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MARIA BITIRI

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PALAEOLITHIC REINDEER HUNTING CAMPS FROM COSĂUȚI (MIDDLE DNIESTER, MOLDOVA)

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Keywords: Middle Dniester region, Late Palaeolithic, Cosăuți site, reindeer hunting camps, river crossing hunting, bone and antler weapons

Abstract: Several Late Palaeolithic sites from the Middle Dniester area are characterized by specific artefact associations and archaeozoological assemblages that permit to include them in a particular category of reindeer hunting camps of the Palaeolithic communities. Among the Palaeolithic reindeer hunting camps, the multi-layered site of Cosăuți has a particular importance, since it includes more than two dozens of cultural layers dated from 20 to 14 thousand years BP. Nearly each of those strata exhibits an abundance of reindeer remains that represents up to 90% of the total archaeozoological material. The site of Cosăuți has yielded a variety of hunting weapons (spearheads, darts and spears, and a harpoon) that served for killing reindeer crossing the Dniester during the migration seasons. The geographical position of the site allows to control the part of the river valley where migrating reindeer herds crossed the Dniester and therefore the Cosăuți site had an advantageous strategical position. In many respects, the Palaeolithic site of Cosăuți resembles the location of the hunting camps of the ethnographically studied communities of caribou hunters in North America.

Cuvinte-cheie: regiunea Nistrului mijlociu, Paleoliticul târziu, situl Cosăuți, tabere de vânătoare pentru vânarea renilor, vânatul la trecere râului, arme de os și coarne de ren

Rezumat: Unele dintre siturile paleoliticului târziu din zona Nistrului mijlociu se caracterizează prin asocieri de piese și inventare arheologice specifice care permit atribuirea lor categoriei distincte a taberelor de vânătoare a renului specifice comunităților paleolitice. Între acestea, situl multi-stratificat de la Cosăuți are o importanță deosebită, având peste 20 de niveluri culturale datate în perioada 20 000–14 000 BP. Aproape toate aceste straturi conțin numeroase resturi de ren, reprezentând cca. 90% din inventarul zoo-arheologic. Situl de la Cosăuți a produs o largă varietate de arme de vânătoare (diverse de tipuri de vârfuri și un harpon) utilizate în vânătoarea renilor care traversau Nistrul pe durata sezonului migrațiilor. Poziția geografică avantajoasă a sitului permitea controlul acestei părți a văii râului, acesta fiind locul pe unde turmele de reni traversau Nistrul. Din multe puncte de vedere, Cosăuți amintește de taberele de vânătoare documentate etnografic ale comunităților de vânători de caribu din America de Nord.

INTRODUCTION

A large number of Palaeolithic sites have been discovered and explored in the Middle Dniester area. The Middle Dniester Palaeolithic sites are comparable with the most famous East European sites in their richness and diversity. Among the Dniester sites, multilayered monuments with loess deposits intercalated layers are of particular importance, since they provide good preservation of the vestiges of the Palaeolithic human activity. Most of them stretch along the right bank of the Dniester, on its middle course, on the territory of the Chernivtsi Region of Ukraine and the north-eastern regions of Moldova (Fig. 1). A significant part of the Middle Dniester sites have been excavated over relatively large areas by A.P. Chernysh from the 50s to -the 70s of the last century and reported in the literature as the reference monuments for the study of the East European prehistory (Chernysh 1977, 1987). The multi-layered site of Cosăuți investigated by I.A. Borziak in the 80s and 90s is among the key Dniester sites (Borziak 1993). According to Borziak (2008: 35), all open multilayered sites of the Carpathian-Dniester region represent a particular socio-cultural phenomenon in the development of the Palaeolithic of Southeastern Europe. We fully agree with this viewpoint, however, we consider that it will be more appropriate to restrict the application of this notion to the specific group of Dniester Palaeolithic sites defined as the "reindeer hunting camps" that are known from the Late Upper Palaeolithic of the Middle Dniester.

The term "reindeer hunting camps" is used relatively rarely in Palaeolithic archaeological studies. This circumstance may be explained by a quite limited number of this type of archaeological sites and the fact this concept was taken from ethnography. By the end of the 19th century, there were particular communities of reindeer hunters among the indigenous peoples of the extreme north of Asia and America, whose lifestyle was adapted to the natural biological cycle of the tundra reindeer. The collective hunting for reindeer at large river and lake crossings was a traditional way of prey resource exploitation, in particular, among the Caribou Eskimos, partly the Ngansans, the tundra Yukaghirs, and the Nenets. In case of successful hunting, the reindeer hunter communities were provided with meat for the entire autumn-winter period (Baskin 2001; Fletcher 2015). No doubt, great caution is needed while applying the ethnographic analogies in the studies of the Late Palaeolithic hunting communities specialized in the exploitation of reindeer prey resources. Nevertheless, such comparisons are helpful in studying the lifeways of the ancient population on the Dniester region during the period of the coldest phase during the last glaciation and the subsequent period of the Late Glacial. Moreover, the implication of modern ethnographic data in archaeological studies is helpful to the elaboration of reliable models on the functioning of the reindeer hunters economy within the framework of the development of the local variant of the Epigravettian culture based on the materials from the multilayer monuments such as Cosăuți and Podgori (Moldova), the upper layers of Molodova 5 and 1, Cormani 4 (Ukraine), and Cotu Miculinți (Romania) (Fig. 1).

The reindeer hunting camps are characterized first of all by the important predominance of reindeer remains among the hunting trophies, their particular settlement near the places of supposed reindeer river crossings, as well as by the presence of throwing and stabbing weapons, and the tools for animal carcass butchering and reindeer skin processing in the archaeological assemblages.

ARCHAEOZOOLOGICAL EVIDENCE FROM COSĂUȚI

Generally, the fauna from Cosăuți is predominated by the tundra-steppe mammal species (Croitor 2018). However, David *et alii* (2003) reported also the presence of such temperate forest species as *Capreolus capreolus* from layer I and *Alces alces* from layer VII, without, however, any indications of the fossil material that was ascribed to these species. Our revision of the osteological material from Cosăuți did not reveal any skeletal remains that may belong to *C. capreolus* and *A. alces*. We suppose that the presence of roe deer was assumed based on the remains of a juvenile individual of *Rangifer tarandus*, while the presence of moose was erroneously based on the fragment of the reindeer antler palmation from layer VII (Covalenco, Croitor 2016; Croitor 2018). Therefore, the faunal assemblage from Cosăuți has a typical tundra-steppe character. This conclusion is further supported by ecomorphological features of certain prey species from Cosăuți. *Bison priscus*, one of them, is characterized by relatively large premolar series and by specific mandible proportions that bring the bison from Cosăuți closer to the modern *Bison bison* that inhabits open environments (Croitor 2008). The craniodental morphological peculiarities suggest that the bison from Cosăuți was adapted to herbaceous forage rich in fibres in the conditions of an open landscape.

Rangifer tarandus, the dominant prey species from Cosăuți (Fig. 2), provides some more information on the ecomorphological adaptations. The reindeer from Cosăuți is characterized by relatively short limb bones, rather small body size, similar to that of the modern tundra reindeer *R. tarandus tarandus*, and relatively large cheek teeth that distinguish the Cosăuți reindeer from *R. tarandus* of the older Paleolithic sites on the Prut-Dniester interfluvium, and bring it closer to *R. tarandus constantini* of the Late Palaeolithic site of Malta, nearby Irkutsk, Russia (Croitor 2010). The antlers of the reindeer from Cosăuți are rather long, thin and poorly branched. The complete male antler from Cosăuți (not preserved) was characterized by the development of a large basal tine with a flattened distal part, a small posterior tine, a strong hook-shaped posterior crown tine, and a small distal palmation with four digits (Fig. 3). The specific morphological characteristics of the reindeer from Cosăuți define it as an open landscape gregarious grazing mammal that was perfectly adapted to the tundra-steppe conditions (Croitor 2010). The arrival of the Siberian Late Pleistocene reindeer *R. tarandus constantini* in the East Carpathian region is part of a more important local faunal turnover marked by the disappearance of *Megaloceros giganteus*, *Crocota crocuta spelaea*, and *Ursus spelaeus*, that certainly indicates deep changes in the environmental conditions during that geological period (Croitor 2018).

The specialized character of hunting at the multi-layered site of Cosăuți is confirmed by the abundance of reindeer bones, which sometimes represent the predominant part of the archaeozoological material, attaining from 80 to 95 per cent of the total number of skeletal remains (Table 1). Most of the reindeer remains were found in highly fragmented state¹; only a few limb bones were articulated. According to the archaeozoological studies, all parts of the

¹ Only 34.000 of more than 65.000 bones and bone fragments were found to be diagnostic (David *et alii* 2003, p. 86).

reindeer skeleton are proportionally represented and no preferential selection of the hunters is observed (David *et alii* 2003; Croitor 2010), a fact suggesting that animals were killed near the site (see also the discussion of similar cases in Baskin 2001). Skull fragments are not uncommon; jaws and teeth are found quite often. Some reindeer antlers are preserved in connection with pedicles, which in some cases are associated with larger broken skull portions (Fig. 3). Different skeletal parts of the reindeer characterized by sexual dimorphism show similar sex ratio (Croitor 2010), confirming the assumption that the whole migrating herd was slaughtered and complete (killed) reindeer individuals were brought to the butchering site. The completeness of the reindeer skeletal remains distinguishes this prey species from other large prey animals from Cosăuți (horse, bison, mammoth, and rhinoceros) that are represented at the site only by a few bones of certain parts of the skeleton.

Cultural layer number	Bone and bone fragments number			% of reindeer skeletal remains
	total number	reindeer remains	other species remains	
1	1 990	1 794	196	90.15
2	4 249	3 830	419	90.13
3B	6 113	5 810	323	94.73
3	12 493	12 070	423	96.61
3A	2 937	2 817	120	95.91
4	2 210	1 529	681	69.18
5	945	795	150	84.12
6	2 933	1 712	221	92.46
7	48	24	24	50
8	67	63	4	94.02
Total	34 005	31 444	2 561	

Table 1. Number of bones of reindeer and other animal species from the cultural layers at Cosăuți.

The age composition of the reindeer remains from Cosăuți indicates the presence of individuals of different age classes: from very young (several weeks) to 10–12 years old individuals. According to David *et alii* (2003, p. 93), the lack of bones of newborn calves indicates that reindeer were not seen in the vicinity of the Cosăuți camp during the calving season and immediately after calving; this period probably corresponded to the season from the end of May to the second half of August. This observation is consistent with the data on the sex composition of the reindeer remains from this site, confirming that the hunting took place in the autumn, during the seasonal migrations of reindeer. The demographic structure of the reindeer remains from Cosăuți indicates that the hunting strategy did not have any selective character. About three-quarters of the whole sample of the reindeer bones from Cosăuți belong to females (for example, 76% of the talus bones), a ratio that is very close to the demographic structure of the modern tundra reindeer herd during seasonal migrations (Croitor 2010, 2018). Therefore, the demographic profile of the reindeer sample from Cosăuți has a "catastrophic" character, which suggests that the hunters slaughtered the whole herd while crossing the Dniester.

GEOGRAPHICAL CONDITIONS OF THE DNIESTER RIVER CROSSING NEAR COSĂUȚI

The site of Cosăuți is located on the first terrace level above the floodplain, closer to its rear seam, at the junction of two river valleys, the Dniester and the Iorjnița (Fig. 1). The annual autumn migrations of reindeer herds have been an important factor for the livelihoods of the Palaeolithic hunting communities from Cosăuți. The reindeer migrations represented a part of the annual biological cycle similar to that of the modern tundra reindeer (Flerov 1952; Baskin 2001). The reindeer of the Paleolithic epoch migrated every year during the autumn season from the periglacial area in the north to the winter pastures in the south covering the area of the Transnistrian Upland, the North Moldavian plateau and the Bălți Plain. The direction of the annual reindeer migrations remained unchanged, although the choice of the migration path, possibly, was periodically adjusted. Nonetheless, the variants of reindeer migration paths were limited by a restricted number of available Dniester River crossings. The middle part of the Dniester River represents an important geographical obstacle due to its canyon-like valley with steep high banks. However, in the vicinity of the modern villages of Galjbyivka and Ţekinovka (Yampol district of Vinnița Region, Ukraine), the terrain is somewhat different and represents a favourable natural choice for the reindeer herds corridor from the north along the valley of the Murafa River (the left tributary of the Dniester) with access to the low Dniester bank with a large shoal of the Iorjnița River (Dniester's right bank tributary) on the opposite side of the Dniester. After

overcoming the fluvial obstacle, the ascent to the plateau was difficult due to the steep (up to 50°) landslide slope 110-115 m high, the foot of which coincides with the surface of the first terrace above the floodplain, currently occupied by the Cosăuți village (Soroca Region, Moldova). The passage for the reindeer was only open upstream the narrow valley of the Iorjnița River. A promising hunting strategy was to ambush and attack reindeer herds on the coastal area near the Iorjnița shoal, where the main group of hunters was probably located, as well as downstream of the river behind the shoal where the auxiliary group of hunters could have been situated.

Hunting weapons from Cosăuți

A successful hunting of reindeer herds on a river crossing requires a set of appropriate hunting weapons. The reindeer hunting camp from Cosăuți² was repeatedly visited by ancient hunters during the autumn-winter seasons and most of the archaeological finds indicate the specific function of this camp. Almost four dozens of specific hunting artefacts have been discovered at the site of Cosăuți (Covalenco and Croitor 2016).

Lances equipped with projectile points made of the longitudinally split epiphyses of horse long bones were the simplest type of weapon at the Cosăuți site. These projectile points were hafted on 3–5 meter shafts and were able (with the lower end fixed on the ground) to resist the frontal onslaught of an adult reindeer male. Similar lances (dagger-like objects, pikes) were also found at many Middle Dniester Upper Palaeolithic sites. First of all, there are the finds from layer 4 of Molodovo-V (Chernysh 1961, p. 102–103, Fig. 36: 2, 4) and layers 5a, 4, and 3 of Cormani-IV (Chernysh 1977, p. 42–43, fig. 22: 5; 46, 49, fig. 23: 19; 54–55, fig. 27: 26–27). The more advanced variants of piercing weapon heads from Cosăuți have a standard peak shape (points) and were made of medium-sized reindeer antler beams (the part of the antlers that form the main antler axis), poorly profiled, commonly S-shaped, 22.5–37.5 cm long (Fig. 4: 10). The blades of such projectile points are narrow, pointed in profile, symmetrical, shaped by intensive abrasive polishing on both sides. The hunting weapons from Cosăuți are peculiar in their longitudinal grooves hollowed out at the ridges of the ribbed edges on the opposite sides of the projectile point. Those grooves attain from a half to one-third of the artifact's total length. The grooves are rather shallow, with broad sloped boards, therefore they could not be used for fixing flint inserts. The most probable function of those grooves was to drain the prey blood. There are also simplified versions of projectile points without grooves; they are semicircular at the end and lens-shaped in cross-section, with a striking blade carefully polished from both sides. It is unlikely that this type of artefacts ending with the semicircular blade was used as projectile points for throwing weapons: they are too massive, lacking the weight balance due to their disproportionate bending, and are characterized by particular marks of wear on the left-side of the blade.

A large variety of throwing hunting weapons (spears and darts) were used to defeat reindeer from the shore at a distance of up to 20 meters or even more. Most of the spears and darts were made of reindeer antler beams with diameters varying between 3 and 5 cm. The spears and darts were equipped with projectile points made of bone (12 specimens), antler (7 artefacts), and ivory (2 artefacts). This is the most numerous and diverse category of hunting weapons that consist of several types. The most common type is represented by the spindle-shaped projectile points with symmetrical outlines, 11-20 cm long and well-adjusted in weight (Fig. 4: 1, 2, 4–6). Their surface is carefully shaped and often polished. This type of projectile points is characterized by circular cross-section. In two cases, the projectile points have a partially flattened side, on which a shallow groove is carved out. The analogies of this type of projectile points are quite numerous. First of all, we have to mention the similar projectile points from the Late Upper Paleolithic sites previously attributed to the "Magdalenian time" (Chernysh 1961, p. 92–93, 102, 113–115; Chetraru *et alii* 2007, p. 117–119; Stanko *et alii* 1989, p. 71–75; Shovkoplyas 1965, p. 207–209).

Some rare forms of projectile points are worth of special attention. First of all, we distinguish the flattened projectile points with their broadest part displaced from the middle to the distal end. It would seem that such a specific shape should have caused a corresponding shift in the centre of gravity, but the projectile point balance is maintained due to the thicker and elongated step for hafting (Fig. 4: 3). The length of these projectile points is about 12 cm, the cross-section of the blade is lens-shaped, becoming oval at the middle of the blade, and circular at the base

² During long-lasting studies of this site, more than 200 bone, antler, and ivory artefacts with use wear marks were discovered. A part of those artefacts corresponds to the standard set of tools known from other Upper Paleolithic sites. Most of the artefacts from Cosăuți are made of reindeer antlers and skeletal remains. Bison and horse bones served quite seldom as source of raw material (7% and 6%, respectively). The reindeer limbs bones (43%) and antlers (40%) were used at Cosăuți most frequently for artefact production, while the axial skeleton bones (ribs, vertebrae) were used only for 8% of artefact manufacturing. One can assume that preference was given to shed antlers characterized by higher density. Mammoth tusk, reindeer and red deer teeth, polar fox canines, as a rule, were used to make adornments. In our opinion, the manufacture of piercing and throwing weapons was one of the most labour-demanding types of bone carving production.

of the blade. Two projectile points with a thickened leaf-shaped body and a short flattened hafting step can be considered “exotic”. In one case, there is a short projectile head with a refined point and a series of embossed projections (Fig. 1: 11); the second artefact is more elongated, tetrahedral in cross-section, with shallow longitudinal grooves on each of the four sides (Fig. 4: 7). In appearance, the latter artefact is similar to the large four-groove arrowhead from Anetovka-II (Stanko *et alii* 1989, p. 70, 73, fig. 38: 1). However, the finding from Anetovka is not flattened with leaf-like outlines, and its hafting part was split. Moreover, only two of its grooves extend along the entire arrowhead length, while the other two grooves are cut only at the arrowhead’s base. The spindle-shaped projectile point with four longitudinal grooves is mentioned among the finds from layer 3 of Molodovo-V (Chernysh 1961, p. 113–114, fig. 40: 10). But the projectile point in question is made on an ivory rod circular in cross-section, the base of which has been lost, and the grooves resemble narrow slots, quite different from the side grooves on the specimens from Cosăuți. One of the longest (up to 34.5 cm) projectile points from Cosăuți (Fig. 4: 9) has an extraordinary aspect due to its long and rather typical conical hafting part and well-defined leaf-shaped and lenticular cross-section blade.

The aerodynamic characteristics of the throwing weapons from Cosăuți ensured hitting the target at a distance of up to 35 m (for darts and light spears) or up to 25–30 m (for medium-sized specimens). The experimental studies demonstrated that the maximum hitting accuracy and penetrating power of the throwing weapons from Cosăuți were achieved at the distance of 10–15 m from the target. The relatively low weight of most projectile points served for the precise hit of the target rather than for the increase of the dart or spear-throwing distance. The precise targeting of a swimming reindeer was important, since an occasional damage of the animal's lungs may have let the lung air out of the thoracic cavity and thus cause the prey to drown (Zaliznyak 1989, p. 96). In this case, harpoons were used to pull out the sunken prey. The large expenditures of labour and time for harpoon manufacturing were largely compensated by the possibility to control the movement direction of the swimming reindeer, and the possibility to pull the wounded animal to the shore using the harpoons. We have at our disposal only one harpoon (Fig. 4: 8) from the first cultural layer at Cosăuți dated back to 17.200 ± 300 BP (GIN-4146). Its large size provided a strong striking capacity, while the two scalloped sides did not allow it to fall out of the wounded prey. The hole in the diamond-shaped base of the harpoon ensured the possibility to hold the hunted animal with a cord threaded through the hole. A similar but somewhat smaller harpoon made of antler was yielded by the layer 1a of the Molodovo-V site (Chernysh 1987, p. 75–76, fig. 36). This specimen provided a radiocarbon date of $10\,590 \pm 230$ BP (GIN-7). The flat two-row harpoons are known from layer 3 of the Cotu-Miculinți site in the Middle Prut area, Romania (Brudiu 1980; Borziac *et alii* 2006, p. 165, fig. 112: 8). The harpoons from Romania are characterized by a smaller size, were less elaborated, and the hole shifted to the harpoon’s centre. Therefore, the harpoons from Cotu-Miculinți are closer to the rotary-type harpoons. We disagree with I.A. Borziac’s statement (1991, p. 45) that the harpoon from Cosăuți was used exclusively for fishing. In our opinion, the Upper Palaeolithic harpoons should be regarded as an important component of the hunting equipment; in particular, the harpoons discovered at the seasonal Late Palaeolithic sites interpreted as “reindeer hunting camps”. The thorough and meticulous modelling, the complexity of the construction, and the presence of the decorative elements suggest that the Dniester harpoons held great value and served as weapons of individual use. According to the ethnographic data, the use of harpoons is recorded equally during coastal and boat hunting (Fletcher 2015, p. 3–8). In this regard, the characteristics of harpoon hunting from boats are interesting, since this strategy significantly increases the efficiency of the hunting trade.

CONCLUSIONS

The geographical location of the Late Palaeolithic site at Cosăuți and the specific character of the annual biological cycle of reindeer permit to advance new interpretations and explanations for the particular archaeological and archaeozoological characteristics of this Palaeolithic site. The review of the Cosăuți assemblage provides a new interpretation of this multilayer archaeological monument associated with the specialized hunting of reindeer as one of the special types of the seasonal sites characteristic of the Late Upper Palaeolithic from the Middle Dniester. The geographical location of the site at Cosăuți most probably was conditioned by the annual migration path of the reindeer herds. The hunting strategy, correspondingly, was represented by the ambush and attack of reindeer herds on the coastal area near the Iorjnița shoal during the crossing of the river by the migrating reindeer herds. The hunting weapons from Cosăuți represent a set of weapons (projectile points, piercing weapons, spears, harpoons, etc.) necessary for an effective ambush attack, the hitting, and the pulling the prey out of the water. Taking into account the specific character of the site function and the hunting weapon assemblage, we propose to apply the term

"reindeer hunting camps" to the specific Late Upper Palaeolithic sites of the Middle Dniester specialized on the hunting of the migrating reindeer herds.

REFERENCES

- Baskin 2003 – L. M. Baskin, *River crossings as principal points of human/reindeer relationship in Eurasia*, *Rangifer* 14, 2003, p. 37–40.
- Borziac *et alii* 2006 – I. Borziac, V. Chirica, M. Văleanu, *Culture et sociétés pendant le Paléolithique supérieur à travers l'espace carpato-dniestréen*, Iași, 2006.
- Borziac 1993 – I. Borziac, *Les chasseurs de renne de Kosoutsy, site paléolithique tardif à plusieurs niveaux, sur le Dniestr Moyen*, *L'Anthropologie* (Paris) 97, 1993, p. 331–336.
- Borziac 2008 – I. Borziac, *Paleoliticul superior din spațiul Carpato-Nistrean (cronostratigrafie, cronologie și periodizare culturală)*, Autoreferat al tezei de doctor habilitat în științe istorice, Chișinău, 2008.
- Borziac 1991 – I. A. Borziac, *On the time of the origin of fishing in the South-West of the USSR*, in: N. A. Ketraru (ed.), *Economic complexes of ancient societies of Moldova*, Chișinău, 1991, p. 39–46 (in Russian).
- Brudiu 1980 – M. Brudiu, *Prelucrarea oaselor și coarnelor de ren în așezarea paleolitică de la Cotu Miculinți (jud. Botoșani)*, *SCIVA* 31, 1980, 1, p. 13–22.
- Chernysh 1961 – O. P. Chernysh, *The Paleolithic site Molodove V*, Kyiv, 1961 (in Ukrainian).
- Chernysh 1977 – O. P. Chernysh, *The multi-layered Paleolithic site of Corman IV and its place in the Paleolithic*, in: G. I. Goretsky, S. M. Zeitlin (eds.), *The multilayer Paleolithic site Corman' IV on the Middle Dniester*, Moscow, 1977, p. 7–77 (in Russian).
- Chernysh 1987 – O. P. Chernysh, *The multilayer reference site of Molodova V. Archeology*, in: I. K. Ivanova, S. M. Zeitlin (eds.), *The multilayer Paleolithic site Molodova V. Stone Age people and their environment*, Moscow, 1987, p. 7–93 (in Russian).
- Chetraru *et alii* 2007 – N. A. Chetraru, G. V. Grigorieva, S. I. Covalenco, *The Upper Paleolithic site Rashkov VII*, Chișinău, 2007 (in Russian).
- Covalenco, Croitor 2016 – S. Covalenco, R. Croitor, *Bone, Antler and Ivory Weapons from the Multilayer Late Palaeolithic Site Cosăuți, Middle Dniester Area*, *StratumPlus* 1, 2016, p. 121–135 (in Russian).
- Croitor 2008 – R. Croitor, *On a find of the bison mandible from the third layer of the Late Paleolithic site Cosăuți*, *Revista Arheologica* 4, 2008, 1, p. 209–215 (in Russian).
- Croitor 2010 – R. Croitor, *The History of Reindeer in the Palaeolithic of Moldova*, *StratumPlus* 1, 2010, p. 137–165 (in Russian).
- Croitor 2018 – R. Croitor, *Paleobiology as a clue to Paleolithic taphonomy: the case of reindeer hunting in Moldova*, *Quaternaire* 29, 2018, 1, p. 81–86.
- David *et alii* 2003 – A. David, A. Nadachowski, V. Pascaru, P. Wojtal, I. Borziac, *Late Pleistocene mammal fauna from the Late Palaeolithic butchering site Cosăuți 1, Moldova*, *Acta Zoologica Cracoviensia* 46, 2003, 1, p. 85–96.
- Flerov 1952 – K. K. Flerov, *Musk deer and deer. The Fauna of USSR*, *Mammals* 1 (2), Moscow-Leningrad, 1952 (in Russian).
- Fletcher 2015 – P. Fletcher, *Discussions on the possible origin of Europe's first boats – 11.500 BP*, *Atti della Accademia Peloritana dei Pericolanti Classe di Scienze Fisiche, Matematiche e Naturali* 93, 2015, 2, A1–18.
- Shovkoplyas 1965 – I. G. Shovkoplyas, *The Mezinskaya site*, Kyiv, 1965 (in Russian).
- Stanko *et alii* 1989 – V. N. Stanko, G. V. Grigorieva, T. N. Shvaiko, *The Late Paleolithic settlement Anetovka II*, Kyiv, 1989 (in Russian).
- Zaliznyak 1989 – L. L. Zaliznyak, *Reindeer hunters of the Ukrainian Polissya of the final Paleolithic epoch*, Kyiv, 1989 (in Russian).

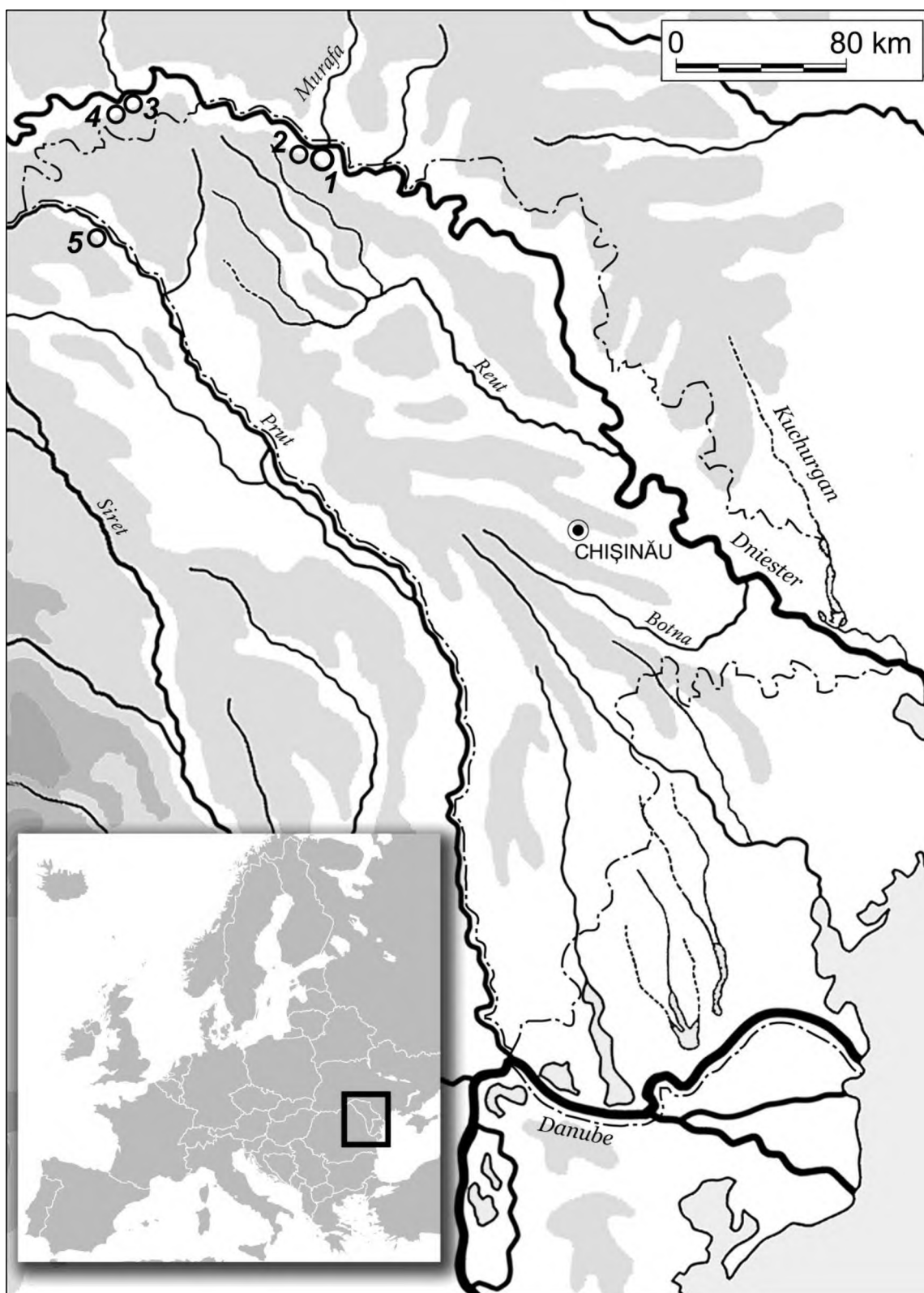


Figure 1. Geographical position of the Late Paleolithic sites mentioned in the article: 1, Cosăuți; 2, Podgori; 3, Cormani IV; 4, Molodova V; 5, Cotu Miculinți.

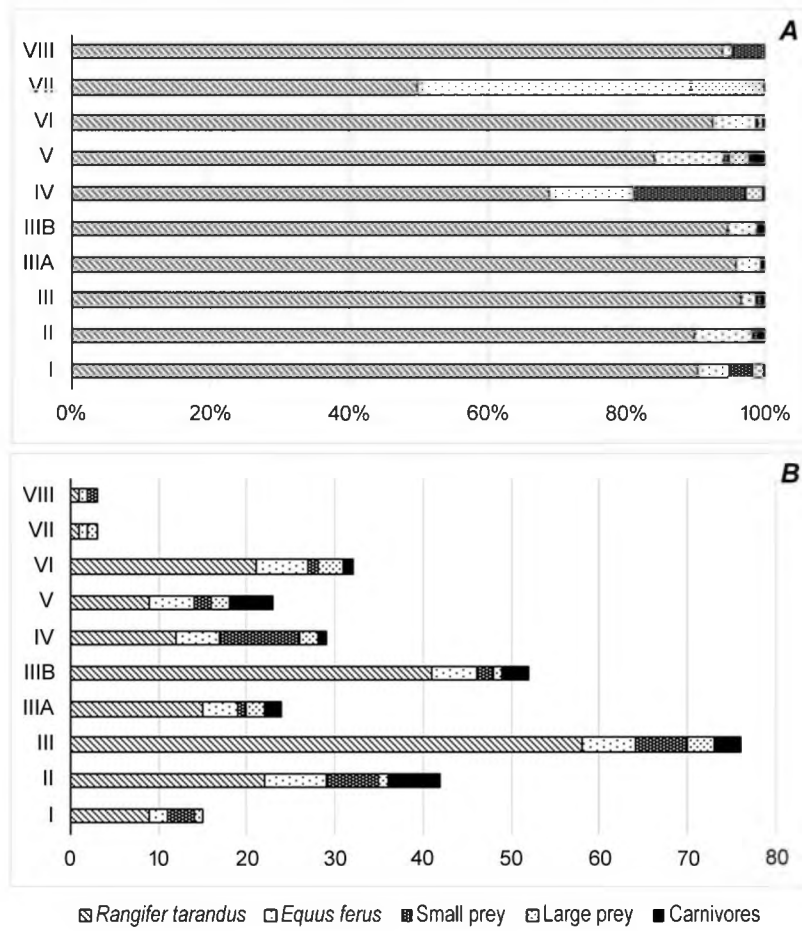


Figure 2. Graphical representation of the prey species remains from the Late Paleolithic site of Cosăuți according to cultural levels: **A**, the composition of animal skeletal remains according to their number; **B**, the minimum number of individuals. The category of "small prey" animals includes *Lepus*, *Ochotona*, and *Marmota*; the category of "large prey" includes *Mammuthus*, *Coelodonta*, and *Bison*.

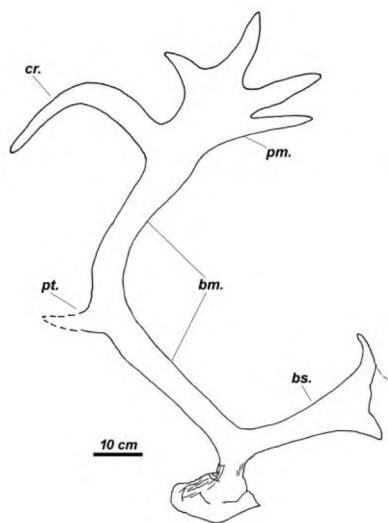


Figure 3. The almost complete male antler of *Rangifer tarandus constantini* from Cosăuți: **bm.**, antler beam; **bs.**, basal tine; **pt.**, posterior tine; **cr.**, crown tine; **pm.**, distal palmation.

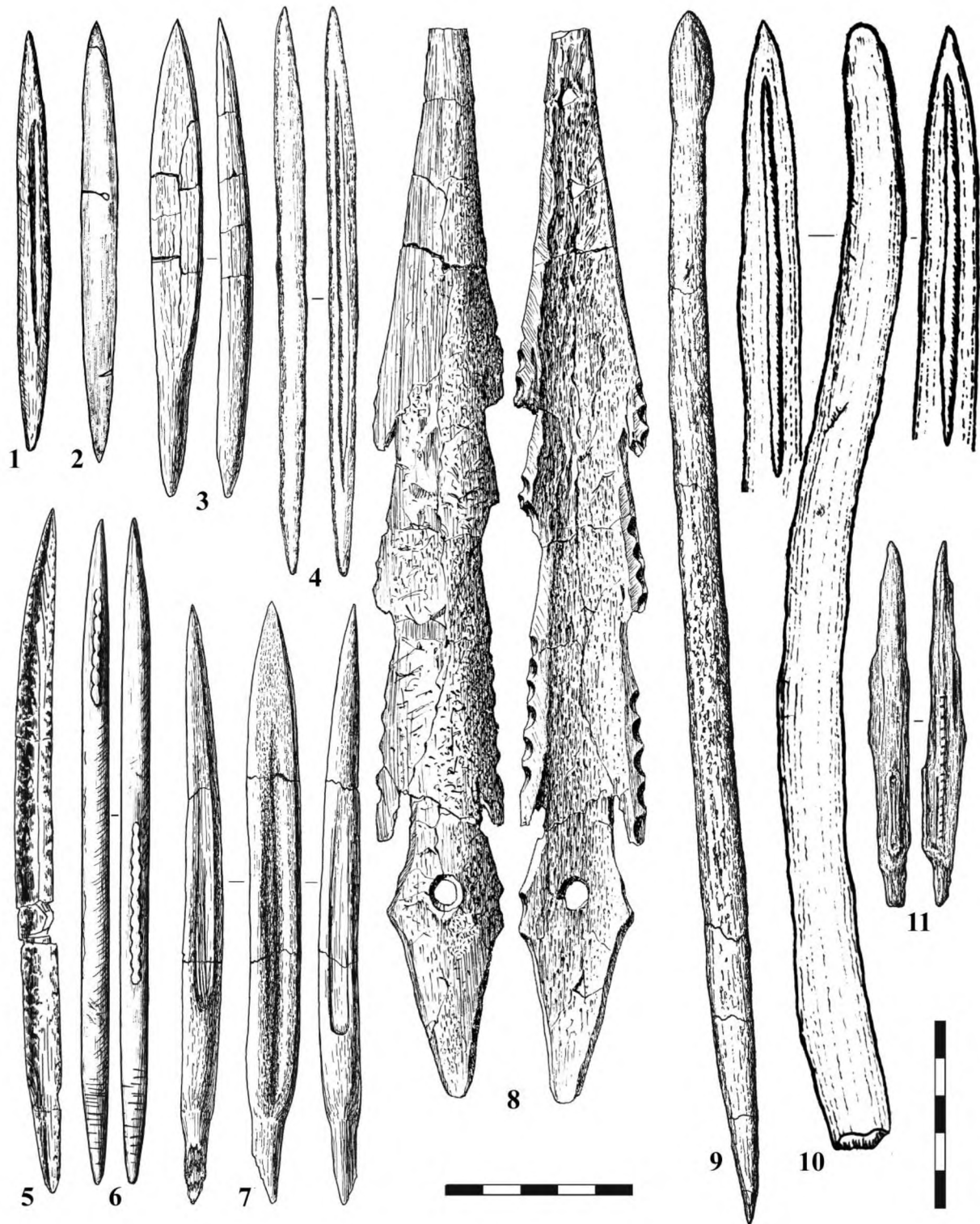


Figure 4. The main types of projectile points for hunting weapons from Cosăuți: 1, spindle-shaped projectile point with longitudinal furrows; 2, spindle-shaped projectile point; 3, flattened projectile point; 4, long spindle-shaped projectile point with longitudinal furrow; 5, long spindle-shaped projectile point; 6, spindle-shaped projectile point with transversal ring-shaped notches; 7, tetrahedral in cross-section projectile point with longitudinal grooves; 8, harpoon; 9, projectile point with a leaf-shaped blade; 10, piercing weapon with longitudinal grooves; 11, projectile point with a series of embossed projections.