

CHRONOLOGICAL PROBLEMS WITH NEOLITHIZATION OF THE NORTHERN CASPIAN SEA AREA AND THE FOREST-STEPPE POVOLZHYE REGION

A Vybornov¹ • G Zaitseva² • N Kovaliukh³ • M Kulkova⁴ • G Possnert⁵ • V Skripkin⁴

ABSTRACT. Steppe and forest-steppe areas of the Povolzhye area (Caucasus and central Asia) bear much interest for the Neolithic in connection with the productive economy of the region at the time. Recent data have allowed correction of the region's chronology. A number of ¹⁴C dates denote the existence of the Neolithic in this territory as early as the 5th to 6th millennium BP. However, some questions are still under debate and require further data to clarify.

INTRODUCTION

The northern Caspian Sea area has been the focus of scholarly attention due to its important strategic location (Figure 1). The area stretches from the Aral Sea in the east to the Black Sea in west, the Caucasus in the south, and the Lower Volga River in the north. The forest-steppe Povolzhye area is further north and reaches the southern border of the northern Caspian Sea area. The forest-steppe zone of Povolzhye is considered one of the first centers from which the Neolithic spread (Vasiliev and Vybornov 1988; Mamonov 1999; Timofeev 2002; Vybornov et al. 2009a,b). Radiocarbon dating can help shed light on the cultural interaction between the south and the north.

This area witnessed interaction of its Neolithic cultures when the productive economy started to develop. In order to better understand these developments, it is essential to have a clear-cut definition of the chronology of these processes. The first step was to establish the chronological framework of the Neolithic in the Caspian Sea region. Many researchers previously dated the Neolithic complexes by comparing them with the Natufian culture of the 6th–7th millennium BP (e.g. Melentiev 1975). However, current ¹⁴C data show that the Natufian cultures occurred earlier than previously thought (Weninger et al. 2009) and correspond more to Mesolithic complexes.

METHODS AND RESULTS

At present, typological, technological, and radiocarbon data on organic materials found in pottery allows us to better understand the numerous implications to the cultural developments mentioned above. The dating of pottery, expanded in a number of published works (Kovalyuh and Skripkin 2007; Zaitseva et al. 2008, 2009) has already produced important and positive results (see Vybornov 2008).

In 2011, the Uppsala laboratory reported a date of 7775 ± 42 BP (Ua-41359) for organics in pottery from Kairshak III. (All dates reported in this paper are uncalibrated.) This date corresponds well with dates from the Kiev laboratory: 7780 ± 90 BP (Ki-14471) and 7740 ± 70 BP (Ki-14095). In 2007, dates were obtained on ceramics from layer 2 of Varfolomeevskaya, 7070 ± 80 BP (Ki-14370) and 6980 ± 90 BP (Ki-14369), which agree well with the 7034 ± 41 BP (Ua-41360) date from the Uppsala laboratory in 2011. Dates for ceramics of layer 2 are 6890 ± 80 BP (Ki-14371) and $6540 \pm$

¹Samara State Academy of Social Sciences and Humanities, Samara, Russia. Corresponding author. Email: vibornov_kin@mail.ru.

²The Institute for History of Material Culture, Russian Academy of Sciences, Saint Petersburg, Russia.

³Herzen State Pedagogical University, Saint Petersburg, Russia.

⁴The Institute of the Geochemistry of Environment, National Academy of Sciences of Ukraine, Kiev, Ukraine.

⁵University of Uppsala, Uppsala, Sweden.



Figure 1 Map of Yelshanian culture sites of central Povolzhye region and the northern Caspian Sea area: 1 – Dzhebel; 2 – Chernikov brod; 3 – Ivanovskaja; 4 – II Staro-Elshanskaja; 5 – Vilovatovskaja; 6 – Shihan; 7 – Maximovka; 8 – Troitskoje; 9 – Lebjazhinka IV; 10 – Krasniy Jar VII; 11 – Iljinskaja; 12 – Nizhnaja Orljanka II; 13 – Chekalino IV; 14 – Ust-Taselka; 15 – Vjunovo Lake I; 16 – Ozimjenki II; 17 – Tenteksor; 18 – Kairshak I; 19 – Kairshak III; 20 – Jangar; 21 – Varfolomeevskaya.

80 BP (Ki-14613) produced by the Kiev lab in 2007, and from Uppsala laboratory, 6544 ± 38 BP (Ua-41361) in 2011. One can see that dates from both laboratories correspond well.

As a result of our dating campaign, we currently have representative series of ^{14}C dates produced from different organic materials, including pottery, for the calendar interval 7700–6500 BP (Table 1). Thus, it is now possible to compare the chronological position of the Neolithic sites in steppe and semisteppe regions of the northern Caucasus and to better explain the cultural processes that developed in the studied region.

Forest-Steppe Povolzhye

The oldest pottery for this region according to many archaeologists is of the Yelshanian culture, found at the Ivanovskaya site (Figure S1)¹ in the Orenbourg region, southern Urals: 7930 ± 90 BP (Ki-14568); 7780 ± 90 BP (Ki-14631); and 7680 ± 90 BP (Ki-14567). These dates are confirmed by the dating of animal bone: 8020 ± 90 BP (Le-2343) (Timofeev and Zaitseva 1998). Vasilieva (2007) and others, on the other hand, argue that the ceramics of this site are not ancient because the ancient pottery was made of an “ooze” type of material while Yelshanian-type pottery was made of clay.

¹Figures S1 to S10 are supplemental files available with the online edition of this article.

Table 1 ^{14}C dates of Neolithic sites in the northern Caspian Sea and forest-steppe Povolzhye areas.

Site	Lab code	Material	Culture	Age (BP)
Kairshak III	GIN-5905	Charcoal	Kairshakskaya	6950 ± 190
Kairshak III	Ki-14634	Bone	Kairshakskaya	7020 ± 80
Kairshak III	Ki-14633	Bone	Kairshakskaya	7190 ± 80
Kairshak III	Ki-14133	Pottery carbon	Kairshakskaya	7950 ± 90
Kairshak III	Ki-14471	Pottery carbon	Kairshakskaya	7780 ± 90
Kairshak III	Ki-14095	Pottery carbon	Kairshakskaya	7740 ± 70
Kairshak III	Ki-14096	Pottery carbon	Kairshakskaya	7680 ± 90
Kairshak III	Ua-41359	Pottery carbon	Kairshakskaya	7775 ± 42
Kairshak III	Ki-16401	Pottery carbon	Kairshakskaya	7870 ± 100
Kairshak III	Ki-16400	Pottery carbon	Kairshakskaya	7290 ± 190
Kairshak III	SPb-316	Bone	Kairshakskaya	7030 ± 100
Tenteksor I	Ki-14137	Pottery carbon	Tenteksorskaya	6630 ± 80
Tenteksor I	Ua-35266	Shells from pottery	Tenteksorskaya	7235 ± 45
Tenteksor I	Ua-35267	Pottery carbon	Tenteksorskaya	6695 ± 40
Varfolomeevskaya 2A	Ki-3589	Bone	Varfolomeevskaya	5430 ± 60
Varfolomeevskaya 2A	Ki-3595	Bone	Varfolomeevskaya	5390 ± 60
Varfolomeevskaya 2A	Ki-3590	Bone	Varfolomeevskaya	5270 ± 50
Varfolomeevskaya 2A	Ki-3596	Bone	Varfolomeevskaya	5220 ± 50
Varfolomeevskaya 2A	Ki-14371	Pottery carbon	Varfolomeevskaya	6890 ± 80
Varfolomeevskaya 2A	Ki-14613	Pottery carbon	Varfolomeevskaya	6540 ± 80
Varfolomeevskaya 2A	Ua-41361	Pottery carbon	Varfolomeevskaya	6544 ± 38
Varfolomeevskaya 2B	Ki-14370	Pottery carbon	Varfolomeevskaya	7070 ± 80
Varfolomeevskaya 2B	Ki-14369	Pottery carbon	Varfolomeevskaya	6980 ± 90
Varfolomeevskaya 2B	Ua-41360	Pottery carbon	Varfolomeevskaya	7034 ± 41
Jangar layer 1	Le-2901	Charcoal	Jangarskaya	5890 ± 70
Ivanovskaya	Ki-14568	Pottery carbon	Yelshanian	7930 ± 90
Ivanovskaya	Ki-14631	Pottery carbon	Yelshanian	7780 ± 90
Ivanovskaya	Le-2343	Bone	Yelshanian	8020 ± 90
Old Yelshanskay II	Ki-14413	Pottery carbon	Yelshanian	6820 ± 80
Iliinskaya	Ki-14096	Pottery carbon	Yelshanian	6940 ± 90
Ozimenki II	Ki-12168	Pottery carbon	Yelshanian	6950 ± 170
Yelshanskay XI	Ki-15439	Pottery carbon	Yelshanian	6820 ± 90
Krasny Gorodok	Ki-14078	Pottery carbon	Yelshanian	6730 ± 100
Lugovoe III	Ki-14584	Pottery carbon	Yelshanian	6700 ± 100
Iliinskaya	Ki-14111	Pottery carbon	Yelshanian	6740 ± 70

At the beginning of the 5th millennium BP, the late Yelshanian-type sites covered the large territory from the Samara Volga area up to the Moksha River basin, including the Old Yelshanskaya II site (Figure S2) dated to 6820 ± 80 BP (Ki-14413); the Iliinskaya site, 6940 ± 90 BP (Ki-14096); and Ozimenki II (Figure S3), 6950 ± 170 BP (Ki-12168). Similar archaeological materials were recovered in the Khopyor River and in the Upper Don River basin.

In the mid-5th millennium BP in the forest-steppe zone of the Volga River basin, the Lugovian culture started to appear. The sites in this region include Yelshanskay XI, 6820 ± 90 BP (Ki-15439); Krasny Gorodok (Figure S4), 6730 ± 100 BP (Ki-14078); Iliinskaya, 6740 ± 70 BP (Ki-14111); Lugovoe III (Figure S5), 6700 ± 100 BP (Ki-14584); and Krasny Yar VII, 6540 ± 80 BP (Ki-14580) (Vybornov 2008). Pottery at these sites consists of wall-sided, flat-bottomed vessels made from oozy clay, characteristic of the Yelshanian type. Similar complexes are found in the wider territory where the Upper Volga Neolithic cultures developed (Zaretskaya and Kostyleva 2001).

DISCUSSION

Early pottery sites have been identified in various parts of the north Caspian Lowland and the lower stretches of the Volga River. Two cultural groups have been distinguished: Kairshak-Tektensor (Figures S6–S8) and Jangar-Varfolomeevskaya (Figures S9–S10) (Vasiliev and Vybornov 1988; Vybornov et al. 2009a,b). A large series of ^{14}C dates have been obtained recently primarily from organic matter found in the ceramics. Earlier results on the sites of this area did not correspond to the Neolithic chronology: bones from Kairshak III dated to 4910 ± 60 (Ki-3145), i.e. the beginning of 3rd millennium BP; bones and charcoal from layer 2A of the Varfolomeevskaya site dated to 5430 ± 60 BP (i-3589), 5390 ± 60 BP (Ki-3595), 5270 ± 50 BP (Ki-3590), and 5220 ± 50 BP (Ki-3596), i.e. late 4th millennium BP (Yudin 2004). The charcoal from layer 1 of the Jangar site dated to 5890 ± 70 BP (Le-2901; Koltsov 1988), i.e. the beginning of the 4th millennium BP.

Due to targeted and comprehensive investigations of Neolithic sites of the northern Caspian Sea area, our knowledge of the area and its past has improved greatly (Koltsov 2005; Yudin 2006; Vybornov 2008). The Neolithic chronological framework for the region ranged from the 5th to the early 6th millennium BP. Previous research placed the beginning of this process in the first quarter of the 6th millennium BP (Koltsov 2005; Yudin 2006).

In 1998, the Kairshak III Neolithic site produced many ^{14}C dates, including 6950 ± 190 BP (GIN-5905) for soil. Results from ^{14}C dating in 2007 yielded 7020 ± 80 BP (Ki-14634) and 7190 ± 80 BP (Ki-14633) for bones, and for charcoal of pottery obtained for the Kairshak I site: 7180 ± 90 BP (Ki-14132) and 7230 ± 90 BP (Ki-14094) (Vybornov 2008). These ^{14}C dates correspond with those obtained for the Jangar and Varfolomeevskaya sites and are also confirmed by the archaeological remains. Pottery of the Jangar type was found in the Kairshak sites, while conversely, vessels of the Kairshak type were found in the Jangar site. Together with dates the Kairshak III site processed in 2007, 6 ^{14}C dates were obtained from direct dating of pottery. These dates range from 7950 ± 90 BP (Ki-14133) to 7530 ± 90 BP (Ki-14632), and are earlier than the results obtained in 1998. However, according to paleogeographical data, heavy aridization took place in the northern Caspian Sea area at the time, which complicated habitation in the desert area (Bolihovskaia 1990; Lavrushin et al. 1998; Spiridonova and Alechinskaya 1999). The aridization only ended when a wet period began in the early to mid-6th millennium.

^{14}C dating of samples from the Kairshak site continued in 2010 using different fractions of pottery: the organic component, 7290 ± 190 BP (Ki-16400); and carbonate one, 7870 ± 100 BP (Ki-16401). The ^{14}C date from the carbonates is older than the organics due to the reservoir effect (Fisher and Heinemeier 2003). A similar situation can be observed at the Tektensor site. Thus, the ^{14}C date obtained for shells in the pottery is 7235 ± 45 BP, and for the organic fraction, 6695 ± 40 BP (Zaitseva et al. 2009). The organic fraction was dated using the liquid scintillation technique by the Kiev Radiocarbon Laboratory, yielding a date of 6630 ± 80 BP (Vybornov 2008). Dates on Tektensor ceramics and those from the layer 2 of Varfolomeevskaya coincide. Neolithic pottery from the north Caspian Sea area was made of ooze with an infusion of clamshells (Vasilieva 1999). The use of ooze spread within about 100 yr, from about 7700 until 7600 BP. Taking into account the 500-yr reservoir effect, a date of 7100–7000 BP is thus likely. This date corresponds well with results of bones of Kairshak III, 7030 ± 100 BP (SPb-316).

If these observations are correct, then the period of Neolithic development of the northern Caspian Sea area corresponds to the late 6th millennium BP. To a certain extent, this fact does not prove the paleogeographers' theory that heavy aridization started in this territory in 7200 BP, restricting habitation in the region at the time (Spiridonova and Alechinskaya 1999). After aridization ended in

7200 BP, the north Caspian Sea area became favorable once again for habitation. One cannot exclude that Neolithization began earlier, however. For example, the materials from Kugat IV include flinty tools of Mesolithic type. More data is needed to refine the chronology.

ACKNOWLEDGMENT

This research is supported by the Russian Humanitarian Foundation, grant 10-01-00-393.

REFERENCES

- Fisher A, Heinemeier J. 2003. Freshwater reservoir effect in ^{14}C dates from food residue on pottery. *Radiocarbon* 45(3):449–66.
- Bolihovskaia IS. 1990. Pale indication of landscape change in Low Povolzhye in last 10 000 years. In: Lebedev LI, editor. *The Caspian Sea. Geology and Geomorphology Issues*. Moscow: Nauka. p 52–68.
- Koltsov PM. 1988. Neolithic Jangar site. In: Merpert NY, editor. *Archaeological Cultures of the North Caspian Sea Region*. Kuybyshev: Kuybyshev Pedagogical Institute Press. p 52–92.
- Koltsov PM. 2005. *Mezolit i neolit Severo-Zapadnogo Prikaspiya*. Moscow: Voskresenie. 350 p. In Russian.
- Kovalyuh NN, Skripkin VV. 2007. Radiocarbon dating of the pottery with the use of the liquid scintillation method. In: Zaitseva GI, Kulkova M, editors. *Radiocarbon in Archaeological Research*. Saint Petersburg: Teza. p 120–6.
- Lavrushin JA, Spiridonova EA, Sulerzhitsky LD. 1998. Geological and paleogeological events in the north of the arid zone for the last 10 thousand years. In: Vasiliev IB, editor. *Problems of Ancient History of North Caspian Sea Region*. Samara: Samara State Pedagogical University Monograph. p 40–65.
- Mamonov AE. 1999. On the cultural status of Elshanskaya complexes. In: Vasiliev IB, editor. *The Questions of the Archaeology of Povolzhye*. Samara: Samara State Pedagogical University Monograph. p 15–43.
- Melentiev AN. 1975. The sites of the Seroglasov culture (the Neolithic of the Northern Caspian Sea region). In: *Short Reports of the Institute of Archaeology* 141. Moscow: Nauka. In Russian. p 112–7.
- Spiridonova EA, Alechinskaya AS. 1999. Division into periods of the Eolithic—the Eneolithic of European Russia according to palynological data. *Russian Archaeology Journal* 1:23–33. In Russian.
- Timofeev VI, Zaitseva GI. 1998. The problem of radiocarbon chronology of the Neolithic of steppe and the southern zones of European Russia and Siberia. In: Zaitseva GI, editor. *Radiocarbon and Archaeology*. Volume 2. Saint Petersburg: IIMK. p 109–16.
- Timofeev VI. 2002. *Some Problems of the Neolithization of the Eastern Europe*. Tver: TSUM. p 209–14.
- Vasiliev IB, Vybornov AA. 1988. *Neolithic of the Povolzhya*. Kuybyshev: Kuybyshev Pedagogical Institute Press. 104 p. In Russian.
- Vasilieva IN. 1999. Goncharstvo naselenija Severnogo Prikaspija v jepohu neolita. In: Vasiliev IB, editor. *Vo-prosy arheologii Povolzhya*. Samara: Samara State Pedagogical University Monograph. p 72–96.
- Vasilieva IN. 2007. On pottery technology of the Volga-Ural region people in the Neolithic. In: Morgunova ML, editor. *Archaeological Sites of Orenbourg Region*. Orenbourg: Orenbourg State Pedagogical University. p 23–38. In Russian.
- Vybornov AA. 2008. *The Neolithic of the Volga-Kama Rivers Basin*. Samara: Samara State Pedagogical University Monograph. In Russian.
- Vybornov A, Dolukhanov P, Aleksandrovsky A, Kovalyukh N, Skripkin V, Sapelko T, Zaitseva G, Shukurov A. 2009a. The Middle Volga Neolithic. In: Dolukhanov PM, Sarson GR, Shukurov AM, editors. *The East European Plain on the Eve of Agriculture*. BAR International Series 1964. Oxford: Archaeopress. p 71–80.
- Vybornov A, Dolukhanov P, Kovalyukh N, Skripkin V, Zaitseva G, Shukurov A. 2009b. The North Caspian Mesolithic and Neolithic. In: Dolukhanov PM, Sarson GR, Shukurov AM, editors. *The East European Plain on the Eve of Agriculture*. BAR International Series 1964. Oxford: Archaeopress. p 81–8.
- Weninger B, Clare L, Rohling E, Bar-Yosef O, Boehner U, Budja M, Bundschuh M, Feurdean A, Gebel H, Joris O, Linstadter J, Mayewski P, Muylendruch T, Reingruber A, Rollefson G, Schyle D, Thissen L, Todorova H, Zielhofer C. 2009. The impact of rapid climate change on prehistoric societies during the Holocene in the Eastern Mediterranean. *Documenta Praehistorica* 36:7–60.
- Yudin AI. 2004. *Varfolomeevskaja stoyanka i neolit stepnogo Povolzhya*. Saratov: Saratov University Press. 200 p. In Russian.
- Yudin AI. 2006. The Neolithic. In: Skripkin AS, editor. *Archaeology of Low Povolzhye*. Volgograd: Volgograd University Press. p 333–452.
- Zaitseva GI, Skripkin VV, Kovalyukh NN, Vybornov AA, Dolukhanov PM, Possnert G. 2008. Radiocarbon dating of pottery from Neolithic sites. In: Derevjanko AP, editor. *Proceedings of the 2nd All-Russian Archaeological Congress*. Volume 1. Suzdal: IA RAN. p 217–9.
- Zaitseva G, Skripkin V, Kovalyukh N, Possnert G, Dolukhanov P, Vybornov A. 2009. Radiocarbon dating of Neolithic pottery. *Radiocarbon* 51(2):795–801.
- Zaretskaya NE, Kostyleva EL. 2001. Radiocarbon chronology of the initial stage of the Upper Volga culture. *Russian Archaeology Journal* No. 1.