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Światowit 39, 125-134

1994

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THE RADIOCARBON CHRONOLOGY OF ZEDMAR NEOLITHIC CULTURE IN THE SOUTH-EASTERN BALTIC AREA

The sites of Zedmar Neolithic culture are situated in the restricted area of Kaliningrad oblastr of Russia and North-Eastern Poland (Timofeev, 1980, 1986, 1991; Guminski, Fiedorczuk 1988, 1990). In the assemblages the local type of Neolithic culture is represented, different in compare with complexes of the main Neolithic cultures of the Eastern Baltic area – Narva, Nieman and comb-and-pit ware entities.

For Zedmar-type assemblages is characteristic specific pottery with crushed-shells and organic tempering and mineral (crushed stone and sand) tempering. Flat-bottommed pots are ornamented by elongated nick, different pits or finger-like impressions, incised lines etc. (Timofeev, 1991, fig. 6). Bone and horn tools are found at all sites of the culture. Flint industry partly resemble Niemonian one. The economy based mainly on hunting (in faunistical remains prevailed bones of wild pig, red deer, auroches etc.), bones of fishes are found also and elements of food-gathering are represented.

For four excavated sites of the culture numerous radioicarbon datings are reached now. The main amount of data came to light from eponymous sites Zedmar (Serovo) loceted in the southern part of Kaliningrad oblast, district of Ozersk, close to Polish border. The excavations of the sites haslong history (Timofeev, 1991). During 1970–80-s large area, more then 1100 sq.m. was excavated at two sites, Zedmar A and D (Timofeev, op. cit., fig. 2), connected with the large Astravishken peat-bog. Good preservation of organic remains gave possibilities to reach for the both sites a number of data, important fot radiocarbon chronology.

We have to discuss Zedmar D materials more detail. For this site the new evidences were reached last years and large number of datings are produced by Radiocarbon Laboratories of the Inmstitute of Material Culture History, Russian Academy of Sciences, St. Petersburg and Svedberg Laboratory, Uppsala, Sweden.

For Zedmar D site the most complete stratigraphy is sefined in the eastern part of the area (1988 excavations). Two periods of occupation were fixed there in stratigraphical succession. Above the main cultural layer (on the top of the sand sediments, superimposed by gyttja and peat) was found the concentration of horizontally imbedded wooden logs (associated with some archaeological finds), dated 4210 ± 45, 4170 ± 45, 4120 ± 100 b.p. (Le–3170, 3177, 3992). Very similar datings came from the pieces of wooden piles or posts, found in vertical positions below the concentration inside the virgin soil-aleuritus: 4300 ± 40, 4250 ± 40, 3890 ± 60 b.p. (Le–3169, 3171, 3168). Pils and horizontaly imbedded on the top of the layer logs most probably represent the details of the same construction (the platform?). From this, late period of the site occupation, had origin, obviously, pieces of charcoal from sand layer in other part of the area of excavations, dated before: 4240 ± 90, 4180 ± 50 b.p. (Le–1176, 848) and samples from some objects (a kind of stones heaps) where were found the thin pile or sharpened stick, embedded partly in virgin soil, dated 4350 ± 80, 4020 ± 80 b.p. (TA–1173, Le–1181) and charcoal (3870 ± 290 b.p., Le-3925).

From the main period of occupation, connected with the Zedmar culture, came datings, reached on different types of materials: 5640 ± 300 b.p. (antler tool, Le–3921), 5170 ± 70, 5150 ± 100, 5090 ± 50 b.p. (charcoal, Le–3171, 3181, 3174), 4990 ± 45, 4880 ± 50 (wood, Le-3173, 3179), 5070 ± 150 (gyttja, Le-3924). Important is sample of gyttja dated 4890 ± 100 (Le–3626), originated from the thin horizon inside the sand layer. This thin, interruptive horizon in the part of the excavated area immediately superimposed the level with the Neolithic Zedmar type finds, give terminus ante quem for the assemblage.

Especially valuable for Zedmar D chronology are accelerator datings, reached in Svedberg Laboratory directly for Zedmar-type Neolithic pottery, using organic remains, „food crust" from the inside of the pot sherds. For dating were chosen typical sherds of both the

main technological groups. Five sherds were analysed, each time soluble and insoluble fractions were dated separately.

Datings for pottery with crushed shells and vegetable matter tempering (each pair of datings is corresponding insoluble and soluble fractions of „food crust" from the separate sherd): 5180 ± 100, 5120 ± 100 b.p. (Ua-2375, 2376), 5030 ± 100, 4950 ± 90 b.p. (Ua-2378), 4840 ± 100 b.p. (Ua-2379, 2380). Datings for the pottery with mineral tempering: 4810 ± 100, 5230 ± 100 b.p. (Ua-2381, 2382), 5360 ± 130, 5280 ± 80 (Ua-2383, Ua-2384).

No significant differences are observed between the insoluble and soluble fractions, except for the samples Ua-2381, Ua-2382. The total amount of material was low for this sherd, 7–15 times lower than the others, and therefore disturbing factors are more severe. Svedberg Laboratory investigations learned, that in such a case the soluble fraction gives the most relevant dating. In that case Ua-2382 data is preferable. The results of AMS dates are shown in figure 1.

Among accelerator datings it should be mentioned some for sherds with mineral tempering which are earkiest for this kind of tempering in the Eastern Baltic area. Judge on this data, prevalence of pots with crushed-stone admixture in the clay in Zedmar D pottery assemblage is not connected with later chronology of this site, compare with other Zedmar cultureassemblages and must have ther ezplanation.

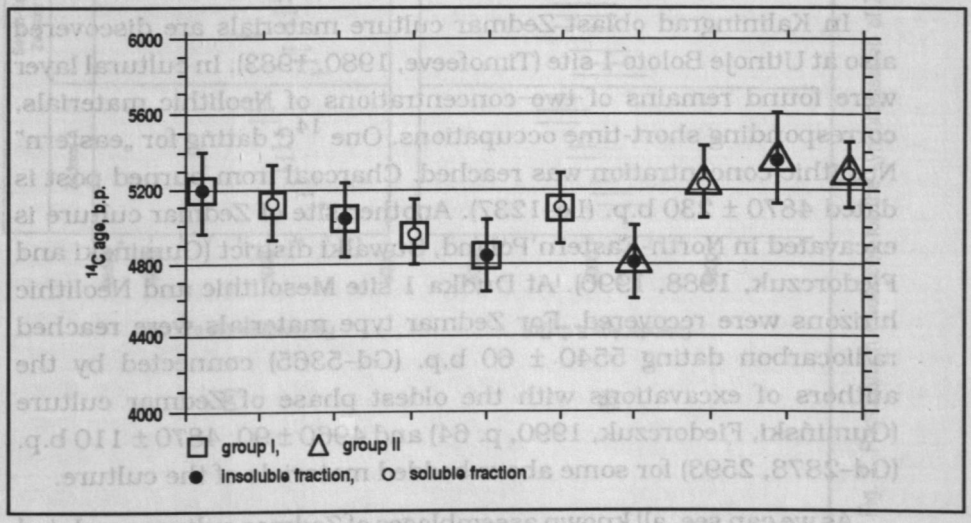

Fig. 1. Collection of ^{14}C determinations (2σ) for two groups of pottery

New series of radiocarbon dating for Zedmar culture layer at Zedmar D site is defining chronology of the assemblage in frames of interval 5400–4900 b.p. The later period of occupation defined now, is connected with finds of other cultural attribution.

At Zedmar A multylayered site Neolithic materials are bedded in lower cultural layer. In part of the excavated area was indentified the subdivision of this layer into three levels, with sterile gyttja in between (Timofeev, 1991, fig. 3). For the Neolithic layer series dating Le and Bln are reached (op. cit. summarized in table 1 of our article. With addition Le–3923, 5130 ± 100 (charcoal from lower horizon). Also, earliest dating 6000 ± 90 b.p., Le–1270 was done on piece of wood (pile?) vertically embedded into virgin soil-aleurtus, but we can not connect directly this dating with Zedmar culture finds. With the beginning of Zedmar culture Neolithic occupation are connected earliest dating 5440 ± 90, 5280 ± 50 b.p. (charcoal, Le–1269, Bln–2162) from the foundation and the lower horizon of the layer. With uppermost horizon of the layer are connected datings 5120 ± 50, 5100 ± 60, 4920 ± 80 (charcoal, Bln–2165, Le–1389, 1388). The chronological position of Zedmar A culture occupation is 5400 (5500)–4900 b.p. On our mind, Zedmar D, also judge on more archaic types of bone-horn inventory and pollenanalitical data (analyses of G.M. Levkovskaja) is some older, then Zedmar D assembleage.

In Kaliningrad oblast Zedmar culture materials are discovered also at Utinoje Boloto 1 site (Timofeeve, 1980, 1983). In cultural layer were found remains of two concentrations of Neolithic materials, corresponding short-time occupations. One ^{14}C dating for „eastern" Neolithic concentration was reached. Charcoal from burned post is dated 4870 ± 230 b.p. (Le–1237). Another site of Zedmar culture is excavated in North-Eastern Poland, Suwałki district (Gumiński and Fiedorczuk, 1988, 1990). At Dudka 1 site Mesolithic and Neolithic hirizons were recovered. For Zedmar type materials were reached radiocarbon dating 5540 ± 60 b.p. (Gd–5365) connected by the authors of excavations with the oldest phase of Zedmar culture (Gumiński, Fiedorczuk, 1990, p. 64) and 4960 ± 90, 4870 ± 110 b.p. (Gd–2878, 2593) for some above bedded materials of the culture.

As we can see, all known assemblages of Zedmar culture are dated 5500–4800 b.p., covered quite restricted period of time.

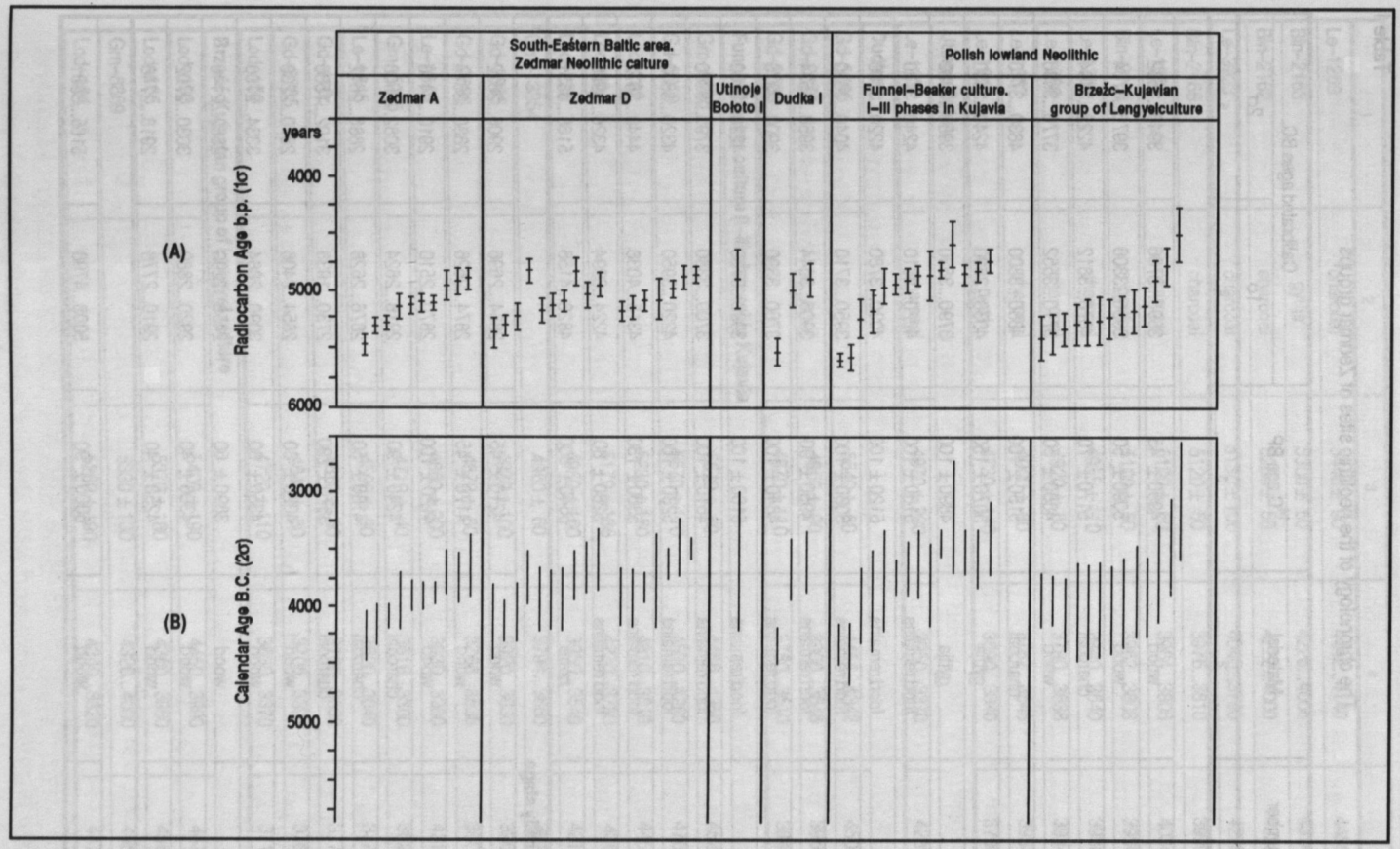

Fig. 2. Radiocarbon evidences for the synchronisation of Zedmar culture and the Neolithic cultures of Polish lowland

Table 1

The chronology of the neolithic sites of Zedmar groups

Lab. number	Material	^{14}C age BP	Calibrated ages BC	
			1σ	2σ
1	2	3	4	5
Zedmar D				
Le–3173	wood	4990 ± 45	3898...3706	3948...3662
Le–3174	wood	5090 ± 50	3956...3806	3976...3784
Le–3171	charcoal	5170 ± 70	4078...3812	4222...3794
Le–3179	wood	4880 ± 50	3710...3552	3778...3536
Le–3181	charcoal	5150 ± 100	4080...3800	4830...3710
Le–3924	gyttja	5070 ± 150	4030...3690	4240...3530
Le–3926	gyttja	4890 ± 100	3790...3530	3950...3380
Ua–2375	food remains	5180 ± 100	4220...3810	4240...3720
Ua–2376	food remains	5120 ± 100	4030...3780	4220...3700
Ua–2377	food remains	5030 ± 100	3950...3710	4040...3630
Ua–2378	food remains	4950 ± 90	3906...3644	3958...3534
Ua–2379	food remains	4840 ± 100	3760...3390	3900...3370
Ua–2380	food remains	5100 ± 100	3990...3780	4220...3660
Ua–2381	food remains	4810 ± 100	3700...3380	3790...3360
Ua–2382	food remains	5230 ± 100	4220...3950	4320...3800
Ua–2383	food remains	5360 ± 130	4315...4038	4440...3872
Ua–2384	food remains	5280 ± 80	4224...3994	4326...3958
Le–3921	bone	5640 ± 300	4828...4156	5165...3831
Zedmar D finally stage				
Le–3170	wood	4210 ± 45	2884...2696	2906...2622
Le–3177	wood	4170 ± 45	2874...2626	2880...2614
Le–3992	wood	4120 ± 100	2870...2510	2910...2410
Le–1176	charcoal	4240 ± 90	2918...2624	3082...2508
Le–848	charcoal	4180 ± 50	2876...2628	2886...2612
Le–3925	charcoal	3870 ± 290	2730...1938	3102...1586
Le–1181	wood	4020 ± 80	2854...2406	2870...2238
Ta–1173	wood	4350 ± 80	3090...2884	3334...2700
Le–3168	wood	3890 ± 60	2458...2290	2552...2146
Le–3169	wood	4300 ± 40	2920...2880	3030...2702
Le–3171	wood	4250 ± 40	2910...2778	2918...2740
Zedmar A				
Le–1270	wood	6000 ± 90	5008...4798	5165...3831

1	2	3	4	5
Le–1269	charcoal	5440 ± 90	4442...4140	4458...4042
Bln–2163	gyttja	5300 ± 60	4226...4006	4314...3984
Bln–2162	charcoal	5280 ± 50	4222...4000	4228...3986
Le–3923	charcoal	5130 ± 100	4040...3790	4220...3700
Bln–2165	charcoal	5120 ± 50	3976...3810	3990...3794
Le–1388	charcoal	5100 ± 60	3964...3806	4034...3768
Bln–2164	peat	5100 ± 50	3962...3808	3980...3390
Le–1268	charcoal	4955 ± 110	3940...3640	3980...3798
Le–1388	charcoal	4920 ± 80	3790...3638	3944...3524
Le–1387	charcoal	4900 ± 80	3782...3548	3938...3388
Le–1319	peat	4730 ± 140	3690...3340	3790...3040
Utinoe Boloto				
Le–1237	charcoal	4870 ± 230	3950...3370	4230...3040
Dudka 1				
Gd–5365		5540 ± 60	4454...4342	4500...4252
Gd–2878		4960 ± 90	3908...3648	3960...3538
Gd–2593		4870 ± 110	3780...3510	3940...3370
Funnel-beaker culture (I–III phases) in Kujavia				
Grn–5035		5570 ± 60	4456...4356	4526...4270
Gd–6019		5570 ± 110	4530...4260	4700...4160
Lod–292		5230 ± 180	4310...3810	4450...3660
Lod–60		5179 ± 185	4230...3780	4360...3540
Lod–225		4950 ± 160	3950...3540	4210...3360
Grn–13354		4960 ± 60	3794...3660	3940...3640
Gd–1985		4930 ± 100	3920...3630	3960...3390
Gd–2638		4870 ± 80	3766...3536	3908...3380
Le–1846		4860 ± 200	3930...3380	4210...3640
Grn–5045		4710 ± 40	3616...3380	3626...3370
Le–1845		4590 ± 90	3620...3040	3770...2780
Gd–416c		4860 ± 60	3706...3538	3778...3390
Gd–2765		4840 ± 80	3706...3394	3784...3378
Lod–159		4720 ± 110	3630...3370	3710...3100
Brześć-Kujavian group of Lyngyel culture				
Lod–193		5400 ± 190	4450...3990	4670...3790
Lod–165		5370 ± 180	4360...3980	4560...3780
Grn–8869		5330 ± 130	4320...4000	4450...3810
Lod–194		5280 ± 190	4340...3820	4470...3670

1	2	3	4	5
Lod–187		5280 ± 190	4340...3820	4470...3670
Lod–195		5260 ± 90	4330...3820	4460...3660
Lod–173		5250 ± 180	4320...3810	4450...3690
Lod–164		5210 ± 180	4320...3810	4450...3690
Lod–110		5160 ± 180	4220...3780	4350...3540
Lod–163		5130 ± 160	4220...3720	4330...3640
Lod–170		4930 ± 160	3950...3530	4210...3350
Lod–162		4830 ± 160	3780...3370	3970...3110
Ox–6370		4515 ± 210	3500...2920	3700...2620

The Zedmar-type sites are situated geographically not far from the territory occupied during the Neolithoc by cultures with the food-producing economy. The materials of the culture reflect some traits of the influences from that direction. Flat-bottommed pottery at the Zedmar-culture sitesappeared much more earliest, then in other parts of the Eastern Baltic area, where pointed-or-round bottommed vessels were common until the spread of Corded were culture about 4000 b.p. Also, among the profiles of the vessels unusual for the Eastern Baltic Neolithic pottery appeared, they resemble Early Eastern Funnelbeakers (Timofeev, 1990, fig. 5–5,6). The other trait, fremd for the Eastern Baltic Neolithic is the peculiar antler industry, based on using red-deer antler for producing T-form axes and large hook-like tools. This type of industry, especially characteristic for Zedmar D assemblage (Timofeev, 1981) has Central-European (Lengyel, Fuuelbeaker cultures) and Scandinavian parallels. Small amount of domesticated animals bones, found also in Zedmar culture assemblages obviously appeared as a result of the South-Western or Western links. The situation is corresponded the cooperation of the foraging society with the region of the foo-producers at the so-called availability phase of the agricultural frontier development, following the definitions introduced by M. Zvelebil and P. Rowley–Conwy (Zvelebil, Rowley–Conwy 1984, Zvelebil, 1986). Radiocarbon evidence gave the dating of the „cooperation" existence – 5500–4900 b.p.

Using the ^{14}C time scale of Polish Lowland Neolithic for chronological comparisons, the lower chronological limits of the Zedmar culture could be synchronised with Brze Kujawski group of Lendyel culture (Grygiel, 1986) and with the earliest assamblages (I–II pfases)

of the Funnelbeaker culture in Kujavia (Czerniak, Domanska, Kosko, Prinke, 1991). Radiocarbon datings are summarized in the table 1 and partly in figure 2 (A–B). The calendar radiocarbon years, the most valuable for the historical reconstructions, give the same horizon of synchronization (Fig. 1–B, calibration after Stiuver, Reimer, 1986). In frames of this chronological horizon have existence the traiis, appeared in the Zedmar culture assemblages about 500–5300 b.p. (4200–400 B.C.), but the concrete centre or region of the infuences we have to define yet.

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