The settlement Komariv – glass-production centre in the European Barbaricum: a cultural and natural environment

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Abstract

The settlement of III-IV centuries AD near the village Komariv is located at the middle course of the Dniester River. In the 1950 - 70s, its excavations were conducted by M. Yu. Smyshko and Yu. L. Shchapova. 40 objects of the late Roman times were excavated (glass-melting kiln, building on a stone foundation, pottery kiln, pits and terrestrial dwellings, hearths). From 2012 comprehensive research of the settlement is carried out by a joint Ukrainian-German archaeological expedition (heads of the project O. Petrauskas and H.-Y. Karlsen). Project implementation provided new information about the monument. The area of the settlement is about 35 ha, of which 12 hectares have been geophysical survey. It is allowed to create a map of archaeological anomalies. 22 objects were excavated during five seasons: pottery kilns, dwellings, household pits and buildings, pit related to the production of glass, etc. In 2012 it was discovered a cemetery and six inhumations were investigated. The chronological frameworks of the existence of Komariv manufactory cover phases from C1 to D1. The settlement has a two-part planigraphy and consists from residential and industrial parts. The production included several crafts: glass, pottery, jewelry production, metallurgy of ferrous metals, burning charcoal and lime, and others. The peculiarity of the material culture of Komariv is strongly influenced by the late antique civilization. The cultural and ethnic composition of the Komariv inhabitants consisted from representatives of local and foreign populations. The study of materials of the monument is carried out by the involvement of a wide range of specialists in natural sciences - soil scientist, paleobotany, paleozoology, geology, etc. These data allow us to expand our understanding of the nature, economy, demography of the monument the closest area and the region between the Dniester and Prut. Since 2013 comprehensive reconnaissance of the area is being carried out to determine the cultural and natural environment in which this unique settlement exists. A special direction of research in Komariv is the creation of a regional map of deposits of raw materials, which was necessary for various crafts - sand, clay, limestone, etc. The study of the natural and cultural environment in which Komariv existed provides an opportunity to highlight the causes of its occurrence, the resource zone, etc.

Keywords: Chernyakhiv culture, Komariv settlement, glass-production factory, landscape archaeology, raw materials.

The complex of archaeological sites with glass-production is located in the north-western region of Chernyakhiv culture. Given the special proximity of Komarov's material complex to the Roman provinces, we note that it is located about 360 km north of the Danube Limes. Given the boundaries of the province of Dacia, the distance is somewhat smaller - about 250-300 km (Fig. 1).

A well-known site of late Roman time near Komariv village lies on the right bank of the middle course of the Dniester River. The Dniester is the main waterway for this region.

The complex of late Roman times with the remnants of glass production consists of a settlement (code „Komariv") and a cemetery (code „Komariv-1"). They are located 2.5 km south of Komarov village (Kelmenetsky district, Chernivtsi region).

The cultural layer of the settlement is fixed along both of two coasts of a small brook, which flows 5 km to the Dniester. The synchronous cemetery is located on the cape of the southern bank of the brook.

The site with the materials of late Roman times near the village Komariv was discowered in 1950 by Oleksandr Chernysh. In 1956-1957, 1962, 1965 and 1969 excavations at the settlement carried out an archaeological expedition led by prof. Markijan Smishko (Smishko 1964, 64-80) In 1974 excavations on the settlement continued the expedition under the leadership of Yulia Shapova (Moscow) (Shchapova 1978, 230-242). For six seasons were excavated about 4,000 square meters of settlement. 40 objects of late Roman times and three objects of early iron-age were explored here (Petrauskas 2014, 87–116).

From 2012 research of the settlement is carried out by Department of the Early Slavs Archeology and Research Center „Rescue Archeological Service" of the Institute of Archeology of NAS of Ukraine. From 2014, German scientists from the Free University of Berlin (group A-6 TOPOI) and the Heinrich Schliemann-Institute of Ancient Studies (Department of Pre and Early History) joined the project[1]. During the execution of the international project, the following works were done: the limits of the settlement were specified; discovered synchronous cemetery; geophysical research of the area of more than 12 hectares was conducted; archaeological excavations conducted; complex analysis of the obtained findings with the involvement of specialists of various branches of archeology and natural sciences has been carried out; inspection of the territory adjacent to the settlement has begun.

Thus, as of 2017, at the settlement Komariv was excavated near 5000m^2, where 63 objects of late Roman times were investigated. In addition, 300 m^2

[1] Heads of project O.Petrauskas, T.Milyan (Ukraine), H.-J. Carlsen, M.Heghevish (Germany).

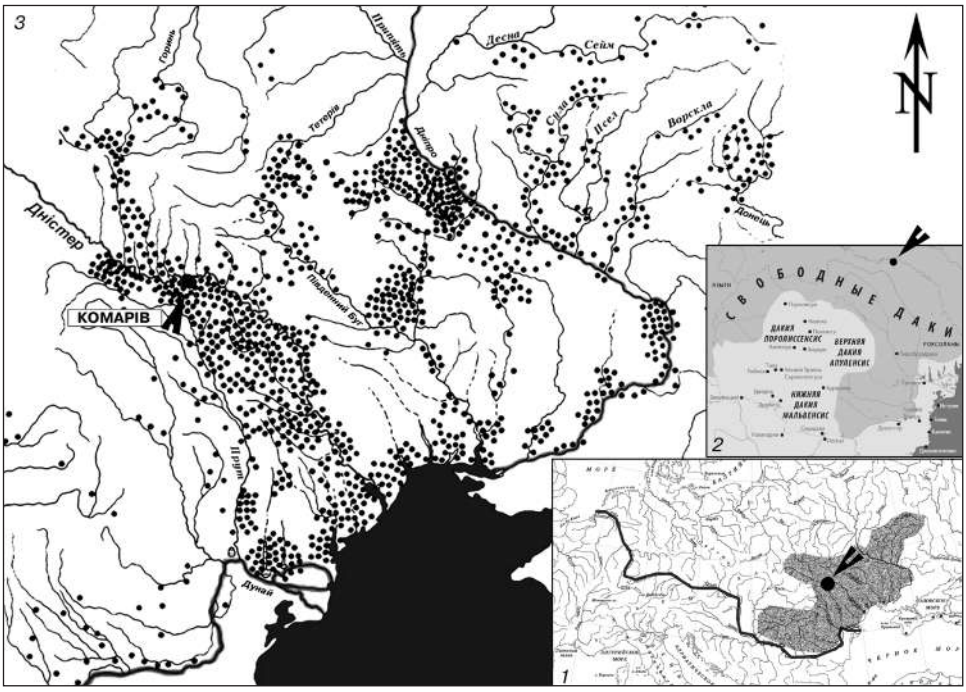

Fig. 1. Komarov's location within the Chernyakhiv culture (1), relative to the borders of Dacia province up to 275 AD (2), and the Rhine-Danube limes of the Roman empire of 1-4 centuries AD. (3).

of area were excavated in the cemetery and six inhumations were investigated (Petrauskas et al. 2019, 327-328).

The settlement in Komariv has a complex of specific features in comparison with other sites of Cherniakhiv culture. It is necessary to briefly characterize its material complex (detail: Smishko 1964, 64-80, Shchapova 1978, 230-242, Petrauskas 2014, 87–116, Petrauskas 2014a, 165-184)

The main types of buildings of the settlement include: ground clay buildings; pithouses; a house with a stone foundation measuring 6×6.9 m; five pottery furnaces, which are excavated in Komarov, and another 20 can be assumed according to geomagnetic exploration; glass-melting furnace; fireplaces; different purposes pits, part of the pits may be linked with the burning of lime and smelting glass; as well as structures of unspecified type.

The main categories of material culture of settlement in Komarov can be characterized as follows.

This is a pottery, which consists of three groups — Chernyakhiv type pottery (up to 90%) and antique production pottery (up to 20% in wheel-made pottery and hand-made ware from different ethnic-cultural groups (up to 10%).

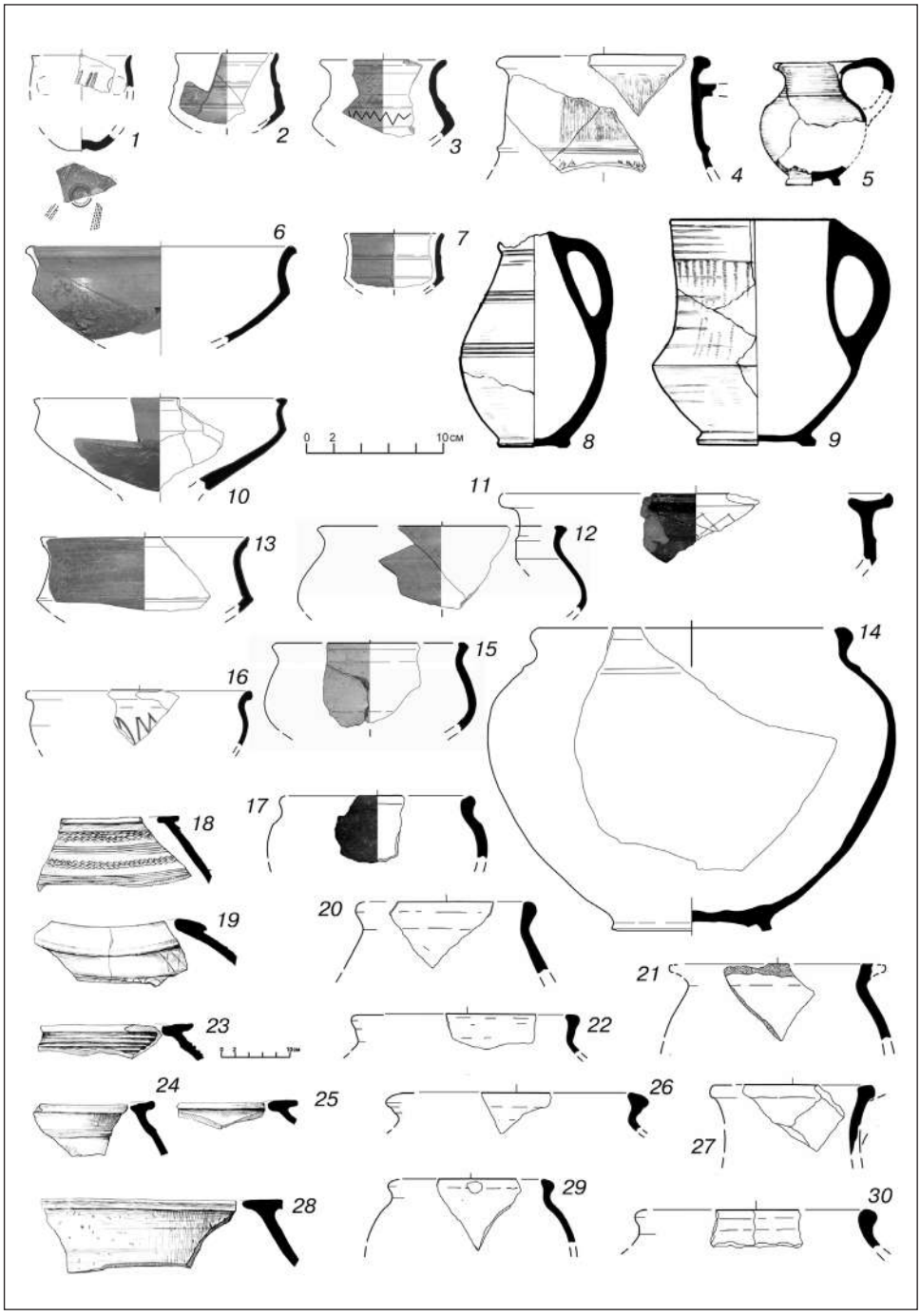

Fig. 2. The main varieties of Chernyakhiv type wheel-made pottery from the Komariv settlement: tableware (1-15) and cookingware (16-30).

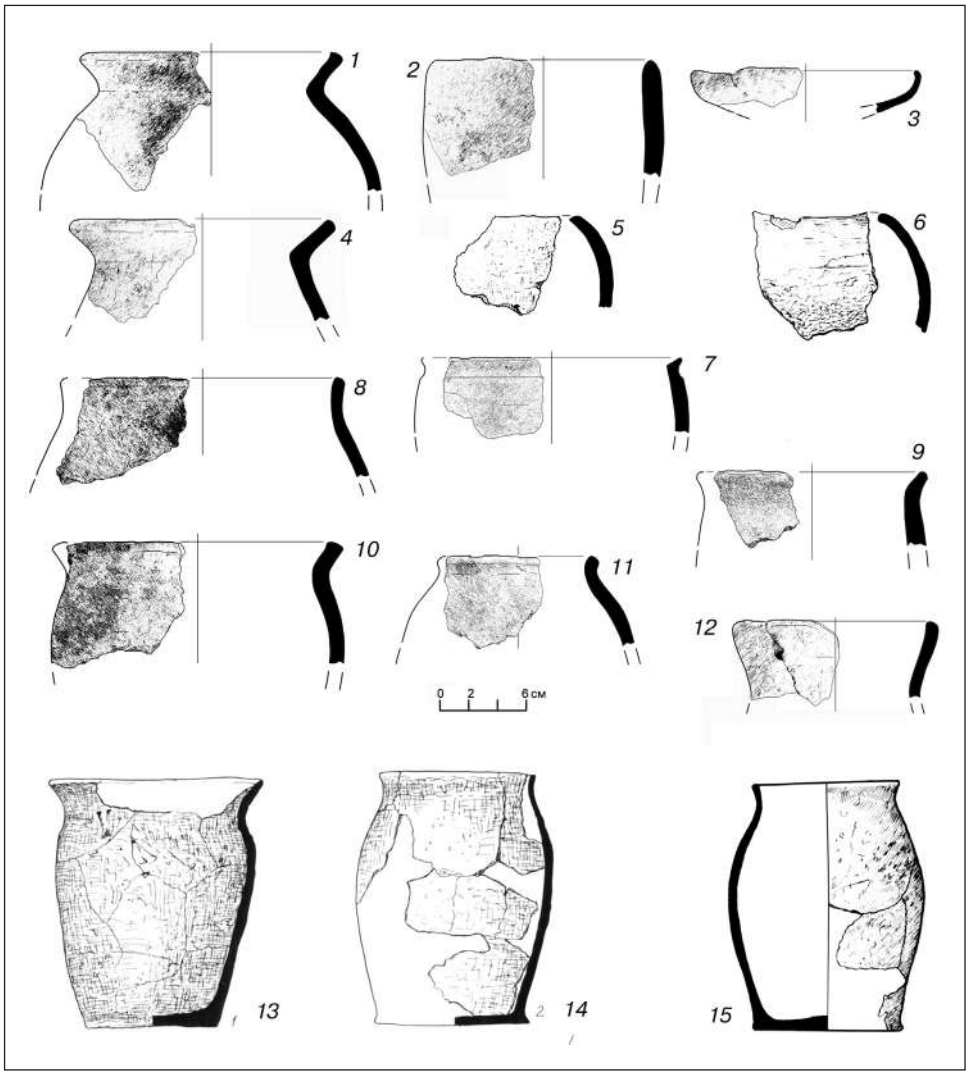

Fig. 3. The main varieties of hande-made pottery from the Komariv settlement.

Chernyakhiv type pottery represented in all of the main categories of this culture - vases, pitchers, cups, bowls, pots, pithos (Fig. 2). The hand-made ware of the late Roman times has prototypes in various ethno-cultural centers. At the present time it is possible to distinguish Late-Scythian-Sarmatian, Early-Slavic, East Germanic and Dacian types of hand-made ware (Fig. 3).

Pottery of antique production is represented by amphorae, red-colored vessels and a lamp. Typological spectrum of amphorus shows the wide geography of centers of their production, mainly from the Black Sea centers. In Komariv also found a rare type of amphoras, for example amphoras of Forlimpopolye

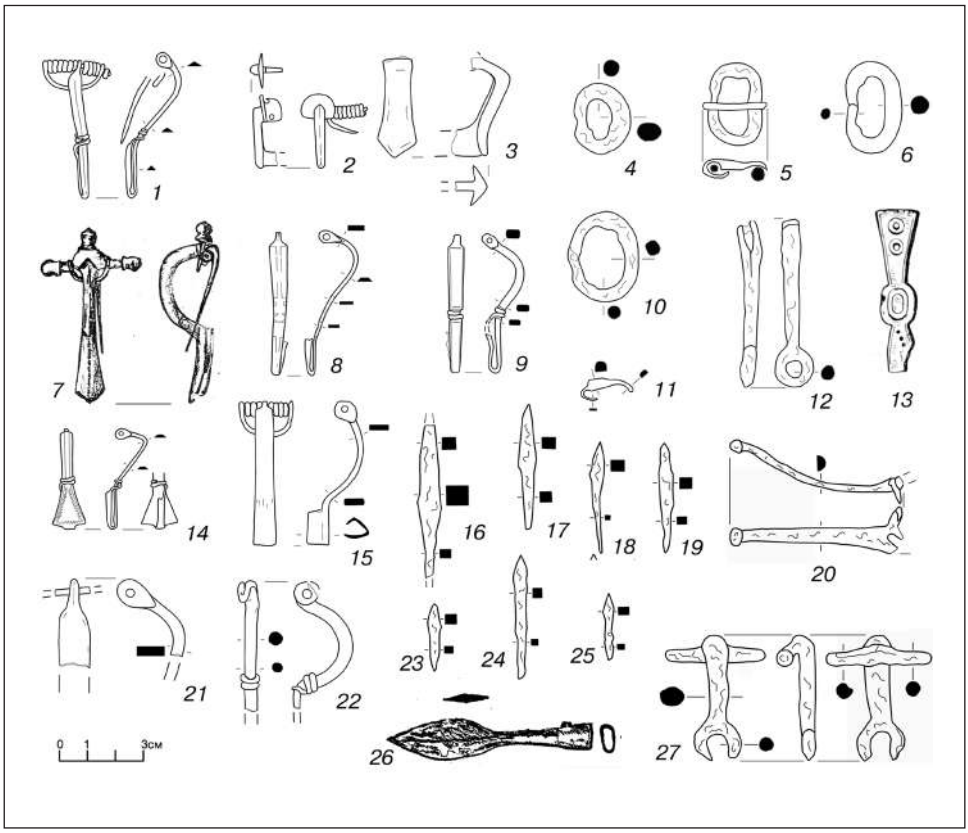

Fig. 4. Details of clothing (1-15, 21, 22) and weapons (16-20, 23-27) of the Komariv settlement.

type, which were manufactured in the north of Italy (Didenko 2015, 23-27, Didenko 2017, 87-96).

At the settlement was found lot of Roman coins that are minted from Augustus (27 BC. - 14 AD.) to Constantine I (306-337 AD.). In addition, there were found the Bosporus coins of Recuporid, which were not known before that on the west of the Dnieper (Didenko and Myzghin 2013, 367-369, Myzgin 2013, 336-341).

Details of clothing and embroidery from Komariv are represented by fibulas, metal parts of belts, pendants and beads (Fig. 4).

The tools found in the settlement are very diverse and numerous. Among them - axes, hammers, anvil, hoes, sickles, spitters and knives. This group includes numerous finds of spindles and pebbles.

Arms items are represented by spurs, arrowheads and spears.

A special category Komariv settlement finds is the building remnants of ancient origin, which are represented by plinfos, tiles, nails.

The chronology of the site is determined by the aggregate of objects from the settlement and the cemetery. In general, it is possible to distinguish the following degrees of relative chronology of barbarian antiquities in Europe (Fig. 5).

B2 \ C1 - fibulae of type Almgren/141 (elbow) and 202-203 (with high receiver), amphorae of Zeest/90 type and early variants of Shelov D type, glass vessels of Eggers/189 type, 192;

C2 - Gorokhovsky/A fibulae (garter, smooth), Thomas I combs (low semicircular back), Eggers/211 glass cups, late Shelov/D amphorae and Zeest 72/73 types.

C3 - Gorokhovsky fibulae /B1 and B2 (faceted with sling receiver), Petrauskas-Sinitsa/type1, var. 3 (flap fibulae), glass cups Eggers/220-221, 230, amphorae of types Shelov/F and Zeest/100.

D1 - Gorokhovsky/B3 fibulae (garters), Petrauskas/type 7 („military"), Eggers cups/232-238, buckles with a strongly thickened front of the frame, amphorae of Zeest types 100 and Böttger/I.1.

D1 \ D2 - two-layer glass fragments of Straume VIII-1 type glass, hook for Kubai type quiver, large size fibula.

Indicators of all phases of the Late Roman time are actually presented in Komariv. Very important finds that point to the earlier (early Roman times) and late (the time of Great Migration of peoples) stages of the existence of this settlement . In absolute dates it corresponds to the end of the II- the middle of the V century (Petrauskas 2014, 87–116, Petrauskas 2014a, 165-184, Rumyantseva 2014, 401-435)

Of course, in Komariv a separate category is the findings of glass. During five seasons of our excavation, about 1000 units were found. For comparison, in Komariv, at 1 m^2 of excavated area, 0.16 units of glass falls, while from other settlements such indicator is several orders less (Obukhiv - 0.002, Velyka Bugaivka - 0.04, Ripniv - 0.001, Zhuvivka Olszanskaya - 0.001 etc) (Petrauskas 2014, 96).

The glass findings present three main stages of glassmaking: glass melting (or remelting); glass processing and finished products (vessels, beads, glass window)

According to research by Yu.L. Shchapova, ready-made glassware from Komariv by morphological and chemical-technological features is divided into two large groups. These groups of glass are conventionally designated as „glass of antique type" (Fig. 6) and „glass of Chernyakhiv type" (Fig. 7) (Shchapova 1978, 230-242).

The question whether the glass was melting in Komariv is the subject of discussion (Smishko 1964, 64-80, Bezborodov 1964, 67-80, Shchapova 1978,

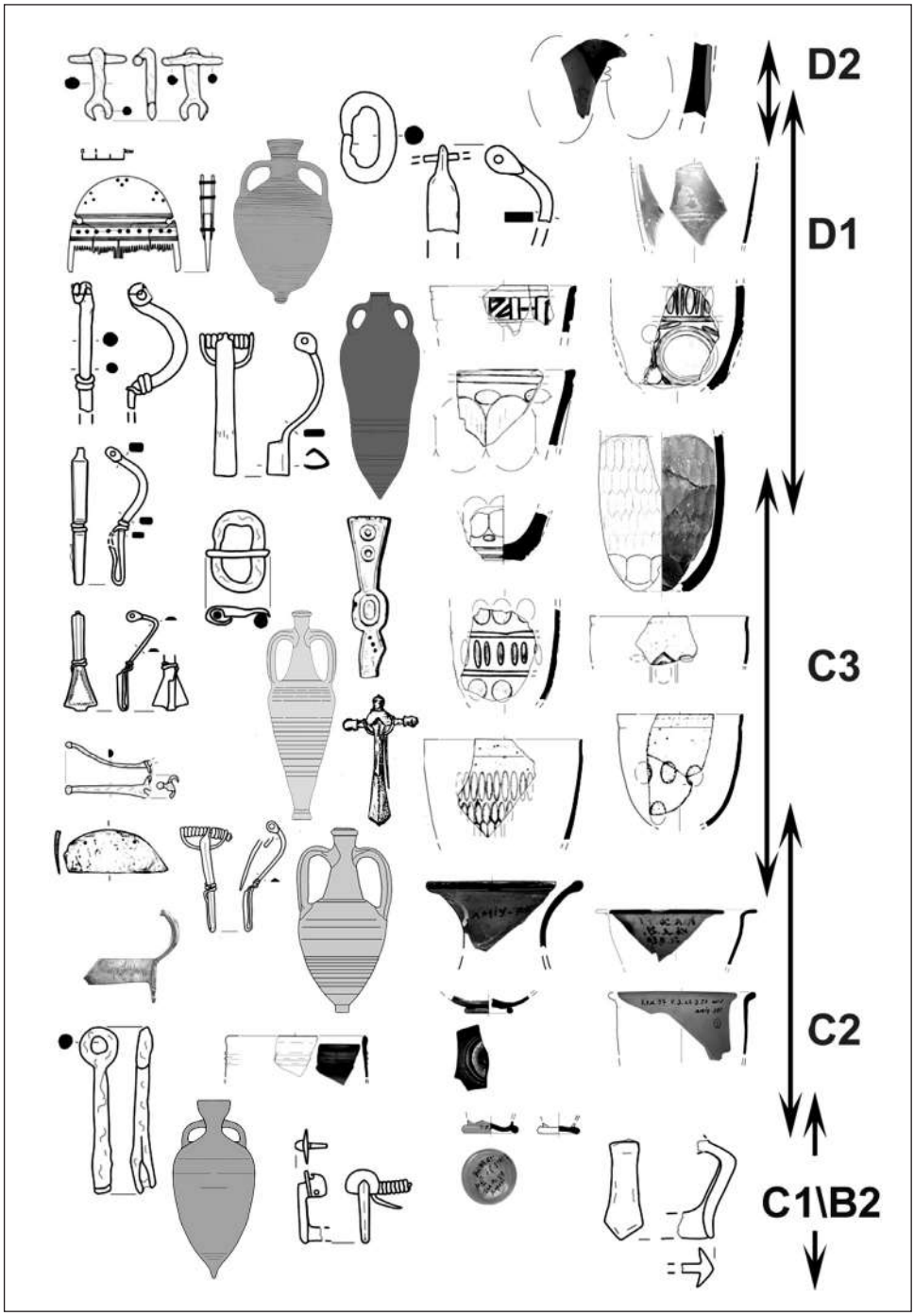

Fig. 5. General scheme of the chronology of findings of the first half of the I millennium AD from the Komariv settlement.

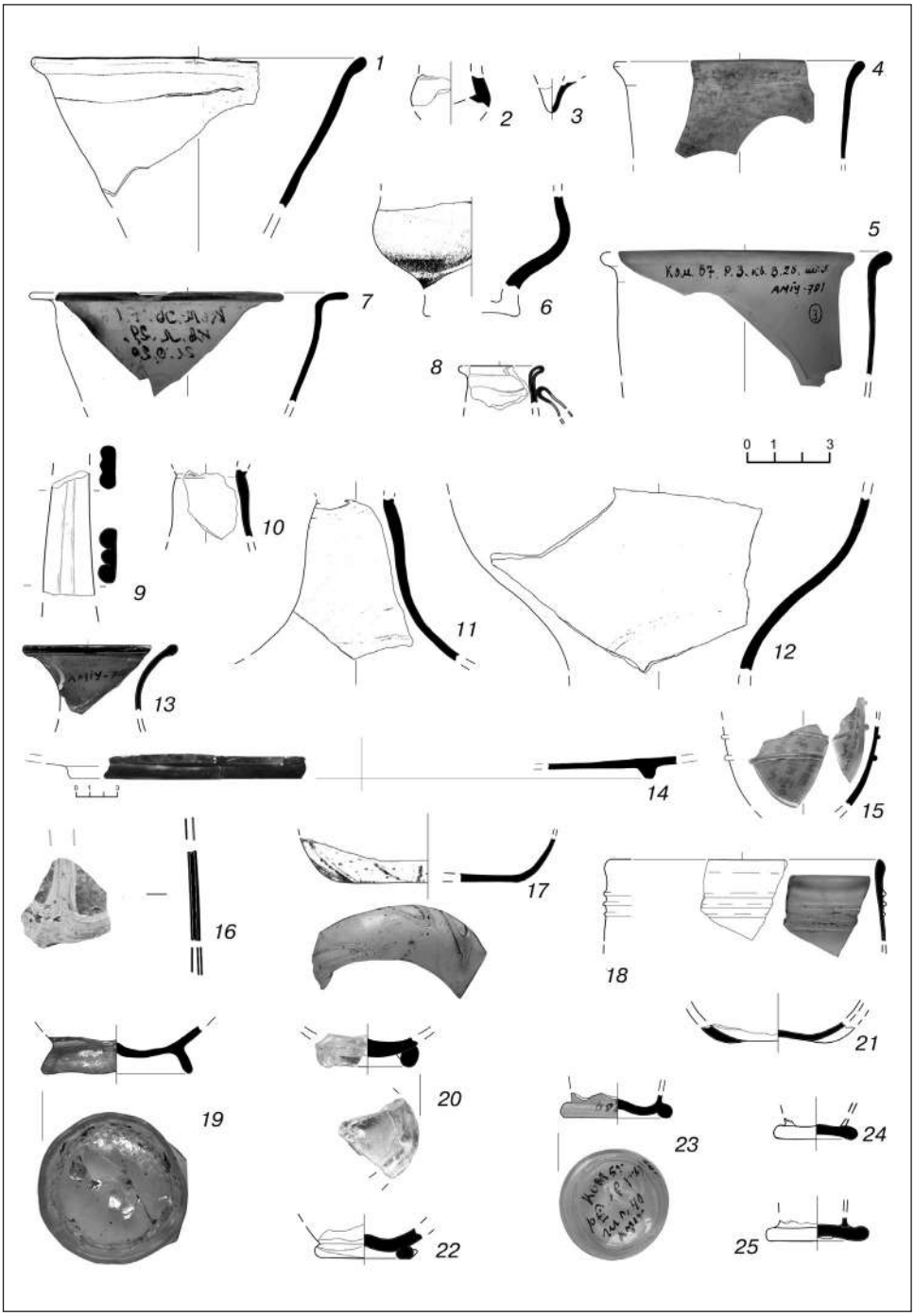

Fig. 6. Some forms of glassware of the first group by Yu. Shchapova, vessels of antique tradition from the Komariv settlement.

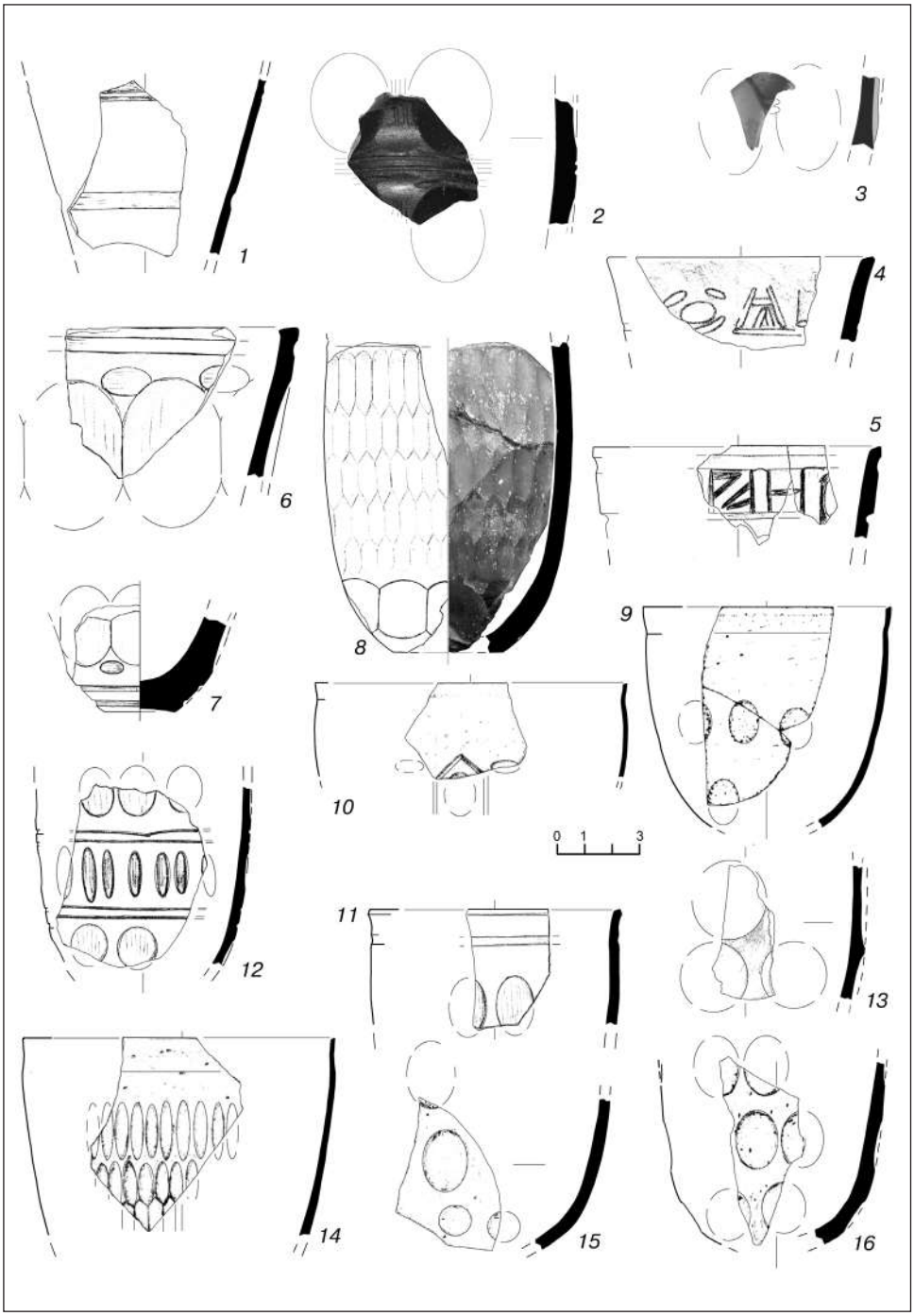

Fig. 7. Some forms of glassware of the first group by Y. Shchapova, vessels of Chernyakhiv tradition from the Komariv settlement.

230-242, Petrauskas 2014, 87–116, Rumyantseva 2017, 141–164, Rumyantseva 2017a, 203–218). Quite enough this is important from the point of view of the natural environment in which the glass manufactory in Komariv arose and has existed.

There are two main types of glass manufactories - primary and secondary. In the primary manufactories there was a glass melting based on sand and alkaline raw materials (natural soda or plants ash); in the secondary - the products were made from imported untreated glass (Seibel 1998).

In Komariv the finds present all stages of glass production - melting glass forming vessels and their decoration. We want to pay attention to the fact that during Smishko`s and our excavations was founded a series of items wich point to the melting of glass from natural components in a place. This is slag and charge that has undergone heat treatment with the unfinished stage of obtaining glass (Fig. 8). Preliminary analysis of the chemical elements revealed the presence of sodium in the slag and charge samples. In our opinion, this is direct indication that the glass was melting in place, namely in Komariv. To carry such semi-finished product from antique centers for 300km no sense.

If we talking about the possibility of glass melting directly in Komariv, then the problem of the raw material base becomes particularly relevant. By definition of Bezborodov between glass and sources of alkaline raw materials was a direct production-geographical link in ancient times (Bezborodov 1956, 35).

Based on other Chernyakhiv settlements, the Komariv looks like a manufactory with high-tech crafts, primarily of antique origin. One more feature of Komariv is his multidisciplinary character. Our research allows us to talk about at least four types of crafts - glass, pottery, processing of ferrous and nonferrous metals. Of course, the settlement had to deal with auxiliary crafts - fell charcoal and lime, leather processing, weaving, etc. This feature distinguishes Komariv from other production centers of the late Roman times from the barbarian territories of Central and Southern Europe. As a rule, such centers produced one kind of products - pottery vessels Iholomy (Poland) (Dobrzańska 1990); products from the horn of Velyka Snytinka 2 (Ukraine) (Mahomedov 1992, 94-116), Birlad (Romania) (Palade 2004)); metallurgy of ferrous metals Uman-Sinitsa (Ukraine) (Pankov and Nedopako 1999, 149-162) or jewelery production Gradiszk (Ukraine) (Rutkovskaya 1979, 317-364) and others. Note that some of these craft centers linked to the quality characteristics of the territory. For example, Uman is located in the zone of deposits of ferruginous quartzites in central Ukraine. Velyka Snytinka on the edge of the forest zone, which provided the opportunity to receive horny raw materials.

Fig. 8. Archaeological remains of the main stages of glass production and processing from Komariv.

The ethno-cultural composition of the Komariv population is very colorful and consists of immigrants from the Roman provinces; representatives of Late Scythian-Sarmatian, East Germanic, Early Slavic and Dacian tribes. In the general ethnocultural system of the Chernyakhiv culture, Komariv refers to heterogeneous types of Chernyakhiv settlements with a multi-component ethnic composition. Such sites are distributed in the contact areas between the regions of compact residence of ethnic groups that are part of the Chernyakhiv culture.

Consequently, taking into account all the above, Komariv look like a powerful crafts, interethnic and cultural center.

Among the conditions in which such production centers had effective existence could be called as: skilled personnel (knowledge of technologies); the availability of technical tools (instruments, devises); raw materials (presence of local deposits or stable supply of raw materials through stable trade routes); market; the socioeconomic environment that ensures its existence (obtaining raw materials, creating a production cell in a certain territory and selling products).

Most of these items are related to the geographic environment in which there is a settlement. This characteristic of Komariv compared with other settlements of Chernyakhiv culture can be built on two indicators of the territory: natural data (qualitative assessment of the territory) and spatial structure (quantitative assessment of the territory).

The study of the natural conditions of the archaeological site has an interdisciplinary character. For this purpose, the following research studies were undertaken and used for the research project on the study of the site in Komariv: geophysics, soil sciences, paleobotany, paleozoology, geology, etc.[2]

Basis of these studies are the traditional archeological methods of studying the territory - archaeological exploration (Avramenko, Didenko and Reida 2015, 262–264). It allows to study landscape features of the territory (relief, soils, vegetation) and spatial structure (area of settlements, resource zones, communicative ways, relation to other historical and cultural formations). Our researches were carried out taking into account the methodological principles and experience of research conducted on the Middle Dnieper (Shyshkin 1999, 129-139), the upper Dniester (Steblii 2007, 17-30) and the left bank of the Dnieper (Lyubichev and Myzgin 2014, 58-71).

These data allow us to expand our understanding of the nature, economy, demography of our site, the closest district and the region between the Dniester and Prut.

[2] Information on these studies is included in the annexes to Komariv's annual research reports on our 2012-15 and 2017 expeditions.

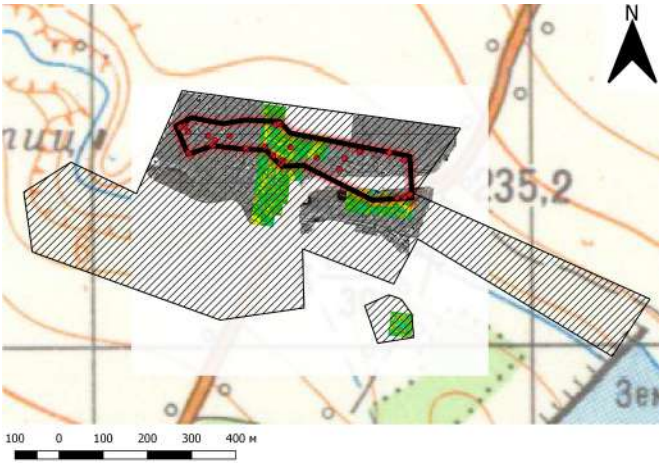

Fig. 9. Komariv production area according to geomagnetic data.

Spatial structure

Thus, the data on "Komariv microregion" compared with Chernyakhiv culture looks as follows.

The area of the Komariv settlement is over 35 hectare. Geophysical studies and archaeological surveys provided preliminary data on the settlement plan. Only the northern part of the settlement has distinct signs of production activity. The analysis of the map allows us to locate 22 anomalies that can be interpreted as craft furnaces and 29, which can be linked with living and household buildings. Production objects (furnaces) are located along the slope of the beam and above the living buildings. In the northwestern part of the settlement, a relief anomaly can be traced, which can be pre-defined as the career remnants.

Thus, about 10 hectares of settlement area can be linked to the production area (Fig. 9). Thus, even if the residential area of the settlement in Komariv was 25 hectares, in the typological spectrum of settlements by area in the calculations of R. Shishkin, it belongs to a group of mega-settlements, that is from 26 hectares and more (Šiškin 1999, 83-90).

According to researcher estimates, the vast majority of settlements (65%) of Chernyakhiv culture have an area of 10 hectares. According to the calculations of Baran, the average area of Chernyakhiv settlements of the Upper Dniester is 3-4 ha (Baran 1981, 19). In the Ukrainian and Moldavian parts of the Middle Dniester, the number of large settlements is considerably bigger: Sobar and Lukashivka — 25 hectares, Budeshti — 35 hectares. Shishkin paied attention to the fact that the mega-settlement is typical for the Middle Dniester (Šiškin 1999, 83-90). According to our calculations within a radius of 30 km from

Komariv in the right bank of the Dniester settlement outweigh area of 10ha. However, notes much higher percentage of super large settlements — 18%.

River system. Cartography of Chernyakhiv settlements of „Komariv location" has allowed to fix that the most typical is the location of settlements on the tributaries 2— 3 orders. For Cherniakhiv culture is most often the tributaries of 3 and 4 orders (totaling 67%), less often 2 order (12%) and 5 order (15%).

Such a specificity may be explained by the „meander" nature of the Dniester river bed, which affects the length of its flow. In areas with a narrow Dniester valley, second-order inflows are dominated by short beams, which have one super-large settlement. In the areas with a wide valley of the Dniester there are tributaries up to 4 orders. There are (tributaries 3 and 4 of the order) several medium or large settlements located on a chain system.

In the system of settlements in relation to the main river of the region (Dniester) and its influx sites monuments are divided into two groups: sites of the dividing plain (Komariv type) and sites of the Dniester valley (Oselivka-Bakota-Sokol type). The Dniester region shows a large percentage of „valleys" settlements, which is here 9%. In the basins of other main rivers (Dnipro, Bug), such percentage does not exceed 1% (according to R. Shishkin's calculations).

Interval and density. In the literature it is accepted to distinguish the chain and nest settlement system (Šiškin 1999, 83-90).

The nest system in the materials of the Chernyakhiv culture seems not to be completely justified. The principle behind the allocation of such „nests" is the subjective visualization of the concentrations (clusters) of sites. Materials of culture, yet do not provide convincing evidence of the systemic nature of such entities. For example, such spatial models as „metropolis and satellites", defense systems, etc. The other, namely, the chain principle in the placement involves the connection of settlements with the water system of the region. In such cases it is possible to talk about two factors that create - the distance between the settlements and the length of the individual links of the water system. It was established that Chernyakhiv settlements within one successive river system are located at a distance of about 2 km (Šiškin 1999, 83-90). In addition, the dependence of the number of settlements on the length of a single link of the river system can be traced. That is, if the length of the brooks (beams) to its fall to the next does not exceed 4-5km, then usually there is one settlement. A brook that reaches the length of 8-10 km has two or three settlements with an interval of 2 km.

A clear interval of 2 km is traced between the settlements located in the basin of the river Sursha. In the course of the Sursha (length 12 km), until river Ramadanka falls in it (basically the terrain changes), there are 3 middle set-

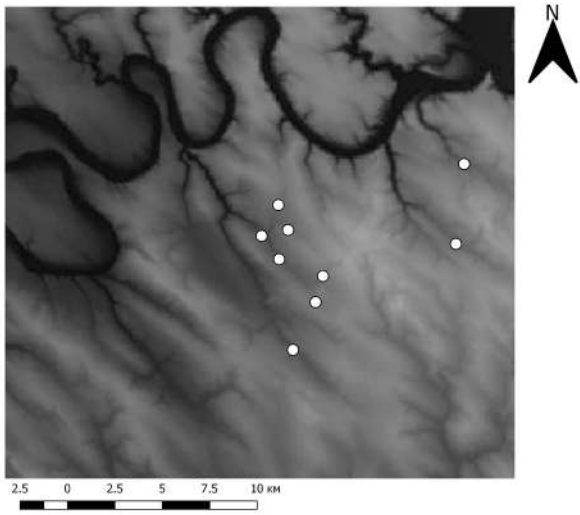

Fig. 10. The Komariv settlement and other settlements which located around them.

tlements (no more than 7 ha). On its right-hand sideways (short beams length of 2-4 km) there are 2 more middle settlements (Fig. 10). Also here are beams (brooks) whose length reaches 8-10 km. But the typical Chernyakhiv topography corresponds only to segments of 4-6 km. The survey of pools of these brooks allowed to detect only one settlement. However, the area of these settlements significantly exceeds the average - up to 30-40 ha. Surveys conducted within a radius of 10 km from the Komariv factor allowed to map 15 settlements of Chernyakhiv culture. So the population density of the region is about 6 km^2 per settlement.

The study of spatial indicators of settlements and the region allows to ask questions about calculations of concrete demographic indicators of a separate settlement, micro-region and region. As an example, you can calculate the materials of the cemetery Chernelyov-Russky (Tylishchak 2017, 159–168). Output for such calculations was the materials of the cemetery (the number of burials, the time of the existence of the cemeteries, the average age of life) and settlements (area of the settlement, the time of its existence and the average number of family/house). By these calculations, we assume that at the same time about 60-70 people or 8-10 families could live in the settlement of Komariv. So at the cemetery we can expect up to 500 burials.

Qualitative characteristics of the geographical environment may be characterized as follows.

Landscape conditions in Komariv can be considered as a set of three main components: soil, relief, vegetation.

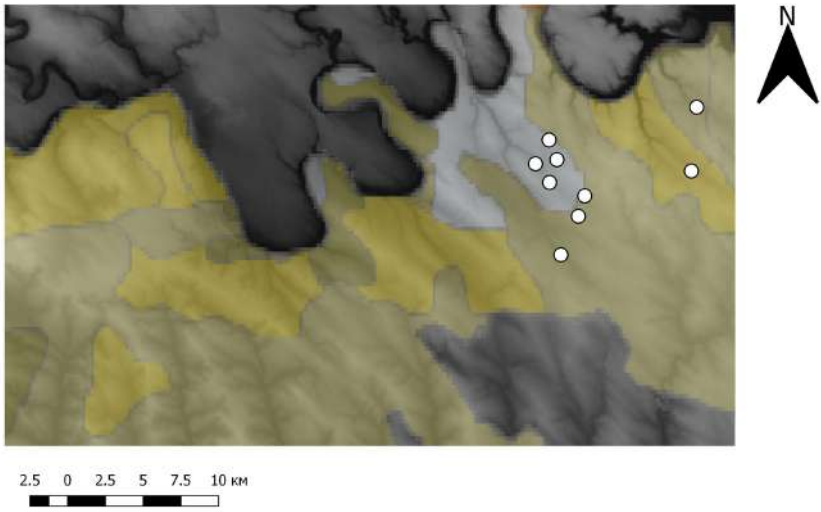

Fig. 11. Type of soils around Komariv.

In general, the microregion of research (conventionally „Komariv location") is located within the Prut-Dniester highland area, which is part of the broadleaf forests and is a transition from broadleaf to forest-steppe areas. It is located on the border of the Podolsk and Precarpathian hills, which has signs of a raised wavy plain with absolute marks of heights of 200 to 480 m (Khotyn highland). The plain is highly dismembered along the Dniester and Prut. Hight complexes with gray and dark gray forest soils (Atlas pochv Ukrainskoy SSR. 1979, 45-48), remains of hornbeam, oak-hornbeam and beech forests (Khotynsky and Bystrytsko-Tlumatsky hills) dominate here. The Prut-Dniester region belongs to the zone of moderate humidification. The vegetation cover is characterized by a combination of natural forests (hornbeam, oak), meadows (floodplain and uppermost) and small areas of steppes on podzolic chernozems, gray forest and turf podzolic soils. The Komariv is located on the border between the Kelmenets steppe and the Sokyryansky watershed forest-steppe natural areas (Heobotanichne raionuvannia Ukrainskoi RSR 1977, 65-67). From other territories of the Sokyryany Ridge forest-steppe district, Komariv is separated by the Polivanian ravine - a large tract that clearly indicates the boundary of the nearest contact zone (Fig. 11).

The exact indicators of settlement are as follows.

Relief. The settlement occupies both separate slopes of the damped beam and the cultural layer does not reach the plains and even the eaves. That is, this is the typical location of Chernyakhiv settlements. It is possible that the smooth slopes provided favorable conditions for the natural draft of air during the op-

eration of furnaces. Let's also pay attention to the results of geophysics, which recorded traces of a large number of stabilized rivers within the settlement. Archaeological work showed that some of the objects of Roman times were damaged by these rivers. Consequently, the active erosion of the slopes of the beam occurred after the end of the existence of the settlement in the 5th century AD.

Soil at the settlement in Komariv are defined as gray and dark gray, which coincides with the general characteristics of the microregion. According to observations of Natalia Stebliy, similar soils are characteristic to the settlements of the Upper Dniester (Steblii 2007, 17-30). Let us pay attention to the fact that the type of soils in Komariv differs from „traditional views" about the attraction of Chernyakhiv sites to chernozems. However, given that there is no chernozems at the „Komariv location" it can be argued that the Cherniakhiv settlements on the Dniester tend to the most fertile soils present in the region.

Plant cover. According to the definition of specialists at the time of existence of a settlement, that is 3-4 centuries, oak is quite prevalent in wood, which coincides with the current indicators of this region.

A separate issue of natural conditions for Komariv as a glassmacking, and wider craft manufactory is the resource base of the Dniester.

Three glass-forming components are required for glass production: sand (silica), limestone (calcite) and soda (sodium). For the full cycle of melting and glass processing, it is also important to have high quality fuel material and refractory clay.

Assuming melting of glass in Komariv, for this purpose, deposits of sand, limestone and meadows are required.

High quality sand (so-called quartz sand) in open access is known for 80 km from Komariv and used in the modern glass industry (Onut, Zastavnivsky rn) 1. In addition, within a radius of 4-5km from the settlement, there are several sand quarries known (Fig. 12). However, the qualitative composition of these deposits of sand is unknown to us yet.

Sources of high-quality limestone provide the geological conditions of the region. In the closest district, deposits of dolomitic limestone are common.

Layers of high-quality clay are also known in immediate proximity to Komariv settlement. The quality of the products from it was evidenced by the experimental work of our expedition (Petrauskas and Koval 2017, 220-228).

All these components could be extracted in a career, the remains of which were recorded by geophysics in the northwestern part of the settlement.

However, the most problematic is the lack of important and rather rare materials like soda, without which it is not possible to glaze.

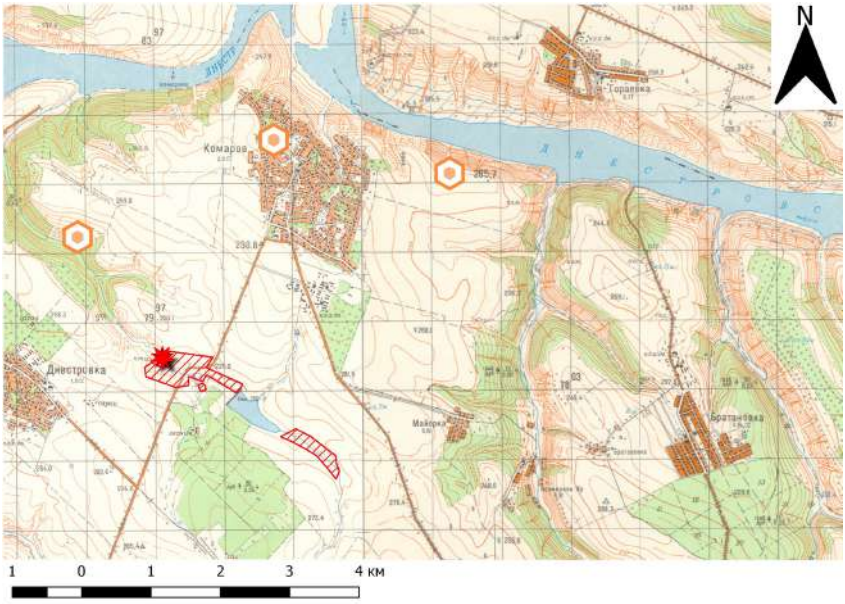

Fig. 12. Sand deposits in the immediate vicinity of the Komariv settlement.

Traditionally it is believed that the extraction of natural soda for the needs of the glass industry in ancient times occurred in Egypt (Wadi-Natrun) or the Balkans. From there it came to the glass centers of the Roman Empire. However, let's pay attention to the fact that in Ukraine surface and open soda deposits are known, in particular on the Crimean isthmus at Sivash.

Second, an alternative source is the ash of plants with a high content of sodium. Such are the ash of marine and saline plants. Beside 300 km south of Komariv, Budzhak steppes with numerous salt mines are located. The volumes of possible sodium production from saline plants of Bessarabia in the 18th century considered at the industrial level. Komariv is connected with Budzhak by the Dniester and Prut rivers.

The limited and remote regions of the soda deposits from Komariv make the transportation issue as a topical. For this purpose, land and waterways could be used. Komariv are conveniently located in relation to the main routes known since the Middle Ages. This is the Dniester itself, which was suitable for transportation up to Kamyanets-Podilsky (active exchange of barges with salt from the 18th-19th centuries). In addition, near Komariv was one of the four major trade routes of the Middle Ages of South-Eastern Europe. The track is known as the "Voloshsky" („Via valahica") or the "Golden Way", or the "Berladra Road". The road linked north-west and south-eastern Europe, one of the main points through which it was held is Khotin, which is located 50 km from

Komariv. The profitability of such combinations in late Roman times clearly confirms the geography of imports found in Komariv. This is evidenced by the geography of the centers of the production of amphora: Heraclea Pontic, Egeid, the isles of Kos and Chios, Sardis (Asia Minor); Forlimpopolye (Northern Italy); North Africa (Tunisia). It should be noted that the percentage of amphora in Komarov is not at random level, which is almost 20% of the mass of all pottery dishes.

Consequently, taking into account this transportation of soda raw materials is possible.

In Komariv, glass was definitely processed and it needed a corresponding quality of fuel and the availability of appropriate equipment. As the analysis of wood species from the late Romanian sites in Komariv, oak forests dominated here (Serhieieva 2017, 76-78). This wood is the ideal fuel for high-temperature technologies in ancient times. Let's look at one more nuance, which is important for the features of Komariv. Part of the grinding stones are made of sandstone of special quality. It contains small grains of garnet. Such a combination is ideal for abrasive tool, wich could be used to decorate Group II glass by Yu.Shapova.

Thus, the data obtained provides the opportunity to reach the following conclusions:

1. Komariv is a unique settlement not only of Cherniakhiv Culture, but also of all the barbarian antiquities of Europe of late Roman times. Its production character and the specifics of the leading crafts (glassware) require special attention to the study of the natural and cultural environment.

2. According to its basic physical and geographical characteristics, Komariv is a part of the system of Chernyakhiv settlements of the region and culture. However, the settlement also has specific features.

- Komariv is distinguished by a large area, which is increased at the expense of the crafting part. The presence of megacities is the property of the middle Dniester. Famous sights such as Sobar and perhaps Lukashivka distinguishes other specific features - the presence of stone construction and possibly the remnants of glass production.

- for the Komariv location is characterized by a chain system of settlement along the rivers with an interval of 2 km. However, it is possible to raise the question of the dependence of the sizes of settlements from the system of water supply:

- the soils of the sites are not chernozem, which is considered to be characteristic of Cherniakhiv Culture, however, the Komariv occupy the highest quality of the regions available (gray and dark gray).

- the raw material base of Komariv's outskirts provides all the main components for obtaining glass except for soda. Delivery of this component is entirely possible taking into account land-based and waterways in late Roman times. Komariv are located at the crossroads/the combination of these paths. These same ways provided the possibility of marketing products in the deep areas of the barbarians.

3. A special connection between Komarov and the territories where the active process of interaction between the empire and the barbaric world took place is evidenced by a map of the original Roman finds on the adjacent territory.

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Așezarea Komariv – un centru de producție a sticei în Barbaricum-ul european: mediul cultural și natural

Rezumat

Așezarea din secolele III-IV d. Hr. din apropierea satului Komariv este situată în zona Nistrului Mijlociu. În anii 1950-1970 au fost efectuate săpături arheologice de către M. Yu. Smyshko și Yu. L. Șchapova, care au cercetat circa 40 de structuri din epoca romană târzie (un cuptor pentru topirea sticlei, o construcție cu fundație de piatră, un cuptor de ars ceramică, gropi, vetre și locuințe de suprafață). Începând cu anul 2012 cercetarea extinsă a așezării a fost realizată de o expediție arheologică mixtă ucraineano-germană (șefii proiectului O. Petrauskas și H.-Y. Karlsen). Implementarea proiectului a furnizat noi informații despre sit. Suprafața așezării este de aproximativ 35 ha, dintre care 12 hectare au fost cercetate geofizic, fapt ce a permis elaborarea unei hărți a anomaliilor arheologice. Pe parcursul a cinci campanii au fost excavate 22 de structuri: cuptoare de ars ceramica, locuințe, gropi și construcții auxiliare, o groapă

legată de producția de sticlă etc. În anul 2012 a fost descoperit un cimitir și s-au investigat șase inhumații. Cadrul cronologic al funcționării atelierului Komariv acoperă fazele C1 și D1. Așezarea are o planigrafie constituită din două componente: partea rezidențială și partea industrială. Producția a inclus mai multe meșteșuguri: sticlărie, producția ceramică și de podoabe, metalurgia metalelor feroase etc. Particularitatea esențială a culturii materiale ce caracterizează așezarea Komariv este determinată de puternica influență venită dinspre civilizația antică târzie. Structura culturală și etnică a comunității din situl Komariv era determinată atât de prezența reprezentanților locali, cât și de reprezentanți ai populațiilor alogene. Studiul materialelor monumentului se realizează prin implicarea unui număr important de specialiști din diverse domenii ale științelor naturii – știința solului, paleobotanică, paleozoologie, geologie etc. Datele oferite de studiile interdisciplinare ne permit să extindem înțelegerea condițiilor naturale în care s-a constituit comunitatea de la Komariv, ale evoluției economice, ale proceselor demografice ce au caracterizat cea mai apropiată zonă și regiunea dintre Nistru și Prut. Din 2013 se realizează o valorificare cuprinzătoare a zonei pentru a aprecia caracteristicile mediului cultural și natural în care a funcționat această așezare unică. O direcție specială de cercetare în Komariv este crearea unei hărți regionale a depozitelor de materii prime, care a fost necesară pentru diversele meșteșuguri - nisip, argilă, calcar etc. Studiul mediului natural și cultural în care a existat Komariv oferă o oportunitate de a evidenția cauzele apariției sale, zona de resurse etc.

Cuvinte cheie: cultura Cernyakhiv, așezarea Komariv, atelier de producție a sticlei, arheologie de peisaj, materii prime.

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