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THE ECONOMIC AND SOCIAL IMPORTANCE OF SALINE SOILS AND SALTWATERS DURING THE LATE NEOLITHIC OF THE PANNONIAN PLAIN AND THE CENTRAL BALKANS

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Abstract. – The importance of salt in human and animal diets suggests that the local resources of saline soils, watercourses, and marshes with saline water had to be well known to past populations. Based on the analysis of the environs of a large number of Late Neolithic and Early Eneolithic sites, this research assumes the great importance of such resources. This paper examines the spatial relationships between settlements and these resources, in the example of five Late Neolithic settlements from the territories of the Pannonian Plain and the Central Balkans. The goals of the research are to provide an initial step in the reconstruction of potential locations for salt exploitation, and provide a better understanding of each settlement and, subsequently, its role and function in the local Neolithic settlement system. The research considers previously published results of the pedological analysis of the settlement environments and archaeological investigations of the settlements. If certain micro-regions and regions did not provide possibilities for the extraction of salt for both animal and human utilisation, salt, and probably cattle, had to be procured through exchange networks. However, if livestock could not be grazed in areas abundant in salt, then salt would have to be added to the animals' diet. We conclude that Late Neolithic settlements should not be observed in isolation, but rather as parts of wider settlement systems including exchange networks with salt as a major commodity. This represents one of the crucial factors for the understanding of cultural development during the 5th millennium BC.

Key words. – saline soils and saltwaters, Late Neolithic, Pannonian Plain, Central Balkans, subsistence economy, exchange networks

The recognition that humans, domesticated livestock, and wild animals needed to include salt in their diets reaches deep into the past.¹ The importance of salt within human² and animal³ diets suggests that the local resources of saline soils and waters had to be well-known to the past populations.

The addition of table salt to the livestock diet represents the earliest practice of corrections in diets deficient in sodium (Na) and chlorine (Cl). Domestic animals can last for several months deprived of salt without displaying the symptoms of deficiency, but if the lack of salt prolongs, the animals lose their appetite. Subsequent weight loss can eventually lead to death. Animals respond rapidly to the addition of salt and the symptoms of deficiency cease.⁴ However, two

other aspects of saline soils and waters are particularly important. First, wild animals also require the intake of salt through food or water. Therefore, areas with saline soils and watercourses, and marshes with saline water represent locations that attract game. Second, these areas

¹ Berger 2006; Sandu et al. 2010; Bánffy 2013; Weller 2015.

² The sodium requirement for the maintenance of the metabolic processes for an adult human individual is 1.5 g, and it is assumed that prehistoric populations consumed less than 1 g of salt daily, see: Šarčević, Lilić, Vranić 2014.

³ In modern conditions of breeding high productivity dairy cows in lactation, the recommended daily intake of salt is 30 to 40 g, see: Petrujković et al. 2003, 231.

⁴ Ševković, Pribičević, Rajić 1980, 343–346.



Fig. 1. The Lalinac salt marsh near Niš, southern Serbia

Сл. 1. Лалиначка Слајина код Ниша, јужна Србија

provided the possibility for the extraction of salt for human and animal diets, medicine, food preservation, production of hides, and other socio-economic activities during the Late Neolithic.

Ethnoarchaeological studies have pointed to the existence of several methods for the procurement of salt. Salt could have been mined, procured through the collection of halophytic plants and their drying and burning, through heating and evaporation of saline water, from saline mud, or directly collected following efflorescence.⁵ The last mentioned method enabled the collection of substantial amounts of salt after a specific process that implies the rise in levels of subterranean waters saturated with sodium and chlorine during the spring, and their sudden decrease during the arid summer months, which results in the retention of salt on the soil surface. Such a phenomenon has been registered in Macedonia (Ovče polje),⁶ the Morava region (Lalinac Slatina near Niš)⁷ (Fig. 1), and within salt marshes (Slatine) in the Vojvodina region.⁸

Salt marshes represent specific ecosystems characterised by halophytic vegetation (salt-tolerant plants common for areas with saline soils).⁹ Salt marsh habitats are considered endangered and fragile ecosystems, with the emphasised fragmentary nature of their occurrence in the territory of Serbia.¹⁰ They are numerous in the region of Vojvodina and the vicinity of present-day Niš, Vranje, and Prokuplje. It is considered that such locations were utilised for game grazing from the Pleistocene and domestic animal grazing in later periods, primarily cattle and sheep, but also horses and pigs.¹¹ The main problem regarding the role and importance of salt marshes lies in the fact that the development of modern

society, economy, trade, and technological advances following the industrial revolution led to the devastation of ecosystems characterised by saline soils and their transformation into cultivated areas.¹²

Archaeological studies in Central and South-eastern Europe have highlighted the importance of areas with saline soils and waters in the economy and society of prehistoric communities.¹³ For example, recent research of the fortified tell settlement of Provadia-Solnitsata, near Lake Varna (Eastern Bulgaria), about 45 km from the Black Sea coast, provided us with insights into the salt production technology of boiling brine from salt water springs in thin walled ceramic bowls during the second half of the 6th and 5th millennium BC.¹⁴ Based on the analysis of the environs of a large number of Late Neolithic and Early Eneolithic sites, the research reveals the great importance of salt resources for past populations.¹⁵

⁵ Tasić 2009, 53–69; Tasić 2012; Weller 2015; Harding 2016.

⁶ Antić, Jović, Avdalović 1980.

⁷ Randelović, Zlatković, Dimitrijević 2007.

⁸ Knežević et al. 2008.

⁹ Miljković 1972; Zlatković, Randelović, Amidžić 2005; Randelović, Zlatković, Dimitrijević 2007; Randelović, Jušković, Šarac 2007; Knežević et al. 2008.

¹⁰ Miljković 1972; Randelović, Zlatković, Dimitrijević 2007.

¹¹ Šefferoová Stanová, Janák, Ripka 2008, 1, 8–10, 12–13.

¹² Šefferoová Stanová, Janák, Ripka 2008, 8–9; Knežević et al. 2008.

¹³ Tasić 2009; Tasić 2012; Perić 2012; Danu, Gauthier, Weller 2010; Sandu et al. 2010; Nikolov 2011; Bánffy 2013; 2015; Weller 2015; Harding 2016.

¹⁴ Nikolov 2011.



Fig. 2. Map of the sites mentioned in the text. Base map M. Zeremski, *Srbija Geomorfološka (morfostrukturna) karta*, R 1:500 000, GEOKARTA, Beograd 1990

Сл. 2. Карта са локалитетима који се спомињу у тексту. Основна карта М. Зеремски, *Србија Геоморфолошка (морфоструктурна) карта*, Р 1:500 000, ГЕОКАРТА, Београд 1990

This paper examines the spatial relationships between settlements and these resources, in the example of five Late Neolithic settlements, from the territories of the Pannonian Plain and the Central Balkans. The studied sites are located near Opovo, Selevac, Divostin, Vitkovo, and Pločnik (Fig. 2). Areas with saline soils and waters are recorded on the topographic maps of the Military Geographical Institute on a 1:25 000 scale. As far as the author is aware, no contemporary research has been conducted on these areas in the vicinity of the aforementioned settlements. The goal of the research is to provide an initial step in the reconstruction of potential locations for salt exploitation and provide a better understanding of each settlement and subsequently its role and function in the local settlement system. The research considers previously published results of the pedological analysis of the settlement environments and archaeological research. Therefore, it is proposed that if certain micro-regions and larger regions did not provide possibilities for the extraction of salt for both animal and human utilisation, salt, and probably cattle, had to be procured through exchange networks. However, since livestock had to be grazed in

areas abundant in salt, if such areas were not nearby, salt would have had to be added to the animals diet. It may prove that such salt exchange networks represent one of the crucial factors for the understanding of cultural development during the 5th millennium BC.¹⁶

POSITION AND ECONOMY OF THE LATE NEOLITHIC SETTLEMENTS

Ugar Bajbuk, Opovo

The site is located approximately 3 km east of the village of Opovo, near present-day Pančevo. It lies on an elevation of a degraded loess terrace (altitude of 78 m) that runs along the former meander of the Tamiš (*Timiș*) River.¹⁷ The site used to represent a small island with an approximate surface area of 5 hectares. The location and pedology of the area surrounding the site near Opovo

¹⁵ Милановић 2017; Bulatović, Milanović 2020, 15–39; Milanović, forthcoming.

¹⁶ Cf. Bánffy 2013

¹⁷ Tringham et al. 1985;1992; cf. Borojević 2006, 8 and Fig. 1.8.

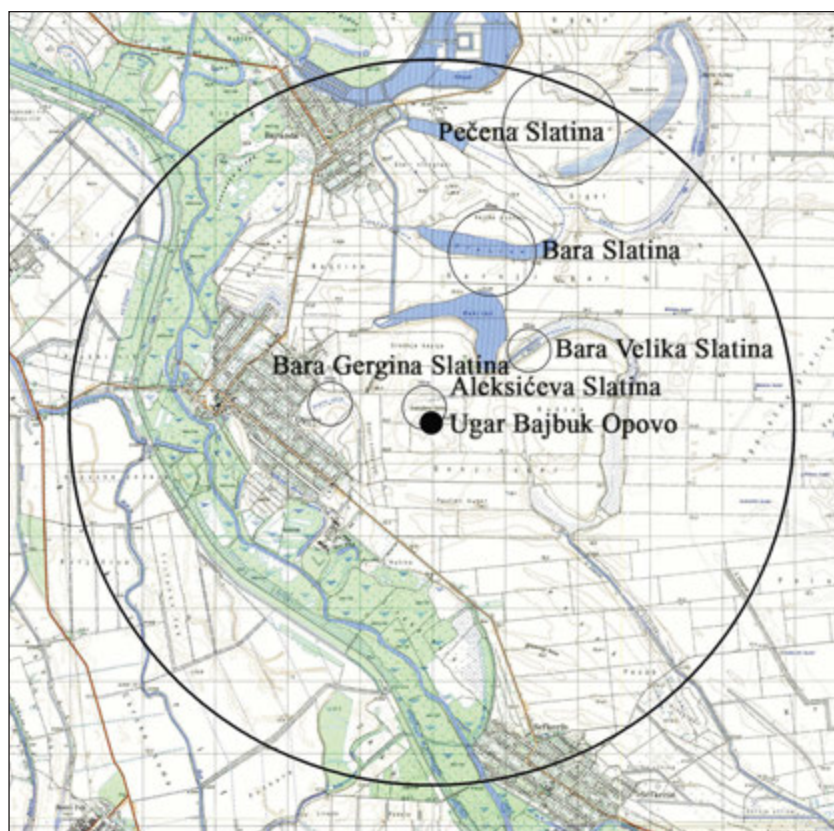


Fig. 3. The Opovo site, on topographic maps of the Military Geographical Institute, R 1:25 000, with marked areas that indicate saline soils and waters within a 5 km radius from the settlement

Сл. 3. Локалитет у Опову, на топографској карти Војногеографског института, Р 1:25 000, са обележеним површинама које индицирају заслањена земљишта и воде унутар територије око насеља пречника 10 km

indicate the prevalence of grassy steppe with patchy forests, marshy and alluvial vegetation, saline soils, watercourses, and marshes with saline water. It was surrounded by flood plain and marshy terrain, and it lies on chernozem, in the vicinity of several smaller and larger surfaces covered in saline types of soil, *solonetz* and *solontchak* (Aleksićeva Slatina and Pečena Slatina), and several saltwater marshes and watercourses (Gergina Slatina, Velika Slatina and Slatina) (Fig. 3).¹⁸ A surface of 380 m² was excavated in the central and northern portion of the site between 1979 and 1987.¹⁹ A 1.6–2.5 m thick layer yielded three Late Vinča building horizons.²⁰ The archaeological research by R. Tringham and colleagues has informed us of a settlement that, in many ways, differs from the contemporary Vinča settlements. This primarily refers to the investment of time and labour into the construction of houses (a total of six burnt houses have been recorded),²¹ the distinct representation of wild animals (65–70%), and animal remains in general (NISP-number of identified specimens is 13,084), an unusually low representation of cattle (22.6%),²² scarce remains of cereals,²³ a lower representation of storage vessels compared to other settlements (e.g. Selevac), and the fact that chipped and pol-

ished stone tools were not produced at the site, or at least within the excavated area.²⁴ All of the aforementioned served as a basis for authors to provide a model that presents the settlement as a location for a more temporary or even seasonal occupation, specialised in the exchange, hunting, and procurement of certain raw materials.²⁵ Therefore, the site near Opovo should probably be considered a settlement that specialised in

¹⁸ Tringham et al. 1992, 354–356; Borojević 2006, Fig. 1.8; cf. Pavlović et al. 2017, 27–29. During the 2019 visit to Opovo, the author was informed by locals that the aforementioned watercourses and swamps were utilised for cattle drinking.

¹⁹ Tringham et al. 1985, Fig. 4; 1992; 354.

²⁰ Tringham et al. 1985; 1992.

²¹ The houses are smaller in dimensions compared to other Vinča settlements, almost square and without any inner (horizontal) separation of space, see: Tringham et al. 1992, 381–382.

²² Russell 1993; Orton 2012, T. 1 and footnote 2.

²³ Tringham et al. 1992, 383; Трипковић 2013, 146; but see also: Borojević 2006.

²⁴ Tringham et al. 1992, 383.

²⁵ Tringham et al. 1992, 384. The authors offered an alternative model in which the settlement was permanent and newly formed by a population from a large main settlement.

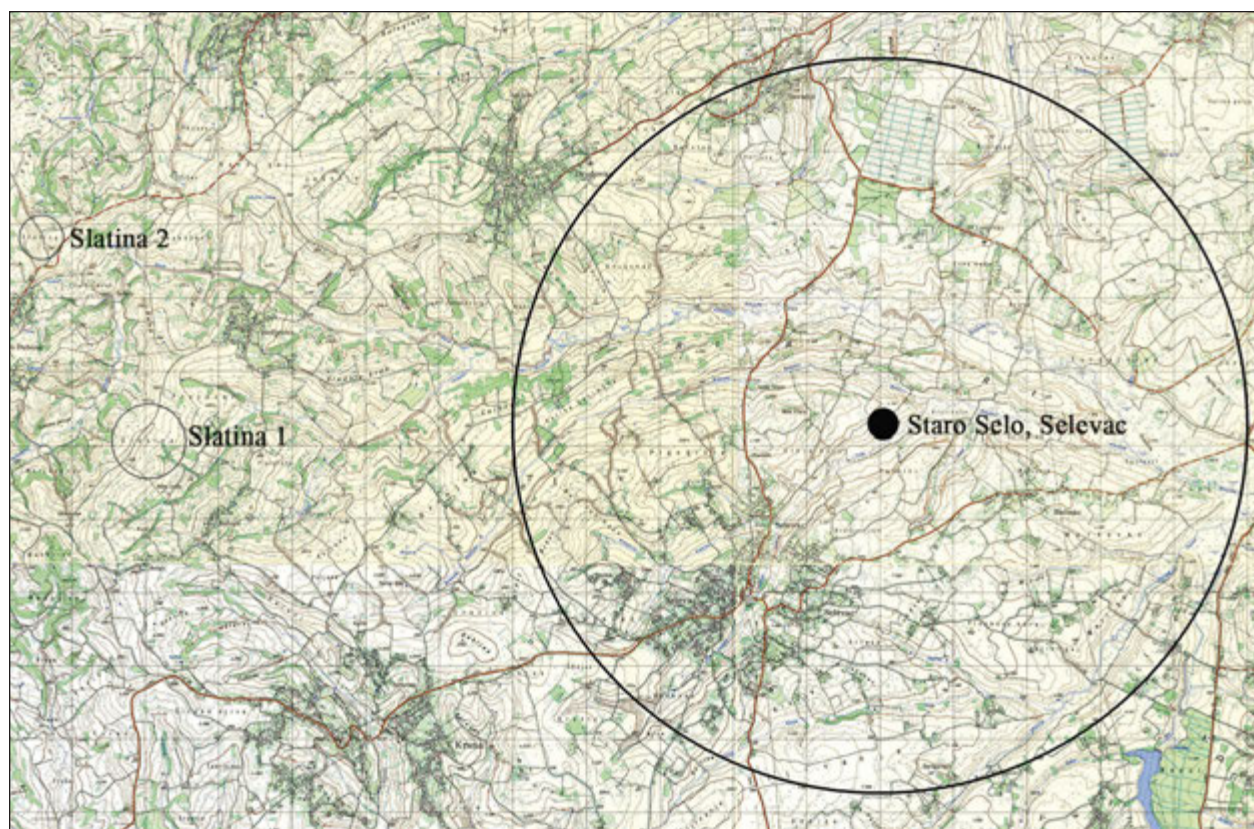


Fig. 4. The Selevac site, on topographic maps of the Military Geographical Institute, R 1:25000, with marked areas that indicate saline soils and waters within a 5 km radius from the settlement

Сл. 4. Локалитет у Селевцу, на топографској карти Војногеографског института, Р 1:25000, са обележеним површинама које индицирају заслањена земљишта и воде унутар територије око насеља пречника 10 km

exchange and hunting, and in which animal husbandry, and possibly salt procurement, played an important role within the activities of the Late Neolithic population.

Staro Selo, Selevac

The site is located approximately 3 km northeast of the village of Selevac, near present-day Smederevska Palanka. It lies on the slopes of Staro Selo Hill (altitude between 130 and 180 m), within the confluence zone of several smaller watercourses into the Konjska River. The site covers an area of approximately 53 ha. It lies on the contact zone between luvisol, eutric cambisol, and the alluvial *pararendzina* (humofluvisol, characterised by loamy alluvial deposits), which are considered fertile and semi-fertile types of soil, suitable for cultivation.²⁶ Surfaces with saline soils have not been recorded in the immediate vicinity, but are found 9.5 km (Slatina 1) and 11.5 km (Slatina 2) east of the settlement (Fig. 4). Between 1968 and 1970, in 1973, and between

1976 and 1978, a total of 409 m² was excavated at the site.²⁷ Ten building horizons have been recorded in a 0.6–3 m thick layer, distributed in four stratigraphic-architectural phases within the central and north-western portion of the site.²⁸ The excavations confirmed the existence of a large and long lasting Neolithic settlement with stratigraphic complexity. It was suggested that, considering the minor excavated area compared to the total size of the site, the highlighted role of Selevac as an exchange centre with wheat as a major commodity remains in the domain of speculation.²⁹ The pedological conditions, relatively poor representation of animal

²⁶ Милановић 2017; Milanović 2019; cf. Pavlović et al. 2017, 27–29.

²⁷ Tringham, Krstić 1990a, T. 3.1.

²⁸ Tringham, Stevanović 1990, 57–58. Figs. 4.1. and 4.2.

²⁹ Tringham, Krstić 1990b, 595.

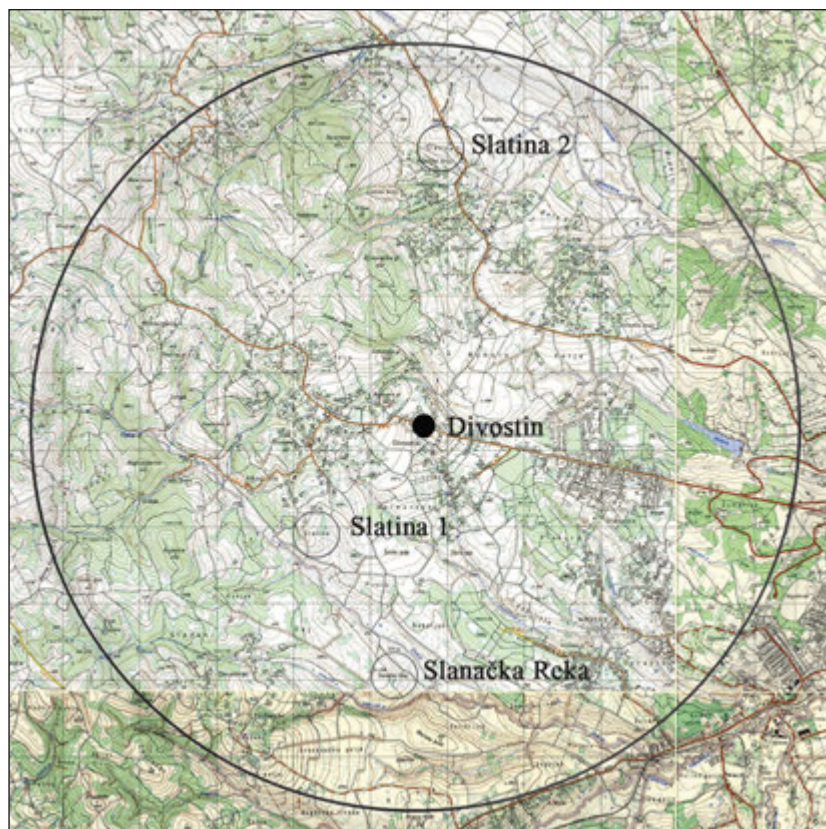


Fig. 5. The Divostin site, on topographic maps of the Military Geographical Institute, R 1:25000, with marked areas that indicate saline soils and waters within a 5 km radius from the settlement

Сл. 5. Локалитет у Дивосћину, на топографској карти Војногеографског института, Р 1:25000, са обележеним површинама које индицирају заслањена земљишта и воде унутар територије око насеља пречника 10 км

remains (NISP 7442), as well as low representation of cattle (38% of NISP),³⁰ storage capacity³¹ and the lack of saline soils in the vicinity of the site likewise indicate a distinctly agricultural, rather than pastoral, character of the settlement,³² which is partially supported by archaeobotanical analysis.³³

Divostin

A multilayered site in the village of Divostin, northwest of present-day Kragujevac, is located on slopes (altitude between 300 and 315 m), in the proximity of permanent springs and the immediate vicinity of the confluence of the Svetinja into the Divostin Creek. A multilayered site in the village of Divostin, northwest of present-day Kragujevac, covered an area of approximately 15 ha. It lies on vertisol in the vicinity of significant areas covered with eutric cambisol.³⁴ Areas of saline soils have been recorded in the vicinity, at distances of 1.6 km (Slatina 1), 2.9 km (Slanačka Reka), and 3.3 km (Slatina 2) (Fig. 5). In 1968 and 1969, a total of 2400 m² was excavated at the site and yielded data on two cultural horizons attributed to the Neolithic.³⁵

A total of two Late Vinča (Divostin IIa–b) building horizons have been recorded within a 0.4–1.8 m thick

layer. A few grindstones, but no handstones, were recorded. Remains of carbonised grains are scarce and the representation of animal remains is significant (Divostin II NISP 10785).³⁶ The surroundings of the site were dominated by steppe vegetation, forests,³⁷ and saline soils, all particularly suitable for cattle breeding (62.7% of the NISP were cattle)³⁸ and the cultivation of fertile forest soil.³⁹

Vitkovačko Polje, Vitkovo

The site is located between the villages of Vitkovo, Venčac, and Bobote, east of present-day Aleksandrovac.

³⁰ Legge 1990; Orton 2012, T. 1.

³¹ Трипковић 2013, 140–141.

³² Cf. Milanović 2019.

³³ McLaren, Hubbard 1990.

³⁴ Милановић 2017; Milanović 2019; cf. Pavlović et al. 2017, 27–29.

³⁵ McPherron 1988; Bogdanović 1988.

³⁶ McPherron, Christopher 1988; Bökönyi 1988.

³⁷ Cf. Grüger, Beug 1988.

³⁸ Bökönyi 1988, T. 17.1; Orton 2012, T. 1.

³⁹ Милановић 2017; Milanović 2019.

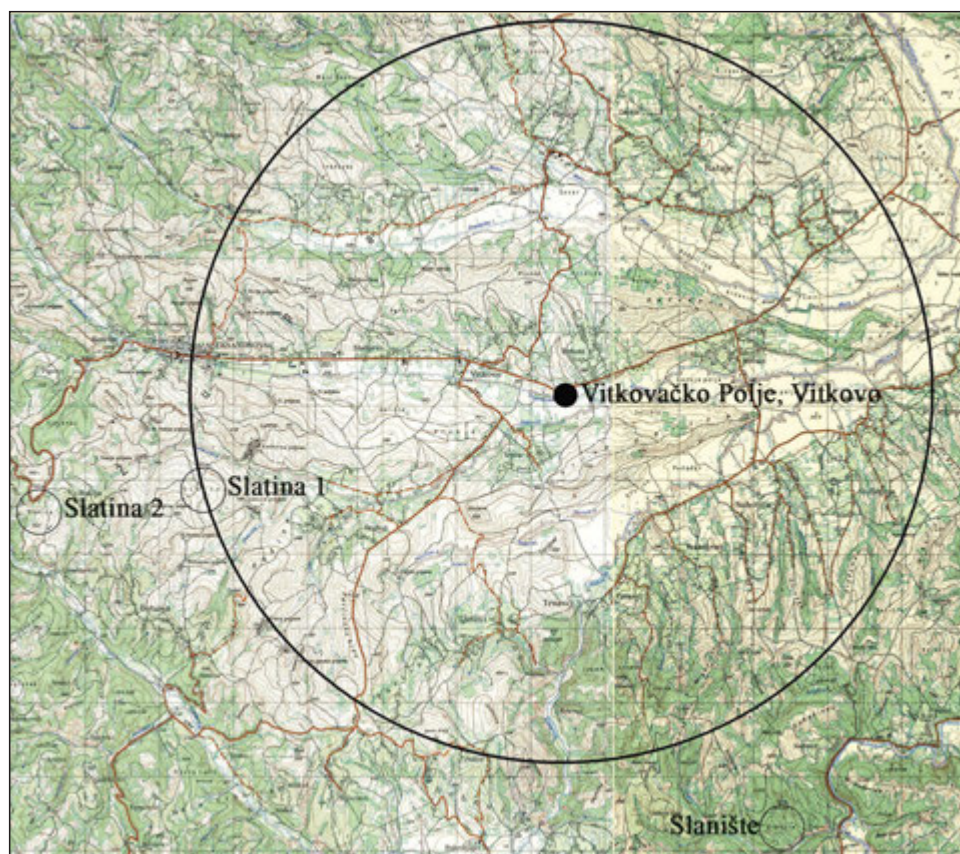


Fig. 6. The Vitkovo site, on topographic maps of the Military Geographical Institute, R 1:25000, with marked areas that indicate saline soils and waters within a 5 km radius from the settlement

Сл. 6. Локалитет у Вићкову, на топографској карти Војногеографског института, Р 1:25000, са обележеним површинама које индицирају заслањена земљишта и воде унутар територије око насеља пречника 10 km

It lies in the lowland plain and on the surrounding slopes (altitude between 300 and 320 m), in the confluence area of Kožetin River and Dubovica Creek, which form the Novačka River. The site covers an area of several dozens of hectares. It is located within the contact zone of alluvium and vertisol, with the occurrence of eutric cambisol in the wider area.⁴⁰ Areas with saline soils have been recorded in the vicinity, at a distance of 4.7 km (Slatina 1) and at greater distances of 6.3 km (Slanište) and 6.9 km (Slatina 2) (Fig. 6). The rescue archaeological excavations conducted in 1969, 1971, and 2001 recorded a 1 m thick layer with building horizons attributed to the Early and Late Vinča culture.⁴¹ The site location near the alluvium indicates the importance of farming,⁴² while the important role of animal husbandry⁴³ and hunting is particularly indicated by the settling of an area dominated by steppe vegetation with patchy forests and saline soils.

Šanac, Pločnik

The site of Šanac is located in the village of Pločnik, west of present-day Prokuplje. It lies on the slopes of Ravan Hill (altitude between 300 and 330 m), in the confluence zone of Paljevački Creek, the Backa River and the Toplica River. It covers an area of several dozen hectares. The site is located in a contact zone of alluvium, eutric cambisol, rendzina, regosol, and lithosol

⁴⁰ Милановић 2017; Milanović 2019.

⁴¹ Tomić, Vukadinov 1969; Бугар 2005; Чађеновић 2007.

⁴² Милановић 2017; Milanović 2019.

⁴³ The representation of sheep and goat in an excavated Late Vinča feature is extremely high (55.4%). However, it has been highlighted that the faunal sample is quite small (NISP 1838), originates solely from one feature from the rescue excavations in 2001 and is not necessarily a reliable representation for the entire settlement, see: Булатовић 2011, 247 and Таб. 2.

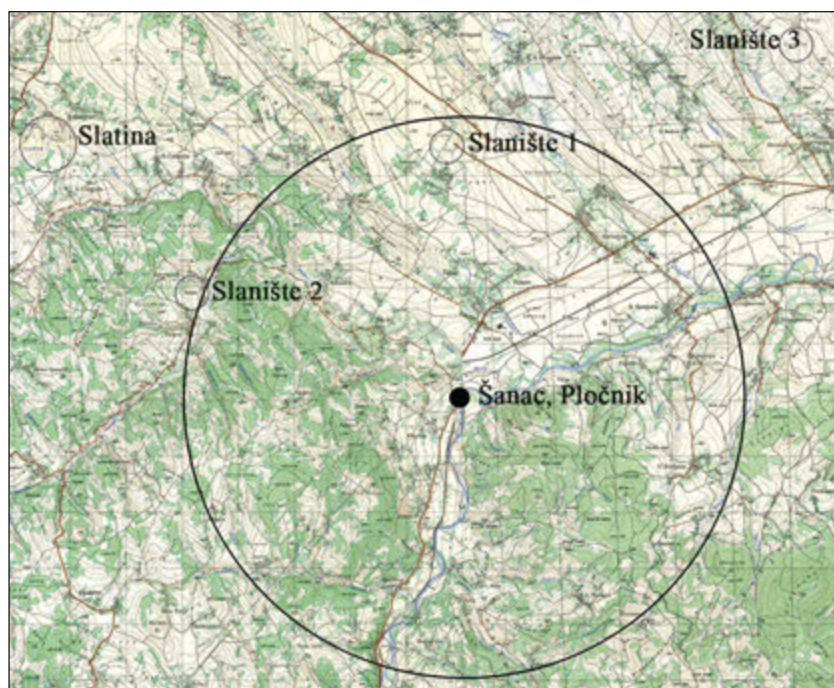


Fig. 7. The Pločnik site, on topographic maps of the Military Geographical Institute, R 1:25000, with marked areas that indicate saline soils and waters within a 5 km radius from the settlement

Сл. 7. Локалитет у Плочнику, на топографској карти Војногеографског института, Р 1:25000, са обележеним површинама које индицирају заслањена земљишта и воде унутар територије око насеља плочника 10 km

on carbonate substrate and vertisol soil type.⁴⁴ Several areas with saline soils have been recorded in the immediate vicinity of the site, at a distance of 4.2 km (Slanište 1) and 4.9 km (Slanište 2), as well as at a greater distance of 8.2 km (Slatina) and 8.3 km (Slanište 3) (Fig. 7). In the course of the earlier phase of research, following the discovery of the first hoard of copper artefacts in 1927, approximately 700 m² was excavated, and an additional 1,000 m² were excavated between 1960 and 1978.⁴⁵ The excavations continued in 1996 and the latest campaign was conducted in 2012 and 2013.⁴⁶ Five building horizons were recorded in a ca. 3.5 m thick layer and the excavations were primarily focused on the north-western portion of the site, where traces of archaeometallurgical activities have been recorded, together with four renowned hoards of copper artefacts.⁴⁷ The archaeological excavations have determined the existence of a large and long lasting Late Neolithic settlement with a complex stratigraphy consisting of horizons attributed to the Early and Late Vinča culture. The prevalence of alluvium and forest soils suggests the importance of crops,⁴⁸ while the representation of animal remains (NISP 2340 from an area of 45 m²), as well as cattle (61.1% of NISP),⁴⁹ numerous areas with saline soils, and steppe vegetation in the surroundings of the site indicate that animal husbandry and hunting, likewise, played an important role in the economy of the site.

Discussion and conclusions

The physical-chemical properties and the past utilisation of areas with saline soils and waters in the Central Balkans are poorly understood. The importance of such natural resources has been emphasised in the territories of the Pannonian Plain and the Carpathian Basin.⁵⁰ The fragility of salt marsh ecosystems, their transformation into arable land, and the shift in micro-regional ecosystems due to the melioration of large rivers during the 20th century have all considerably contributed to the disappearance and devastation of salt marshes. This opens the possibility that certain areas with salt sources have not been recorded on the examined topographic maps. Importantly, previous research has indi-

⁴⁴ Милановић 2017; Milanović 2019; cf. Pavlović et al. 2017, 27–29.

⁴⁵ Grbić 1929; Stalio 1960;1962; Šljivar, Kuzmanović-Cvetković 2009, 56.

⁴⁶ Šljivar 1996; Шљивар 1999; Шљивар и Кузмановић-Цветковић 1997; Šljivar, Kuzmanović-Cvetković, Jacanović 2006; Šljivar, Kuzmanović-Cvetković 2009; Марић et al. 2017.

⁴⁷ Марић et al. 2017.

⁴⁸ Милановић 2017; Milanović 2019.

⁴⁹ Bulatović 2018, Tab. 5.5.

⁵⁰ Miljković 1972; Šefferová Stanová, Janák, Ripka 2008; Тасић 2009; Tasić 2012; Perić 2012; Sandu et al. 2010; Bánffy 2013; 2015; Weller 2015; Harding 2016.

cated that such areas are connected with heavy soil types (chernozems and vertisols) and steppe vegetation.⁵¹

This research, which presumes the great importance of these resources for past populations, should be regarded as an attempt to provide a better understanding of each individual Late Neolithic settlement and its role and function within the local settlement system.⁵² For certain cases, when settlements were located in the immediate vicinity of areas with saline soils and sources of saltwater, it is likely that cattle breeding and hunting were important. The process of salt procurement could have represented an important activity of the Neolithic populations.

Significant differences regarding the availability of saline soils and waters can be observed in the provided example of five Late Neolithic sites located in different geographical micro-regions. Therefore, certain settlements, like the one in Opovo, seem to have been oriented towards hunting, while cattle breeding and the procurement of an important resource such as salt could have had significant importance in the subsistence economy. Such settlements were particularly important for the exchange networks of the Vinča domain. The inhabitants of other settlements seem to have been primarily focused on cultivating crops, judging by the lack of areas with saline soils in the surroundings and the availability of soils suitable for agriculture. The settlement in Selevac represents such an example (surrounded by three fertile and easily cultivated types of soil), whose inhabitants most likely procured salt and cattle through exchange networks with other settlements. However, their livestock had to be grazed in areas abundant in salt or the salt was added to the animals' diet. A low representation of cattle within faunal samples of the Selevac site may indicate that their breeding may not have been the primary activity of the inhabitants of

that settlement. They could have obtained some cattle from more specialised settlements, such as Opovo, which were located where there were saline soils and waters. Based on the availability of local resources, certain settlements held a special place in the settlement system and their roles and functions were tightly connected within the mixed economies of the Neolithic. One such settlement is represented by the site in Pločnik, which stands out due to the representation of two fertile and easily cultivated soil types and the abundance of steppe and saline soils. Other settlements, like the examples from Vitkovo and Divostin, were in the vicinity of solely one soil type suitable for cultivation (alluvium and eutric cambisol, respectively), and the surroundings were abundant in steppe vegetation and saline soils, which indicates that animal husbandry and hunting were of particular importance for its inhabitants.

All this leads to the conclusion that the Late Neolithic settlements should not be observed in isolation, but rather as a part of a wider settlement system, in which the exchange networks with salt as a major commodity had a crucial role. In addition, that could be a good explanation for the expansion of Vinča settlements towards the salt-rich regions, such as the Pannonian Plain in the north, Ovče Polje in the south and the Tuzla Region in the west. Future research should be focused on extensive areas of Late Neolithic settlements, the examination of larger sets of archaeozoological and archaeobotanical samples, as well as areas with saline soils and saltwaters in the vicinity of the Late Neolithic settlements, pollen analyses and analyses of stable isotopes of animal remains, which can be used to study salt exploitation, plant and animal management and Neolithic subsistence economy.

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⁵¹ Милановић 2017, 235–250.

⁵² Cf. Милановић 2017; Milanović 2019.

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Резиме: ДРАГАН МИЛАНОВИЋ, Археолошки институт, Београд

ЕКОНОМСКИ И ДРУШТВЕНИ ЗНАЧАЈ ЗАСЛАЊЕНИХ ЗЕМЉИШТА И СЛАНИХ ВОДА У КАСНОМ НЕОЛИТУ ПАНОНСКЕ НИЗИЈЕ И ЦЕНТРАЛНОГ БАЛКАНА

Кључне речи. – заслањена земљишта и слане воде, касни неолит, Панонска низија, централни Балкан, одржива економија, мреже размене

Значај соли у исхрани човека и животиња сугерише да су локални ресурси у виду површина заслањених земљишта и слане воде морали бити добро познати прошлим популацијама. Додавање кухињске соли у исхрани стоке представља најстарију праксу кориговања исхране дефицитарне у натријуму (Na) и хлору (Cl). Домаће животиње могу да издрже више месеци без соли, а да не покажу симптоме дефицита. Уколико ускраћивање соли траје дуже, животиња губи апетит и тежину и на крају долази до угинућа. На давање соли животиње врло брзо реагују и симптоми дефицита нестају. Међутим, веома битна су још два њихова аспекта. Први се односи на чињеницу да је и дивљим животињама неопходно уношење соли путем хране или воде. Стога су површине са заслањеним земљиштима и водом привлачиле дивљач, те била идеална за лов. Други аспект се односи на могућности за добијање соли за људску и животињску исхрану, медицинске сврхе, чување хране, производњу коже и друге економско-друштвене функције коју је со могла имати у касном неолиту.

Физичко-хемијски састав и коришћење површина са заслањеним земљиштима и водом у прошлости на простору централног Балкана веома су слабо познати. Знатно више се зна о тим важним природним ресурсима у Панонској низији и Карпатском басену. Фрагилност слатинских екосистема, њихово претварање у ораничне површине и измена микрорегионалних екосистема услед мелиорације великих река у 20. веку знатно је допринела њиховој несталности и девастацији.

У овом истраживању се претпоставља велики значај таквих ресурса за прошле популације на основу анализе околине великог броја локалитета из касног неолита и раног неолита. У овом раду испитан је просторни однос између положаја насеља и површина са заслањеним земљиштима, водотокова и бара са сланом водом на примеру пет насеља

из касног неолита Панонске низије и централног Балкана. У питању су локалитети код Опова, Селевца, Дивостина, Виткова и Плочника. Површине са заслањеним земљиштима и водом у овом раду су евидентирани на топографским картама Војногеографског института у размери 1 : 25000. Савремена истраживања тих локалних ресурса у близини пет насеља, колико је аутору познато, нису вршена. Циљ истраживања је да се учини први корак у реконструкцији могућих места на којима је могла бити експлоатисана со и да се боље разуме свако појединачно насеље из касног неолита и његове улоге и функције у локалном систему насељавања. У обзир су узети и раније публиковани резултати педолошке анализе околине насеља и археолошких истраживања.

На примеру пет налазишта из касног неолита, лоцираних у различитим географским микрорегијама, могу се уочити велике разлике у заступљености заслањених земљишта и слане воде и других локалних ресурса. Одсуство таквих локација у околини каснонеолитских насеља сугерише на значај мрежа размене којима се морала добављати со, а вероватно и говеда. Слабија заступљеност говеда у фаунистичким узорцима са појединих локалитета, која нису имала нарочите погодности за њихов узгој, као што је Селевац, указује да узгој говеда није био примарна активност становницима тог насеља. Она су свакако могла бити добављана из других, више специјализованих насеља, чија је околина обилвала заслањеним земљиштима и сланом водом, као што је Опово, што би објаснило њихову слабу заступљеност у том насељу. Поред тога, стока је морала бити терана у области богате сољу или је со додавана у животињску исхрану. Произилази да каснонеолитска насеља не би требало посматрати изоловано, јер чине део ширег система насеља, у којем су мреже размене са сољу као главним артиклом имале кључну улогу за разумевање културног развоја у 5. миленијуму пре н. е.