The Use of Wood at the Zamostje 2 Site

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Abstract

Prehistoric sites preserved in the waterlogged environments of northern Europe, the Baltic region, and Russia possess a number of common features related to the specifics of their locations in prehistoric times and the later conditions of their preservation. The lake settlements of the forest zone of European Russia did not undergo any drastic changes in their economy based on hunting and fishing during most of the Mesolithic and Neolithic periods. The importance of fishing can be understood by studying the remains of wooden items from such sites, which include utensils like paddles, floats, and nets, as well as fish traps and other fishing constructions. The comprehensive analysis of wooden artefacts enables not only a detailed reconstruction of woodworking traditions and techniques at the sites, but also the reconstruction of the surrounding landscape, as exemplified by recent studies made at the Zamostje 2 site (Sergiev Posad district, Moscow region, Russia). This article presents the results of these studies. The assemblage of wooden artefacts – with more than 300 items – and fishing structures (fish traps, weirs, and fish screens) found at the Zamostje 2 site currently represents a unique opportunity to assess not only the role of wood in hunter-fisher societies during the Mesolithic and Neolithic periods in the forest zone of eastern Europe, but also the scientific potential of this fragile find material category.

1 Introduction

In Stone Age archaeology, waterlogged sites are a very rare encounter. They show an astonishing level of artefact preservation due to their location in waterlogged areas of prehistoric shores or within and at the bottom of water reservoirs. The economy based on the active use of water resources – sea, river, or lake – is not the only common feature of these settlements or locations of special economic activities (primarily fishing): the fundamental peculiarity of such sites is the availability of a unique information source, namely wood. This is because wood and plant fibres can be preserved only in the anaerobic environment provided by some bog, lake, or sea deposits. The humidity and chemical environment further define the degree of preservation of these fragile organic materials.

One of the best sources of Mesolithic and Neolithic wooden artefacts and constructions in eastern Europe is the material excavated at the Zamostje 2 site (Sergiev Posad district, Moscow region, Russia) by the authors in 1989–1991, 1995–2000, and 2010–2014 (see also Lozovski & Lozovskaya, this volume). This paper discusses the wooden materials

Figure 1. Locations of Mesolithic and Neolithic settlements with wooden artefacts. Drawing: F. Myachin, modified by O. Lozovskaya.

from Zamostje 2 by presenting the typology of wooden items and studying the woodworking tradition by analysing the used technology, as well as the selection of raw materials. Also some comparative material is presented.

2 Mesolithic and Neolithic wooden assemblages in European Russia

The vast forest territories of European Russia (with the Urals acting as the eastern boundary) have revealed only very few Stone Age sites with preserved wooden tools and/or remains of wooden constructions (Fig. 1). Antrea Korpilahti, located on the Karelian Isthmus and within present-day Kamennogorsk, is one of the earliest known sites. In the autumn of 1913, some Stone Age finds were made here, and in the following year, the excavations by the Finnish archaeologist Sakari Pälsi revealed more finds, including the remains of a willow bark net and 18 pine bark floats (Pälsi 1920). The find is dated to ca. 8650–8440 calBC according to radiocarbon dates obtained from two bark floats and one piece of net cord (Miettinen et al. 2008).

The Veret'ye 1 settlement (excavated by Svetlana Oshibkina in 1978–1985 and 1988–1989) is located at Lake Lacha (eastern Oka River region) and dates from 8500 to 7200 calBC. According to the excavator, it is likely to have been inhabited in the first half of the Boreal period (Oshibkina 1997: 145–146; 2006: 26–27). The site revealed 372 wooden artefacts, including multiple arrowheads and shafts, spears, and barbed points, as well as bows made of coniferous species. Among the most significant finds is the collection of axe handles with egg-shaped sleeves and straight, bent, or curved handles, as well as ornamented and zoomorphic artefacts (Oshibkina 1997). The most northern site is the Vis 1 peat bog, excavated by Grigoriy Burov in 1960–1967. It is dated to ca. 7300–5800 calBC (Burov et al. 1972), and is well known for the 31 hunting bows and pieces of ski and sledge runners; a total of 173 wood finds were made there (Burov 1981; 2009).

In addition, Mesolithic wooden tools have been found at some sites in the Volga and Oka regions, such as Ivanovskoye III and IV, Stanovoye 4, Okayëmovo 5, and Ozerki 17.

Figure 2. Location of the Zamostje 2 site: a – view of the Dubna River floodplain; b – excavations (1997) at the channelised river bank. Photos: a O. Lozovskaya, b D. Ramseyer.

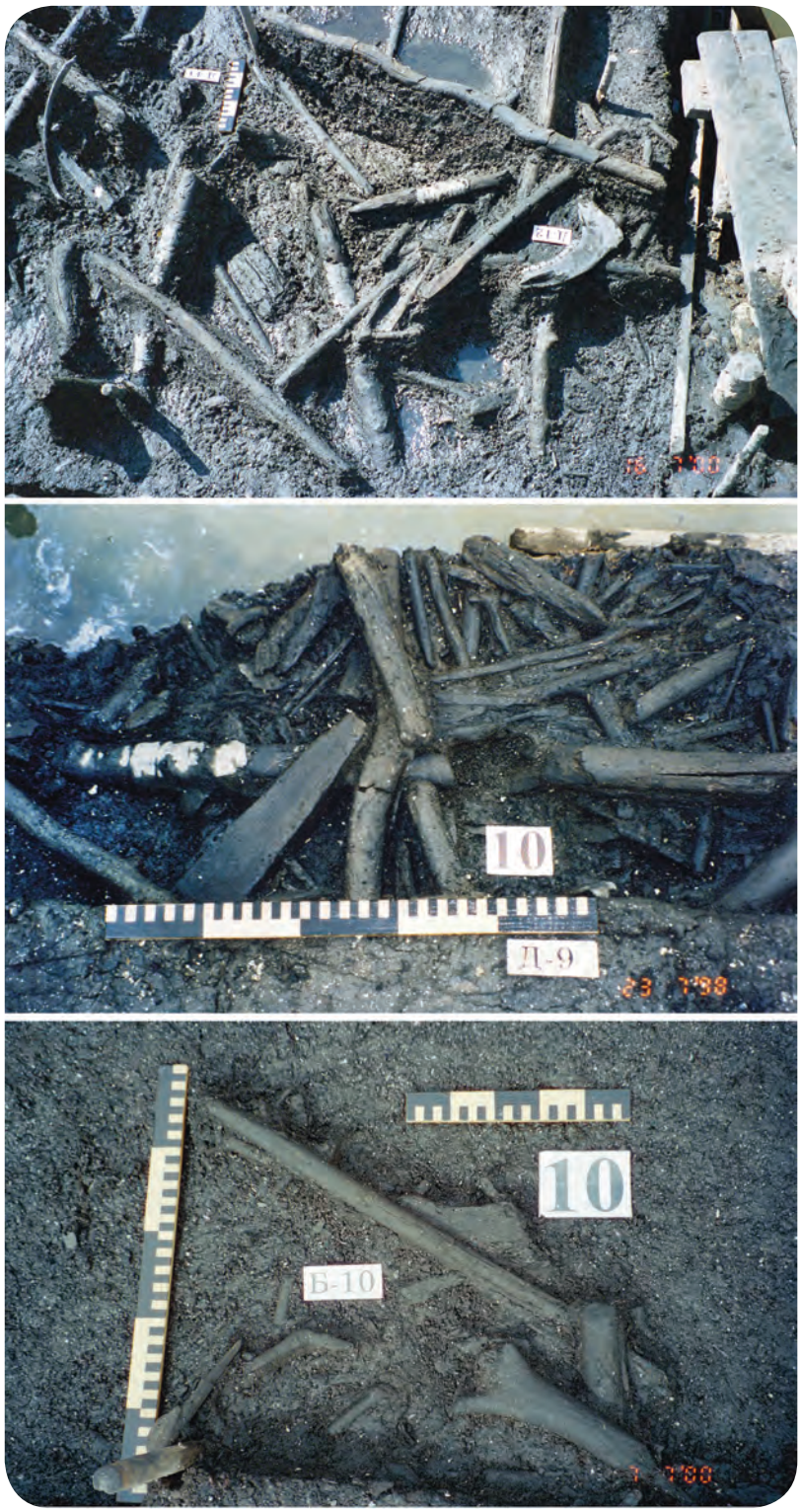

Figure 3. Zamostje 2. Wooden remains on the surface of the lower Mesolithic layer (excavations 1998 and 2000). Photos: O. Lozovskaya.

Excavations were carried out in various years by Dmitriy Kraynov, Mikhail Zhilin, and Elena Kostylëva (Kraynov et al. 1995; Zhilin 2004). Yet only a limited number of artefacts was found, consisting mainly of floats, paddle fragments, and zoomorphic figures. The Sakhtysh group of settlements revealed some Mesolithic items (Averin et al. 2009) and a number of Middle Neolithic tools (Sakhtysh 1), including ladles with duck-head-shaped handles, mallets for nuts, and fragments of paddles. Excavations were led by Dmitriy Kraynov in 1970–1975 (Gurina & Kraynov 1996). At some sites (Stanovoye 4, Sakhtysh 2a), archaeologists have also discovered remains of fish traps and other constructions.

Settlements in north-west Russia belong to the sphere of central European pile dwellings, and their cultural context is linked to the famous Middle and Late Neolithic sites in the Baltic States (Sārnate, Šventoji, Zvidze). Of importance is also the Usvyaty IV settlement, excavated by Aleksandr Miklyaev in 1963–1967. Wooden tools discovered here include a large number of mallets for processing water chestnut (*Trapa natans*), vessels, axe shafts, and a paddle with a figured handle (Miklyaev 1971). Similar tools were also found at the Naumovo (Miklyaev & Semenov 1979) and Serteya II settlements (excavations by Aleksandr Miklyaev and Andrey Mazurkevich), including several axe shafts and composite sleeves (Mazurkevich et al. 2010).

Other important Neolithic wetland sites include Modlona, Repishche IV, Voymezhnaya I, and Karavaikha 4, as well as Okhta 1 in the centre of St Petersburg. Yet another site in the Volga–Oka area has become a valuable source of information related to wooden artefacts and woodworking, namely the multilayer lake settlement of Zamostje 2, which is presented here in detail.

3 The Zamostje 2 site

3.1 Location, stratigraphy, and wooden remains

The Zamostje 2 site is located in the northern part of the Moscow region, in the centre of an ancient lake depression, which is now occupied by the Dubna River floodplain and its artificial channel (Fig. 2). In prehistoric times, the site was situated on a cape between two large post-glacial water basins (Lozovski et al. 2014). The economic activities of the ancient inhabitants were connected to the gradually overgrowing lake and riverside forests (see Lozovski et al. 2013a). Wooden tools and long-time constructions, mainly fishing-related, played an important role in the ancient economy.

A hunter-fisher site had existed in this place since the very beginning of the Atlantic period, when gradual lowering of the cyclically fluctuating water level resulted in periodic drying of the area. The lowest Late Mesolithic cultural layer is dated to ca. 7000–6500 calBC and the upper Late Mesolithic layer is dated to ca. 6200–6000 calBC. The beginning of the Neolithic in the Russian forest zone is traditionally associated with the appearance of pottery production, because the productive economy appeared there only at the end of the Bronze Age. The Early Neolithic is dated to ca. 5800–5200 calBC, and the Middle Neolithic is dated to 4900–4300 calBC.

Wooden remains from Zamostje 2 can be divided into three main categories: 1) broken sticks, branches, and wood chips – filling of the cultural layer (Fig. 3). No technological traces were left on these items, but their appearance at the site is due to human activity, according to Lyudmila Abramova, a Moscow State University specialist in the botanic analysis of peat bogs (Ershova 2013: 183); 2) fishing constructions, including fish traps (Fig. 4: 1) and screens made of long splinters, as well as numerous piles of fish fences, and 3) wooden tools, which, alongside bone and flint artefacts, are an important source of information about

Figure 4. Zamostje 2. 1 – Remains of Early Neolithic fish traps (excavations 2011–2013); 2 – Early Neolithic paddle among fish trap splinters; 3 – Annual rings on a section of an Early Neolithic paddle handle; 4–5 – Net knots (No 22 and 23); 6 – Late Mesolithic paddle fragments; 7 – Paddle fragments during excavation works (1990). Photos: 1–6 O. Lozovskaya, 7 V. Lozovski.

artefact typology and woodworking technology (Lozovskaya 2008; 2009; 2011; Lozovskaya & Lozovski 2013).

In addition to fishing constructions, in recent years the authors have found remains of nets, namely 70 isolated knots of plant fibre (Fig. 4: 4–5); a ^{14}C date taken from two small pieces place them in the Final Mesolithic layer (7087±45 BP; Ua-50259). The mesh size is unknown. All knots, apart from a simple one, are sheet bend knots. This knot type is common in net making even today. In thread twisting or the cabling of two threads, the S direction is dominant (60%), the Z direction is rare (10%), and in other cases, the fibres are straight. Similar knots were used to make nets also, among others, at Antrea and Vis 1.

In the following, the wooden assemblage of Zamostje 2 is presented. At first, the typological division of tools is given, followed by the technological study of the artefacts. After this, the selection of raw materials – both for tools and for fishing constructions – is presented, and, finally, these results are briefly compared with data from recent pollen analyses.

3.2 Wooden tools – typology

In the course of the excavations, the authors found more than 300 wooden tools, most of them belonging to the Late Mesolithic layers, that is, the most favourable period for artefact preservation. On typological grounds, the collections feature:

- Egg-shaped removable sleeves of axes/adzes (Fig. 5: 3). This hafting type was widely used in northern Europe during the Boreal period (Lozovskaya 2012: 96–98);

- Angular adze handles of two types: with and without a stop. These finds are similar to some Alpine Neolithic artefacts; no parallels are known in Russia to date;

- A number of paddles of different types (Fig. 4: 6–7), including a willow-leaf-shaped blade, a blade with 'shoulders', a broad blade with a two-sided end, and one blade with a pointed end. These finds differ from every other known Mesolithic paddle in the region, including finds from Okayëmovo 5 (Zhilin 2004: Fig. 50: 1). The Early Neolithic paddle found in association with one of the fish traps (Fig. 4: 2) and dated to ca. 5600 calBC (6676±47 BP; CNA-1342) possesses a large asymmetric blade (Lozovski et al. 2013b: Figs. 9 & 10);

- Egg-shaped floats with off-centre holes (Fig. 5: 5–6). These artefacts have a different shape compared to all parallels within the region (Zhilin 2004: Fig. 24);

- A unique fish hook from the Early Neolithic layer (Lozovskaya 2012: 91–93);

- Removable arrowheads (Fig. 5: 8–9), which have no prototypes in the bone toolkit, and a dart tip of uncommon shape (Lozovskaya 2011: Fig. 2: 1; 2012: 89, 91–92)

- Tiny wooden spoons with a shaped handle (Fig. 5: 7) and flattened bowls (Early Neolithic), as well as a ladle blank and a fragmented dish (Mesolithic layers), constitute a unique set of vessels from the Late Mesolithic and Early Neolithic (Lozovskaya 2011: 18, 20; 2012: 92–94);

- Zoomorphic figures and decorated planks with ornaments (Fig. 5: 1–2). Such finds are a common feature at Mesolithic sites in eastern Europe (Lozovskaya 2012: 94 Fig. 2: 1–3): for example, decorated artefacts have been found at Veret'ye 1 (Oshibkina 1997: Fig. 97, 100, 115). It is worth mentioning that all three wooden sculptures from Zamostje 2 – a bird, a snake, and a boar head (Fig. 5: 4, 10–11) – are individual, illustrative pieces, not just parts of other artefacts, and differ both thematically and stylistically from other traditional zoomorphic symbols at the site (elk head, duck silhouette, etc.);

- Sledge runner with a non-centred rib and eight rectangular strap holes (Fig. 6: 11);

- In addition, the material includes flattened points, tools with blunt heads, objects with expressive forms, and other tools of unknown function.

Generally, wooden findings from Zamostje 2 are characterised by only a small amount of tools related to hunting equipment, which distinguishes them from earlier Mesolithic sites of the forest zone, such as Veret'ye 1. On the other hand, fishing equipment includes plenty

Figure 5. Zamostje 2. Wooden implements from Mesolithic (1–6, 8–11) and Early Neolithic (7) layers. Photos: 1 E. Girya, 2–11 O. Lozovskaya.

of paddles with high typological diversity. All in all, the typological profile of the Zamostje 2 wooden items is pretty unique, although some tool types reflect specific European tendencies and inventions (axe handles, sleeves, and vessels).

3.3 Wooden tools – technological study

Technological analysis of the wooden tool production process helps in acquiring an idea of the cultural peculiarities and technological skills of ancient people. It includes two main aspects: working techniques and material selection (see below). Tool production and working techniques were reconstructed based on the comparison of traces on the surface of wooden artefacts: traces on prehistoric wooden artefacts were compared with the ones resulting from experiments using replicas of stone and antler tools similar to the ones found at Zamostje 2 (given their functional determinations) (Lozovskaya & Lozovski 2013). Conclusions are based on the analysis of over a hundred artefacts with remains of diagnosable technological traces. The following core operations were common:

- Chopping and adzing. No less than 60 items with negatives inflicted by stone axes or adzes were identified (Fig. 6: 2–6). The tools were used to finish ends of different shapes, using either a straight or shaped blade. Artefacts and blanks were also fragmented using controlled breakup, or wide surfaces were worked and flattened. These methods were also used in the production of small items, like zoomorphic figures. Adzes were mostly used to shape items in the lowest layer – this period is characterised by concave cutting negatives.

- Planing (Fig. 6: 13). Planing negatives are found much less frequently on wooden artefacts (total 20 items), which may also be the result of preservation problems. Narrow and long cutting negatives are likely to have been made by shafted blades or even inserts of a two-handed scraper. Most traces are found on long artefacts made of thin branches, and are always located along the grain.

- Scraping. Scraping traces are rare, and belong to the final surface working stage. Fine thread-like scratches, along and across the grain, are encountered on tiny artefacts in good condition (spoons, bowls, a hook, conical items) and date to the Late Mesolithic and Early Neolithic (Fig. 6: 9–10, 12).

- Cutting. Incisions or cross-cutting marks made by blades are found only occasionally and were used during the Mesolithic particularly to limit the worked areas or to make lateral notches, during the Early Neolithic to create relief shapes or details (Fig. 6: 8).

- Only one item shows the use of beaver incisors despite hundreds of tools made of the lower jaws with incisors found *in situ* at the site (Lozovskaya & Lozovski 2015). This item is a decorated blade from the Upper Mesolithic layer: short distinct cuts form a two-sided ornamental composition (Fig. 5: 2).

Hence, according to the analysis of technological traces, the inhabitants of the Zamostje 2 site used various technical operations in the production of wooden artefacts. A noteworthy feature is the high proportion of products with traces of rough 'primary' working on the ends and surfaces by an adze. Planing was very popular too, but only a few examples of cuts along the grain were preserved. Scraping and cutting were uncommon, and are found mainly in the Early Neolithic layer. Traces of working with beaver incisors are seen on only one object, but it should be taken into account that not all traces of various modified edges were identified. No traces of drilling, scraping grooves, sawing, bending, or burning were noticed. On the other hand, techniques used for surface shaping, among others for producing spherical sleeves and cavities/holes, remain unknown due to abrasion and other preservation-related issues.

Even though most operations were multipurpose, their combination reflects local traditions and skills. As a comparison, the set of techniques used at Veret'ye 1 is slightly different (Lozovskaya & Lozovski 2013). For example, adze and axe traces are less explicit and fewer in number there (Fig. 7: 1–4). Also traces of end and surface finishing are encountered,

Figure 6. Zamostje 2. 1–10, 12–13 – Technological traces on the surfaces of artefacts; 11 – sledge runner (before conservation). Photos: 1–6 , 8, 11–13 O. Lozovskaya, 7, 9–10 E. Girya.

most likely related to initial working. Planing is the main working method at Veret'ye. It was used on different surfaces (shaped, spherical, lengthened), along (Fig. 7: 7–8, 11) and across the grain. Like at Zamostje 2, scraping played no individual role, and was applied to reshape tools; its traces have deep relief and overlap previous negatives (Fig.7: 5). Examples of cutting (by blade) include various cuts on arrowheads, sockets for strings (Fig. 7: 11–13), shaped cuts of harpoon barbs, and so forth. Beaver incisors were used to prepare sockets and holes (Fig.7: 6, 9–10) (Lozovskaya & Lozovski 2013: Fig. 6: 17–19). One long socket for inserts exhibits signs of the use of fire. No traces of drilling, sawing, or bending were found.

As further comparanda, the primary methods for producing wooden tools at pile dwellings (settlements) of north-western Russia during the Middle and Late Neolithic were planing and cutting – however, negatives of preliminary working rarely remain. The production of numerous shaped objects and small elements is typical. Scraping traces are well preserved, yet they are related mainly to the secondary processing of artefacts. Cutting traces are diverse and sometimes unexpected: for example, the internal surface of a boat and two vessels were cut with a blade. No traces of drilling, socket cutting, adze operations (including the use of beaver incisors), or artificial burning were found. Thus, each settlement or group of settlements is characterised by its own methods and traditions of woodworking and tool production.

3.4 Choice of raw materials – wooden tools

The second key component in the study of wooden tool production technology is the selection of raw material, as it has an effect on the technological operational characteristics of the tool. It consists of selecting both an appropriate part of the tree (trunk, branch, twig, root, knob, etc.), which is essential for many categories of wooden implements like axe and adze handles and hunting bows, as well as a suitable wood species. As of today, 277 species determinations based on the microanalysis of wood cell structure have been made of Zamostje 2 materials. This includes 121 tools and 148 piles and other elements of fishing constructions, as well as four analyses of ropes and lacings. Of these, 267 determinations were made by Maria Kolosova, State Hermitage (Russia), and 10 by Daniel Pillonel (Switzerland) (Lozovski & Ramseyer 1998: 17; Lozovskaya & Kolosova 2011).

In total, 14 wood species were used for tool production (Fig. 8a). The most popular species in all archaeological layers are pine (*Pinus sylvestris*), birch (*Betula*), and elm (*Ulmus sp.*); their overall share amounts to 50–60%. Pine is dominant in all layers. The second largest group is the willow family (*Salicacaeae*; including willow, aspen, and poplar) and ash (*Fraxinus sp.*) with a share of 18–26%; in the Early Neolithic layer, the complex is no longer present. Occasional use of bird cherry (*Padus racemosa*) (6 items in the lower layer), alder (*Alnus sp.*), fir (*Picea sp.*) (two items), maple (*Acer sp.*), snowball (*Viburnum*), oak (*Quercus sp.*), and lime (*Tilia*) (one item each) is also attested. All layers are characterised by a divergent use of wood species compared to the pollen analysis data (Lozovski et al. 2014: Fig. 7: 8), This can be caused, among others, by the human factor, namely the selection of raw material (elevated use of elm and rare woods like ash, maple, and willow family; negligible use of alder and hazel (*Corylus*), and sporadic use of oak and lime). In general, for a Mesolithic site of the Early Atlantic period in the forest zone of European Russia, Zamostje 2 shows an unexpectedly high share of broad-leaved species in the used raw material. The available, albeit fragmentary and incomplete data about wood use in other contemporary or earlier settlements in the Russian north and the Volga–Oka region indicates the dominance of coniferous species: at Veret'ye 1 (Boreal) these comprise 83.6% (based on 86 determinations), and at Vis 1, ca. 88% (aggregated data of 67 items) (Burov 1981; Oshibkina 1997: Table 22); all the individual determinations from Stanovoye 4 (Late Pre-Boreal), Ivanovskoye III, Okayëmovo 5, Ozerki 16 and

Figure 7. Veret'ye 1. Technological traces on the surfaces of wooden artefacts. Photos: O. Lozovskaya.

17 are pine (including bark) (Kraynov et al. 1995; Zhilin 2004).

The authors registered some tentative connections between tool categories and the chosen species and its mechanical properties: angular handles – bird cherry, elm (impact strength and wear-proofness); paddles – elm and aspen (low porosity and moisture-proofness), vessels – pine, lime (easy to cut), and elm, ash (solid). Pine was used to make both small piles (branches) and round poles and poles with flattened points (big trunks). Nevertheless, the scope of used material types is generally very large, which means that the selection of raw material lacked any strict regulation based on cultural or technological traditions. Such traditions are easy to track down in later times, that is, in the Middle and Late Neolithic of the Alpine region, and to a smaller extent in western Russia and the Baltic region as well.

The ancient population used both branches of young trees and large trunks with a diameter of no less than 20 cm (pine, elm, willow, aspen), as evidenced by the width of some items, as well as knobs with cross-grained fibre structure. This indicates that actual forests existed in the immediate proximity of the site. Most branches are of pine and birch.

3.5 Choice of raw materials – fishing constructions

Large pine trunks and, in one case, a willow trunk were used to produce fish traps and light screens found in the riverbed of the Dubna River, which divides the Zamostje 2 site into two parts. A set of three Early Neolithic fish traps lying close to each other, as well as the remains of a screen at the bottom of the prehistoric water reservoir dating back to the Late Mesolithic, have been published in detail already previously (Lozovski et al. 2013a). The length of standard split splinters is about 2 metres or more, which indicates specific requirements for the raw materials. Based on an analysis of splinters collected from another, destroyed construction at the river bottom (with a barbed point inside) (Lozovski et al. 2013c: 62–63), it seems that flat trunks with straight fibres and nearly no knots were used. The cross section of splinters shows 2–4 annual rings with a barely observable curve (roughly measured 13–17 cm in diameter) – however, the exterior side of the splinters is not the surface of the trunk. The ring thickness ranges from 1 to 2 mm. The technology of pine trunk splitting for splinters or other blanks (such as arrow shafts) was widespread in prehistoric times and apparently did not undergo any significant change at least during the Late Mesolithic and the Early Neolithic at Zamostje 2. Bevelled bone tools with an operating angle of 45° – which are quite common for the Volga–Oka region – were most likely used for this purpose (Maigrot et al. 2014).

Numerous clusters of vertically driven piles in the modern riverbed (150 pieces), made of sharpened branches/trunks, were found in the same settlement sector (ancient water reservoir) as the Neolithic fish traps and the Mesolithic screens. That is why they are generally interpreted as the remains of stake nets or other fishing constructions. The raw material used for fish fence construction consisted mostly of branches and trunks of young trees: 50% of them had a diameter of 5–7 cm, and the biggest pile had a diameter of 11 cm; on some of them, the bark was still preserved. However, radiocarbon datings revealed chronological deviations from the above-mentioned artefacts (excluding three piles with the same age as the constructions in the river), as 19 of 24 piles date to the end of the Early Neolithic or the Middle Neolithic.

A deviating picture can also be seen with regard to the tree species used as piles (Fig. 8b). Altogether ten species are present, listed in order of frequency: hornbeam (*Carpinus betulus L.*), poplar, and bird cherry, followed by elm, pine, willow, alder, and maple, as well as a sporadic occurrence of birch and ash. First, the selection of trees drastically differs from the list of species used for wooden tools, which was dominated by pine, birch, and elm. This difference can, however, be explained by different chronological periods of production.

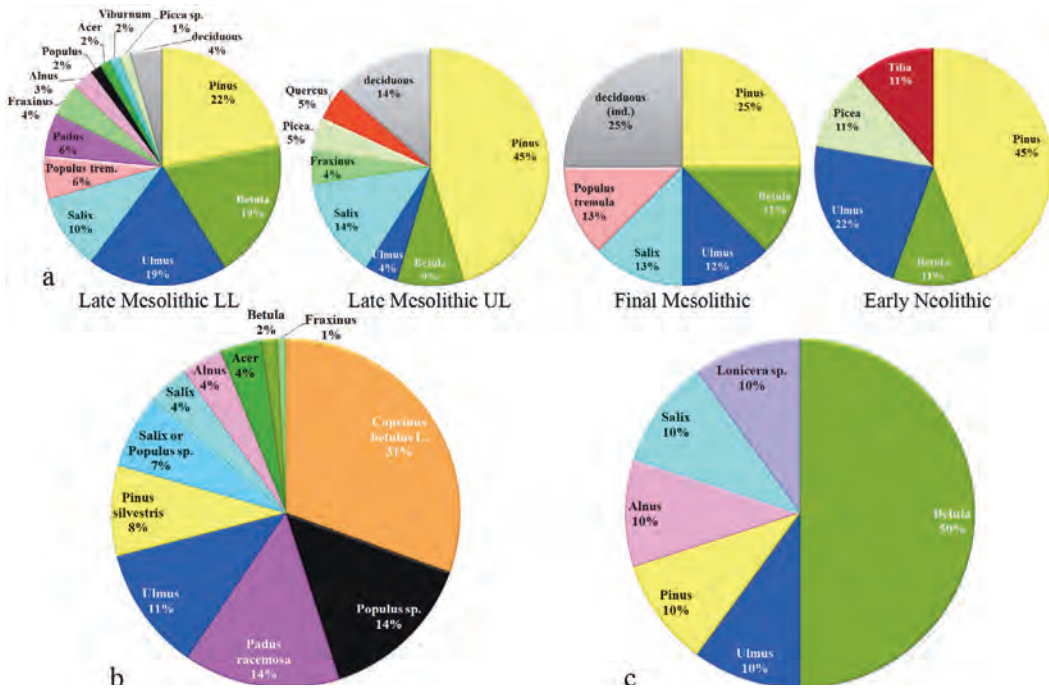

Figure 8. Zamostje 2. Distribution of wood species used for the production of: a – mobile tools (presented by layers; LL – lower layer; UL – upper layer); b – piles of constructions found in the riverbed; c – fish traps excavated on land. Species determination by Maria Kolosova. Drawing: O. Lozovskaya.

Second, many species totally absent in the pollen spectrum are presented here, including bird cherry, ash, poplar, aspen, and snowball (Lozovski et al. 2014: Fig. 7: 8). Third, the occurrence of hornbeam, a species that according to the majority of palynologists and palaeobotanists has never grown to the north of Moscow in the Atlantic period or afterwards, is especially pronounced. The age determination of hornbeam samples nevertheless revealed that this species was present in site's surroundings at least from the end of the 7th to the end of the 5th millennium calBC. This contradiction inspired us to also carry out new palaeolandscape studies.

3.6 Pollen analysis – new details

In palynological analyses of two new sections by Ekaterina Ershova (Moscow State University) in 2013, two key components of the vegetation structure were identified. The first one is local, including pollen of such trees as birch and birch shrub in particular, which like willow grows in bogs or forms thickets around reservoirs, alder (black alder), and pine (sphagnum pine forest). The second one is regional or zonal, and is represented by broad-leaved trees (oak, maple, lime, elm; in addition, hornbeam pollen was found), as well as hazel. The share of broad-leaved trees was permanently ca. 10–15% during the existence of the settlement. Watershed forests were the source of elm and maple, and obviously also ash, bird cherry, and high amounts of hornbeam. The most frequently used species – birch and pine as well as willow – grew in riverside wetlands and sphagnum forests with a high humidity level. This concept of local and regional wood flora reflects the possibility of using various forest areas around the site.

4 Conclusions

The comprehensive analysis of one of the biggest and best-preserved wooden assemblages of the Late Mesolithic–Early Neolithic period in Russia, the Zamostje 2 material, provided an opportunity to ask some important questions about prehistoric practices and to obtain some preliminary answers. From a typological point of view, both general patterns of chronological or territorial order, as well as individual features characteristic of a particular site or cultural community, were recorded – as far as today's source base allows such conclusions to be made. The variability of techniques and operations, which have been reconstructed on the basis of the comparison of technological traces visible on the surface of prehistoric wooden pieces and the experimental samples, indicated the presence of differences not only in areas remote in space, but also within a single settlement at different times. Finally, the questions of deliberate choice of raw materials and ancient human behaviour in specific geographical conditions were solved by comparing the tree species used for archaeological materials and the compositions of surrounding forests, as evidenced by pollen analyses.

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