY SLAVIC HILLFORT IN OPISHNIA

This article is dedicated to interdisciplinary research of the Opishnia settlement. Based on the integration of archaeological and paleogeographical data, a paleolandscape analysis of the early Slavic settlement is conducted. The study reconstructs the natural environment of the settlement in the Early Middle Ages, highlighting its landscape conditions, main principles of economic activity, and the formation structure.

Key words: the Early Middle Ages, Romny culture, the Slavs, hillfort, geoarchaeology, paleolandscapes, soil, natural conditions.

Paleolandscape analysis is a scientific approach to studying ancient natural landscapes, their structure, dynamics, and evolution during various geological epochs. This analysis allows for the reconstruction of past environmental conditions, including climate, flora, fauna, and human influence on the natural environment.

The main methods of paleolandscape analysis include the study of geological, paleontological, archaeological, and geographical data, as well as the application of modern technologies such as geographic information systems (GIS), isotope analysis, and other chemical markers.

Studying paleolandscapes is important for understanding the economy, culture, and life of early Slavs, as the natural environment directly in-

fluenced the development of their societies. Paleolandscape analysis allows us to reconstruct the conditions in which the Slavs lived and understand how they adapted to changing ecological conditions. These studies play a crucial role in examining settlement structures, as they reveal how settlement sites changed depending on natural conditions, such as climatic shifts, water level decreases, or landscape movements. This helps reconstruct the organisation of space, relationships between different groups, and the preconditions for the emergence of complex social structures. Overall, the study of paleolandscapes is an important tool for understanding how early Slavs interacted with natural environment, how it shaped their economic activities, culture, and social structures, and how environmental changes influenced their development (Горбаненко 2005; Матвіїшина, Пархоменко 2016; Матвіїшина, Пархоменко, Скороход 2019; Горбаненко, Журавльов 2021; Матвіїшина та ін. 2021; Пуголовок, Кушнір 2022).

For more detailed information on the results of paleo-soil research of Eneolithic–Early Modern sites as part of the general paleolandscape analysis, please refer to the web resource that includes the corresponding database: <https://paleosoil-holocen.info/> (Leiberiuk, Kushnir, Shvaiko 2024) and summarizing works by the staff of the Paleogeography Department of the Institute of Geography of the National Academy of Sciences of Ukraine (Матвіїшина та ін. 2024).

It is worth noting that such studies in settlement archaeology are not rare. The high mobility of the population, particularly during the Early Middle Ages, caused a reorganization of the natural landscape. As a result, the remains of medieval settlements in Europe serve as indicators of human impact on both the natural and cultural landscapes (Herold 2016, p. 107-120; ed. Contreras 2017; Dobrowolski et al. 2018; Marcinkowski, Szczepaniak 2019; Zamelska-Monczak et al. 2021). On a global scale, climate was one of the factors influencing migration. In this publication, we present the impact of humans on the local landscape, using the example of an early Slavic settlement near Opishnia.

© PUHOLOVOK Yuriy Oleksandrovyeh, 2025 — PhD in Archaeology, Senior Research Fellow, SE “Scientific Research Centre ‘Protective Archaeological Service of Ukraine’”, the Institute of Archaeology, the National Academy of Sciences of Ukraine, ORCID: 0000-0002-7610-8005, yuriy.puholovok@gmail.com

© KUSHNIR Anatolii Stepanovych, 2025 — PhD in Geography, Senior Research Fellow, the Institute of Geography, the National Academy of Sciences of Ukraine, the Department of Geomorphology and Paleogeography, ORCID: 0000-0001-8995-1467, kushnir.paleo@geo@gmail.com

© MATVIISHYNA Zhanna Mykolaivna, 2025 — DSc in Geography, Professor, the Institute of Geography, the National Academy of Sciences of Ukraine, the Department of Geomorphology and Paleogeography, ORCID: 0000-0003-1412-7232, kas05061988@ukr.net

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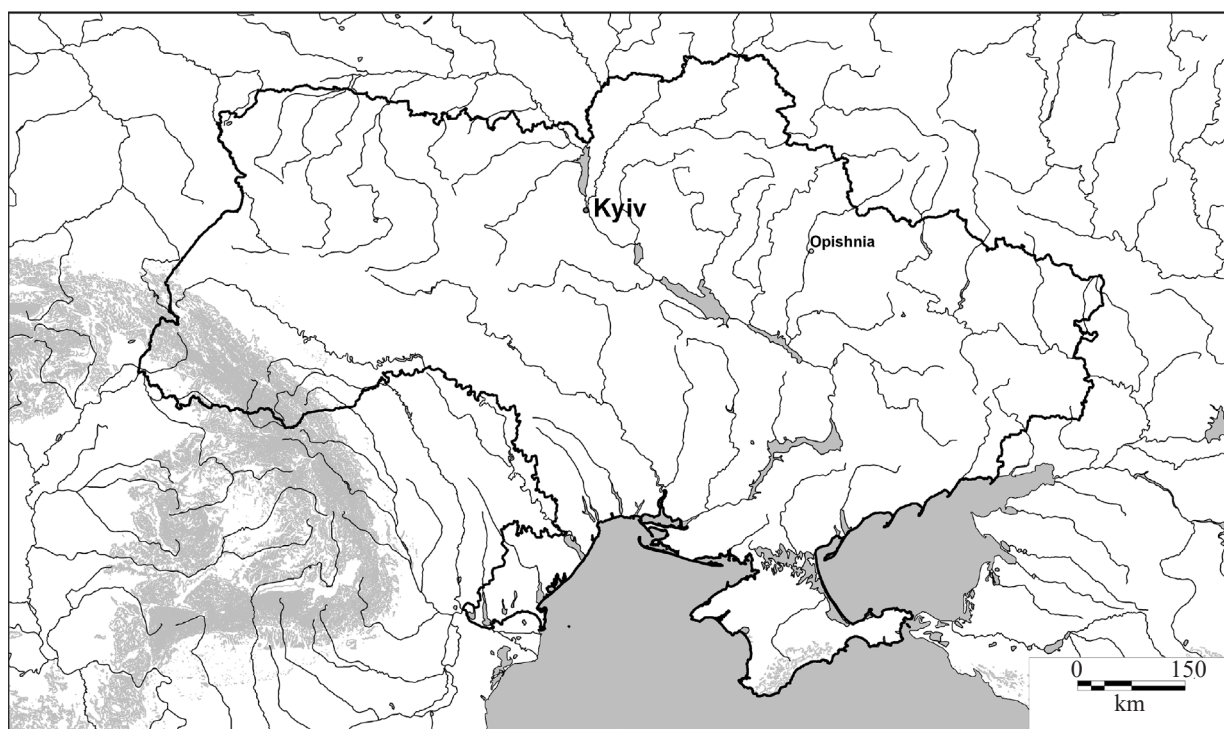


Fig. 1. Opishnia on the map of Ukraine

In the second half of the 8th century, fortified settlements emerged as a new type of settlement in the Dnipro Left Bank region (Пуголовок 2016, с. 13). Their emergence and functioning led to the creation of new anthropogenic landscapes that persisted for several centuries. (It is worth noting that an anthropogenic landscape is one that has been altered by human activity, while cultural landscape represents a specific type of anthropogenic landscape). Fortified settlements, such as wooden-earthen forts with various functions — administrative, military, protective, or cultic — were a unique feature of the early medieval landscape in Slavic lands from the 6th to 13th centuries (Buko 2013; Šalkovský 2015; eds. Christie, Herold 2016). This also applies to the territory of Ukraine, where by the end of the 20th century, about 700 fortifications from the 8th to the 13th centuries were known (Кучера 1999). In the area of the Siverian settlement dating from the 8th to 11th centuries, about 130 settlements are known, according to various estimates (Сухобоков 1975b, с. 21; Енуков 2005, с. 63). One of the earliest sites for the Romensk culture area is the Opishnia settlement, located in the northeastern part of the town of Opishnia, on the right bank of the Vorskla River in the Horydysche tract (fig. 1). The site has been well-known in professional literature since the early 20th century and is associated with a group of researchers of Slavic antiquities in the Dnipro Left Bank who

carried out surveys or excavations there (Ляпушкин 1946, с. 117-127; Сухобоков 1975а; Пуголовок 2018, с. 53-55).

To expand the research potential of the site, interdisciplinary geoarchaeological studies were conducted there in 2017–2018, one of which focused on the study of ancient soils and relief. The interaction between humans and the landscape is one of the modern directions of both archaeological and paleogeographical research. Landscape analysis, understood as the examination of the complex of natural (physiographic) conditions for a particular time period, represents a unique object in such studies. In this context, soil serves as an important indicator of the landscape. Buried soils beneath various age archaeological objects make it possible to analyze the landscape characteristics of the time when the archaeological site was created. This study aims to apply the geoarchaeological approach based on integrated archaeological and paleogeographical data using the example of the Opishnia settlement and thus conduct a paleo-landscape analysis of the early Slavic settlement.

General Landscape Characteristics of the Settlement Location

According to its location, settlements of the Romny culture are divided into three types: those located on promontories, hook-like promontories,



Fig. 2. Opishnia hillfort. Aerial survey, by Yu. O. Puholovok

and residuals. The Opishnia settlement is situated on a flat, slightly lowered eastern side of a hilltop, over 80 m above the water level of the Vorskla River, which is a remnant of the original bank, separated from the plateau by the Tatarpunka stream valley and ravines. Clay extraction by residents is evident along the northern and western slopes. A cemetery is located in the northwestern part, and remains of turf-covered excavations are found to the southeast and at the centre (fig. 2). The area of the settlement is defined by the spread of cultural remains on the surface, depressions from dwellings, remains of fortifications, and excavation results on the site (fig. 3, 4).

At the beginning of the 20th century, the settlement was larger; the northern part of the promontory was destroyed between the 1920s and 1940s, possibly due to the local population's extraction of clay for pottery, the traces of which are still present on the site today. Its current dimensions are as follows: length along the east-west axis — 150–160 m, shorter north-south axis — 40–50 m. The total area is 0.8 hectares. Remains of fortifications, consisting of a wooden-and-earthen rampart about

2.5–3.0 m high, a low escarpment approximately 1 m high, and a filled-in moat, are located on the eastern side (fig. 5).

In terms of relief, the area selected for the fortifications belongs to the elevated part of the Poltava Plain. The formation of modern landscapes is primarily influenced by the widespread distribution of loess deposits, which overlay the bright red-brown clays of the Pliocene, as well as the Paleogene sandy and clayey deposits. Floodplain areas have formed in the valleys of the Vorskla River and its tributaries.

According to the soil cover maps of Ukraine, this territory falls under the distribution of moderately weakly humus-accumulative podzolized chernozem soils in the forest-steppe humid subzone; in terms of granulometric composition, these are light and heavy clay soils (46–55 %).

The content of heavy metals in the soils of this territory, according to the National Atlas of Ukraine is as follows: Copper (Cu) — 13–24 mg/kg; Zinc (Zn) — 0–40 mg/kg; Cobalt (Co) — 5–10 mg/kg; Molybdenum (Mo) — 4.1–5.0 mg/kg; Chromium (Cr) — 30–40 mg/kg; Manganese (Mn) — 400–



Fig. 3. The Southeastern Part. Depth of the Rampart and Ditch Cross-Section. Excavations by O. V. Sukhobokov, 1975. From the north-west, by Yu. O. Puholovok



Fig. 4. Opishnia Hillfort. From the South-West, by Yu. O. Puholovok

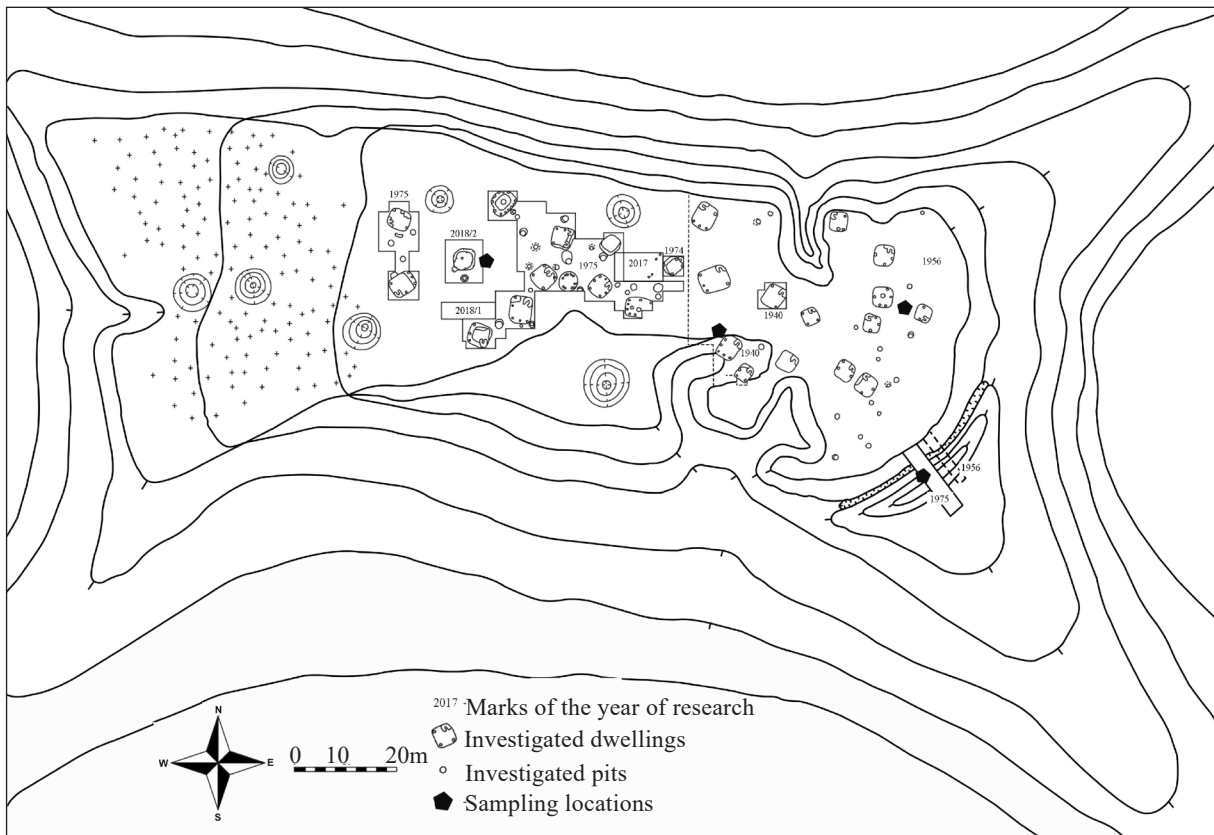


Fig. 5. Opishnia Hillfort. Plan of the Excavation Area, by Yu. O. Puholovok

500 mg/kg; Lead (Pb) — 13.1–15.0 mg/kg; Nickel (Ni) — 15–20 mg/kg (Канаш, Лактіонова, Медведєв 2007, pp. 188-189).

Settlements on residuals are located at the very edge of the plateau, separated from it by a ravine or valley. The formation of residuals is mainly caused by accumulative-denudation processes, leading to the separation of part of the original bank from the plateau. The relief of this area can be considered well-dissected. The relief dissection coefficient according to the National Atlas of Ukraine is 1, which is an above-average indicator for the territory of Ukraine (Карти України 2025). This relief configuration may have been one of the reasons for the placement of the early Slavic settlement at this location, as the hilltop area is surrounded by slopes on all sides, which made it particularly suitable for constructing fortifications with minimal labor costs.

The development of the Slavic settlement can be divided into several phases. At the initial stage, the settlement did not have fortification elements such as a rampart and a ditch. Evidence supporting this hypothesis includes the discovery of ceramics found in the fill of the rampart, which likely originated from the cultural layer of the settlement area (Сухобоків 1975а, с. 25-26). Subsequently, forti-

fications were constructed. The fortification structures themselves had at least two stages of existence, as indicated by the remains of both charred wooden and burned elements (Сухобоків, Юренко 1995, с. 11). The settlement's abandonment likely occurred at the beginning of the 9th century, when its inhabitants left the fortification. However, items from later periods were found in the cultural layer of the site. For example, fragments of moulded and early wheel-thrown pottery were discovered on the southern slope of the site (Мироненко 1998, с. 67, рис. 2). Additionally, fragments of a pendant in the shape of an axe, dating to the 11th century, were found during excavations in 2018 (Пуголовок 2020, с. 164). However, the relationship between these items and the excavated complexes of the settlement cannot be confirmed due to their chronological inconsistency. They are likely related to later populations in nearby settlements.

Materials and Methods

Paleogeographical studies of the Opishnia settlement were carried out in 2017 and 2018 by specialists from the Institute of Geography



Fig. 6. A General View of the Research Site with Markings of the Soil Cross-Sections

of the NAS of Ukraine, Zh. M. Matviishyna and A. S. Kushnir. A series of soil samples were analyzed at different hypsometric levels (catena) within a small area that has never been plowed or subjected to agricultural work, including soil material from the cultural layer of the archaeological site and a cross-section of the settlement's protective rampart (fig. 6). This allows for the tracking of natural conditions during the formation of the settlement, as well as elements of natural and anthropogenic succession and the related changes in the physiogeographical characteristics of the territory.

One of the most important components of field work is the selection of soil samples for further laboratory studies. Soil and sediment samples are selected separately by genetic and/or stratigraphic horizons. For each type of analysis, sampling is performed according to a different scheme. For example, for micromorphological analysis, soil samples are selected in monoliths, for physico-chemical analysis, mainly a small amount of material in crumbly form, etc. In this way, a paleopedological method is formed in the study of buried and modern soils (Веклич та ін. 1979). Soils are considered indicators of past physiogeographical conditions, they reflect changes in vegetation and climate that occurred during their formation. The methodology for studying fossil soils is based on the principle of actualism, meaning that fossil soils should be studied using the same methods as modern soils. However, it is important to remember that fossil soils are often altered by subsequent diagenetic processes, which give them new structural features, complicating the recognition

of their original structure (Матвіїшина, Кушнір 2018; Hildebrandt-Radke et al. 2019).

Six samples were sent to the Spectral Analysis Laboratory of the Optical Spectroscopy and Luminescence Department of the M. P. Semenenko Institute of Geochemistry, Mineralogy, and Ore Formation of the NAS of Ukraine, for the determination of chemical element concentrations in the genetic horizons of soils. Ten samples were sent to the Thin Section Laboratory of the Isotope and Mass Spectrometry Department of the same Institute for the preparation of thin sections with undisturbed soil structure for further micromorphological analysis. Micromorphological analysis focuses on the study of soil structure (composition, texture, aggregate state, porosity) and the substance composition (humus, fine and coarse dispersive parts, neoformations, inclusions) (Матвіїшина 1982; Кармазиненко 2010). All collected data allow for the identification of elementary soil-forming processes and the genetic types of soils, such as chernozems, forest soils, podzols, solonchaks, etc. Detailed studies of buried soils can identify not only their main genetic types but also subtypes (Kiosak, Matviishyna 2023). The genetic horizon indexing was conducted according to the classification of O. N. Sokolovskiy, which we use because it is based on the principles of genetic soil science. This is important for paleogeographic reconstructions. Micromorphological analysis generally involves laboratory confirmation or refutation of the macromorphological description of the soil and the study of soil-forming processes at the micro level.



Fig. 7. The Territory of the Hillfort. A Cross-Section of Soil no. 1

Research results

Stratigraphic section 1. Excavation within the Hillfort (fig. 7).

The cultural layer (a layer of soil containing material remains) is represented by a humus horizon. This is a dark gray material, carbonate-free, with evidence of active faunal bioturbations and a large number of grass roots. The material is loose, poorly structured, and medium loam.

A soil sample from the cultural layer was analysed for the concentration of 16 chemical elements. Table 1 presents the content of chemical elements in the material from the cultural layer of the hillfort territory (the background (standard) indicators for this area are presented above).

The maximum permissible amount of chemical elements in soils (by basic elements) is Cr — 100, Ni — 80, Zn — 20, Pb — 30 (Жовинский, Кураева 2002). Thus, we state that the content of lead and chromium in the cultural layer of the early Slavic period is increased. The indicators of other elements are within normal limits.

Stratigraphic section 2. The Defensive Rampart of the Hillfort (fig. 8).

Artificial Embankment of the Defensive Rampart (0.0–0.7 m). From above, the embankment and the soil beneath it are represented by modern turf (thickness 0.1 m) and layered sediments (thickness 0.6 m), which are very poorly processed by soil formation. The material of the embankment is soil-form-

ing rock from the moat in front of the embankment. This mixed material is mainly represented by loess-like loam and homogeneous loess. In the middle part of the embankment and above the buried soil, there are bands with spots of dark gray or light gray material. The soil above the embankment is in the initial stage of formation, it is not yet fully developed, but is evolving according to the sod type. Carbonates permeate the mass, and in the lower part of the embankment, there are also concentrations of small carbonate nodules. Micellar forms of CaCO_3 are clearly visible above the buried soil.

The structure of the embankment of the shaft is typical of such structures. In addition to loess deposits, the embankment also contains layers of sod that were taken from the surface of the surrounding soil and, to some extent, reinforced the structure during construction. The carbonation of the embankment material is related to the carbonation of the loess rocks. The transition and the border with the buried soil are clearly visible; it is slightly wavy and horizontal, followed by a sharp change to gray colouration.

Soil under the Rampart of the VIII–IX Century (0.7–1.6 m). From top to bottom, genetic horizons are clearly visible: H + Pk (transition from the embankment), Hk, Hpi, P(h)ik, Pk. Before a depth of 1.05 m, the remains of two wooden trunks (up to 15–20 cm in diameter) used in the construction of the protective rampart are visible. The wooden material itself has not been preserved.

Table 1. Chemical Element Content in Material from the Cultural Layer of the Settlement Territory

The name of of the element	Mn	Ni	Co	Ti	V	Cr	Zr	Nb	Cu	Pb	Zn	Sn	Ga	Se	Y	Ba
Quantity, mg/kg	600	30	3	1000	40	50	400	3	40	50	50	2	5	10	50	200

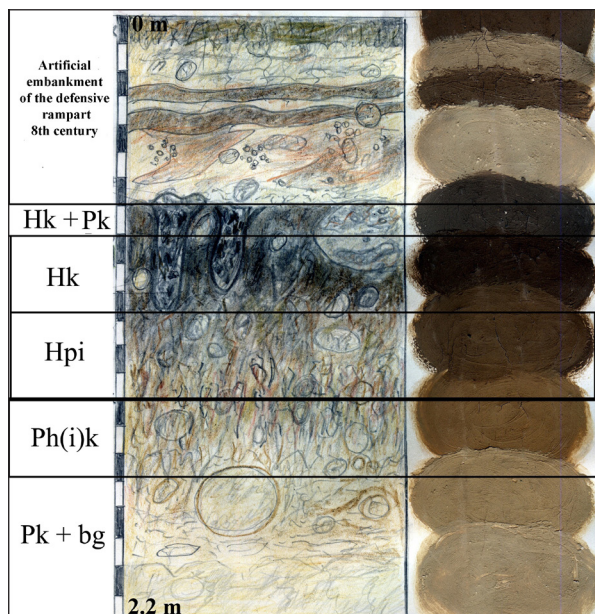


Fig. 8. A Cross-Section of Soil no. 2. The Protective Rampart of the Settlement. Field Colour Sketch with Stratigraphic Division of the Soil Profile Beneath the 8th Century Rampart, by Zh. M. Matviishyna

Hk + Pk (transition from the embankment) — 0.7–0.8 m. — gray, loose, granular, dusty light loam.

H(k) — 0.80–1.05 m. — brownish-dark gray to black, loose, lumpy-grained dusty light to medium loam. In the horizon, the material is the darkest in the profile, gradually lightening downwards, with a transition and boundary that are gradual according to the colour change and boiling with 10 % HCl.

Hpi — 1.05–1.25 m. — brownish-gray heterogeneously coloured, weakly compacted, large-lumpy, and vaguely nutty dusty medium loam. The transition and boundary are gradual according to the color change and the increase in carbonation.

P(h)ik — 1.25–1.60 m. — pale-grayish-light brown to brown, weakly ferruginous, heterogeneously coloured, with signs of vertical columnarity and some compaction, lumpy medium loam. The transition and boundary are gradual with a lightening of colour and an increase in CaCO₃ content.

Pk — 1.6–2.0 m. — grayish-fawn, fairly homogeneous, loess material, which is lumpy-crumbly light loam.

Pk + bg (2.0–2.2 m. (visible)) — light-fawn loess, hidden-layered, homogeneous, lumpy-crumbly dusty light loam.

Based on the combination of characteristics — humus content, content and location of carbonates in the profile, granulometric composition — the soil can be defined as leached chernozem, of me-

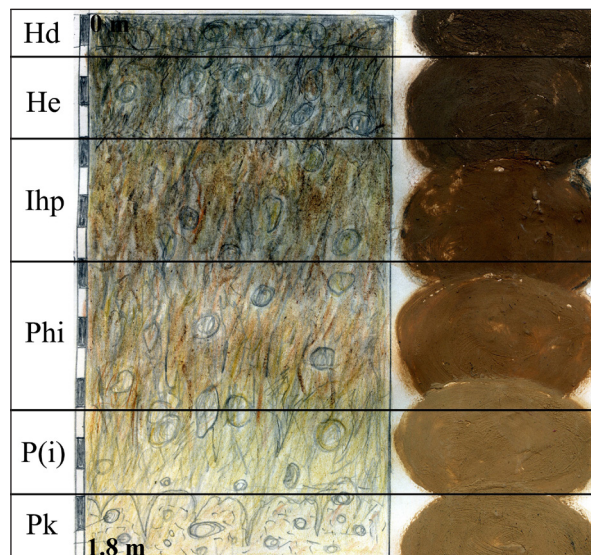


Fig. 9. A Cross-Section of Soil no. 3. Field Colour Sketch Showing the Stratigraphic Structure of the Background (Modern) Soil, by Zh. M. Matviishyna

dium thickness, from light to medium loam, with signs of the primary hydromorphic stage of development, formed on loess. It reflects the forest-steppe conditions of formation.

Stratigraphic section 3. Soil for Comparison with Soil Buried under the Embankment.

It is located 100 m east of the rampart on a gentle slope towards the Vorskla River valley. This section with modern soil (fig. 9) is described for comparison with the soil of the 8th– 9th century under the rampart. In an open area with meadow-steppe vegetation. The following soil profile was observed.

This soil is classified as gray forest, silty-medium loam, formed on loess. This classification is supported by the following features: a clear differentiation of the profile into genetic horizons; a humus-rich horizon containing SiO₂ powder in combination with the brown ferruginous and more clayey illuvial horizons located below it; and a deep (1.6 m.) occurrence of carbonate illuvium with hard carbonate nodules.

The conducted micromorphological study of soil samples (fig. 10) confirmed the morphological analysis. When examined under a microscope, washed areas in the humus-eluvial horizon and inflows of collomorphic clays and their concentration around pores in the illuvial horizon are traced, which is a sign of podzolized soil.

Therefore, based on a comparison of the profiles of the ancient (9th–10th century) and modern soils, we can conclude that at the time of the creation of the defensive ramparts, open spaces with

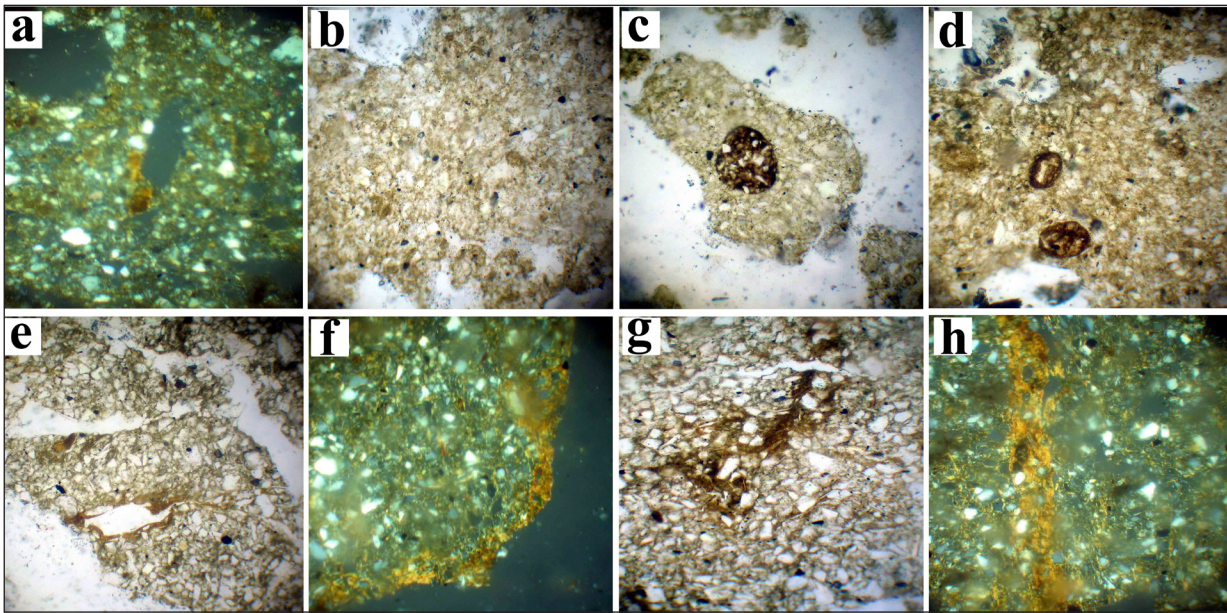


Fig. 10. A Cross-Section of Soil no. 3. Micromorphological Structure of the Soil: *a-g* — Humus-Eluvial Horizon; *e-h* — Illuvial-Humus Horizon (*a, f, h* — Nicol Prism Crossed; *b-d, g* — Nicol Prism Parallel)

meadow-steppe vegetation prevailed. A change in soil type within a given territory (i.e., transition from one type to another) is usually a very long process, that under natural conditions, may take from several hundred to several thousand years. In this case, we are talking about physical and geographical conditions that existed at the time the embankment was constructed, which are recorded in the soil buried under it. The boundaries of natural zones, compared to today, were probably shifted northward. The soils identified under the rampart are now characteristic of the flat spaces of the modern central forest-steppe. This is consistent with regional paleogeographic models for Ukraine (Матвіїшина, Кушнір 2018; Gerasimenko et al. 2022), Early Slavic time (Матвіїшина, Пархоменко, 2016; Матвіїшина, Пархоменко, Скороход 2019; Матвіїшина та ін. 2021; Petr et al. 2025) and general paleogeographic reconstructions of the second half of the Holocene (Feurdean et al. 2021; Hájková et al. 2022).

Over the 12 centuries since the construction of the rampart, the chernozem soil could have turned into a typical gray podzolized forest soil reflecting wetter formation conditions. The soil profile

increased by 30 cm, and the differentiation of the profile with a clear illuvial horizon and a less humus humus-eluvial horizon appeared.

In addition, a soil sample from the humus-eluvial horizon (0.1–0.4 m) of this section was analysed for the concentration of 16 chemical elements. The results are presented in Table 2.

Comparing the obtained data with the maximum permissible concentrations of chemical elements in soils and the general background for this territory, we conclude that the content of all analysed elements in the modern soil is within the normal range. In contrast, the cultural layer from the early Slavic time settlement (Stratigraphic section 1) shows elevated concentrations of lead (Pb), chromium (Cr), and zinc (Zn). These increases are interpreted as the result of active economic activities carried out by the settlement's inhabitants, particularly related to everyday practices such as metalworking (production or repair of tools and weapons), pottery production, and waste accumulation. Modern contamination is unlikely because the soil samples were collected directly from undisturbed cultural layers in areas unaffected by recent agricultural or construction activities. Furthermore,

Table 2. Content of Chemical Elements in the Humus-Eluvial Horizon of Soil Cross-Section no. 1

The name of the of the element	Mn	Ni	Co	Ti	V	Cr	Zr	Nb	Cu	Pb	Zn	Sn	Ga	Se	Y	Ba
Quantity, mg/kg	800	20	4	2000	50	60	-	4	30	30	-	3	4	-	50	-

macromorphological analysis confirms the integrity and preservation of the ancient soil structure, and comparison with nearby background soils supports the natural historical origin of the elevated metal content.

Conclusion

In temperate climate conditions of the forest-steppe zone, depending on the relief, soil types can form along the catena from alluvial-podzolic soils (in floodplains) to chernozems (on watersheds and especially on low terraces) and grey forest podzolic soils. The type of vegetation under which these soils develop is also of great importance. Therefore, it is rational to compare soils of the same geomorphological level, as we have attempted to do. At the same time, one must consider the fact that at the time of the construction of the defensive rampart, there likely existed broadleaf forest areas on the slopes or along the valleys of small and large rivers, which diversified the landscapes and provided the local population with construction material for establishing settlements (Пуголовок та ін. 2015, с. 120-122). Archaeological evidence supporting this hypothesis include remnants of wooden logs in the structure of the defensive wall (Сухобоків, Юренко 1995, с. 6), wooden structures in the pits of dwellings (Ляпушкин 1961, с. 276), and the results of charcoal analysis from pit filling and cultural layer which identified the tree species as oak¹.

Meadow landscapes near rivers served as pastures, and meadow-steppe areas were used as agricultural land, etc. (Горбаненко, Журавльов 2021, с. 101-108). In general, the temperate climate conditions, relatively varied landscape differentiation on a small territory, which included fertile lands, provided comfortable conditions for establishing settlements and further economic development (Горбаненко, Журавльов 2021, с. 143-159). This is supported by the findings of grain crops and the bones of domestic and wild animals (Ляпушкин 1961, с. 276; Пашкевич, Горбаненко 2003).

Overall, the number of artefacts indicating the economic activity of the settlement's inhabitants was relatively small. Undoubtedly, the presence of grain storage pits supports the hypothesis that agriculture and the cultivation of cereal crops were practiced at the settlement. The primary criterion for identifying these pits is their shape — they may be

pear-shaped, bell-shaped, or jug-shaped. A characteristic feature of these pits is the presence of a relatively narrow neck and walls that expand towards the even bottom (Пуголовок 2016, с. 136-137). Other finds include imprints of cereal plants on the bottoms of pots. Ceramic analysis revealed imprints of millet, wheat, rye, barley, oats, and peas (Пашкевич, Горбаненко 2003, с. 161-163). A small number of finds related to grain harvesting and processing, such as fragments of sickles, grinding stones, and grain mills, were also discovered (Ляпушкин 1961, с. 273; Сухобоків, Юренко 1995, с. 37). Finds associated with animal husbandry include artefacts indicating the use and care of domestic animals, particularly horses for riding. These include a fragment of a bit showing signs of heavy wear (Сухобоків, Юренко 1995, с. 58), fragments of iron bridle rings, and a massive buckle tongue (Пуголовок 2018, с. 58; 2020, с. 163). At the same time, it is noteworthy that there are no fishing-related tools. Fish bones and scales were found only in small quantities, and only in one of the storage pits (Ляпушкин 1961, с. 301).

The presence of both large and small cattle in the herd influenced the formation of anthropogenic landscapes around the settlement. Animal husbandry was an important factor shaping agricultural landscapes, as livestock was used not only for food products but also for land cultivation, transportation, and as a source of fertiliser. Large pastures for livestock significantly altered natural landscapes. The increase in the number of cattle led to an expansion of grazing areas, thus increasing the resource zone of the settlement. Pastures were located in meadows of wide floodplains and low river terraces, providing easy access to water for the animals. These processes likely altered the plant cover of the area and formed anthropogenic landscapes, including arable land and pasture territories.

Thus, the conducted paleolandscape analysis of the Opishnia settlement points to the key role of natural resources in choosing the settlement's location, which was characteristic of earlier periods. However, the choice of a high topography site and the construction of fortifications were new phenomena for the Left Bank of the Dnieper, and the factors that led to this development remain unclear. One theory suggests a threat from the Khazar Khaganate (Сухобоків, Юренко 1995, с. 62). At the same time, considering the presence of several ethnic groups — Slavic and Alan-Bulgarian (Пуголовок 2018, pp. 165-176) — the version of a threat from the Khaganate can be considered as one of the possible

¹ The analysis was made by M. S. Serheieva, DSc, a senior researcher at the Institute of Archeology of the NAS of Ukraine.

reasons for the fortification of the Opishnia settlement. Given that the Khazar Khaganate had significant influence over the Left Bank of the Dnipro at that time, the presence of defensive structures may have been a response to the growing military threat posed by nomadic groups inclined toward aggression and conquest in the region. However, external threats should not be the only explanation. Internal

factors, such as social and economic changes in society, were also important. Perhaps the fortification of settlements became part of a broader process of strengthening local tribal alliances that sought to protect their territories and resources amid increasing social and political competition.

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Юрій О. Пуголовок¹, Анатолій С. Кушнір², Жанна М. Матвіїшина³

¹Кандидат історичних наук, старший науковий співробітник ДП «Науково-дослідний центр «Охоронна археологічна служба України», Інститут археології НАН України, ORCID: 0000-0002-7610-8005, yurij.puholovok@gmail.com

²Кандидат географічних наук, старший науковий співробітник відділу геоморфології та палеогеографії, Інститут географії НАН України, ORCID: 0000-0001-8995-1467, kushnir.paleo@ukr.net

³Доктор географічних наук, професор, завідувач сектора палеогеографії, Інститут географії НАН України, ORCID: 0000-0003-1412-7232, kas05061988@ukr.net

ПАЛЕОЛАНДШАФТНИЙ АНАЛІЗ РАННЬОСЛОВ'ЯНСЬКОГО ГОРОДИЩА В ОПІШНІ

Статтю присвячено міждисциплінарним дослідженням Опішнянського городища. Його палеоландшафтний аналіз вказує на ключову роль природних ресурсів у виборі місця для розміщення поселення, що було характерним і для попередніх епох. Однак вибір місця з високою топографією і побудова укріплень були явищем новим для території Дніпровського Лівобережжя, і фактори, що викликали це явище, не до кінця зрозумілі. Серед них виказувалося припущення про загрозу з боку Хозарського каганату. У той же час, з огляду на наявність кількох етнічних груп населення — слов'янської та алано-болгарської, версію про загрозу від каганату можна розглядати як одну з можливих причин укріплення Опішнянського городища. Враховуючи, що в цей період Хозарський каганат мав значний вплив на Лівобережжя Дніпра, наявність оборонних споруд може бути реакцією на зростаючу військову загрозу з боку кочових народів, які мали тенденцію до агресії і завоювань у регіоні. Однак не можна зводити всі фактори лише до зовнішньої загрози. Важливими є і внутрішні аспекти, зокрема соціально-економічні зміни в суспільстві. Можливо, укріплення поселень стало частиною загального процесу зміцнення місцевих племенних союзів, що прагнули до захисту своїх територій і ресурсів у контексті підвищення соціальної та політичної конкуренції між ними.

Результати палеоландшафтного аналізу свідчать про те, що на момент спорудження оборонного валу в околицях городища на схилах або вздовж долин малих і великих річок існували ділянки широколистяних лісів. Вони урізноманітнювали ландшапти і забезпечували тогочасне населення будівельним матеріалом під час заснування городища. Лучні ландшапти біля річок слугували пасовищами, лучно-степові ділянки використовувалися як сільськогосподарські угіддя тощо. Загалом, помірні кліматичні умови та відносно різноманітна ландшафтна диференціація на невеликій території, зокрема родючі землі, забезпечували комфортні умови для заснування поселень і подальшого розвитку ремесел.

К л ю ч о в і с л о в а: раннє середньовіччя, роменська культура, слов'яни, городище, геоархеологія, палеоландшапти, ґрунт, природні умови.

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