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RADIOCARBON CHRONOLOGY OF LATE NEOLITHIC SETTLEMENTS IN THE TISZA-MAROS REGION, HUNGARY

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ABSTRACT. We investigated chronological questions of five Late Neolithic settlements in the Hungarian Tisza-Maros region. Fifty new radiocarbon dates provide an internal chronology for the developmental phases of the tell settlements, and place them into the wider framework of the southeastern European Neolithic. An example is presented of how a unique type of stratigraphic excavation helps the interpretation of radiocarbon data, which are in contradiction with the stratigraphic position of the samples.

INTRODUCTION

We have been conducting a new research program in Szeged for the last 15 years to investigate the chronology and settlement patterns in the Hungarian Tisza-Maros region, from the time of the transition between the Late Neolithic Age (LNA) and the Early Copper Age (ECA). In the course of this project, we dated a new series of charcoal and bone samples from the Neolithic stratified settlements at Hódmezövásárhely-Gorzsa, Hódmezövásárhely-Kökénydomb, Szeged-Tápé-Lebö-A, Szegvár-Tüzköves and the single-layer flat settlements at Deszk-Ordos and Deszk-Vénó (Horváth 1982, 1987; Hertelendi & Horváth, in press). The sites belong to the Middle Neolithic Age (MNA) Szakálhát culture, the LNA Tisza culture, the Gorzsa group and the Proto-Tiszapolgár phase of the Tisza culture, which are cultural manifestations of the middle and south Tisza region of Hungary and adjacent areas of Yugoslavia and Rumania (Fig. 1). We have selected both well-studied and new settlements, representing together the total span of the LNA in this region. We report here the first complete radiocarbon-based chronology of this period in Hungary. The sequence of sites forms the basis of a reliable internal chronology, in absolute dates, for the developmental phases of the Szakálhát and Tisza cultures. The study also provides a basis for placing the LNA of the Tisza region properly into the wider framework of the southeastern European Neolithic. Table 1 details and Figure 2 summarizes the new dates. We present the results obtained by the Debrecen Laboratory as uncalibrated radiocarbon years BP and calibrated years (cal BC), using the calibration curves of Pearson *et al.* (1986), Clark (1975) and the computer program of van der Plicht and Mook (1989). We discuss all the published and known dates from other laboratories as well.

ARCHAEOLOGICAL INTERPRETATION OF THE DATES

Because the excavations were methodically carried out by stratigraphic levels, we first checked the concordance of individual measurements as uncalibrated radiocarbon years and the position of the samples in the relative sequence. Figure 3 shows the method, using the example of the stratified tell-like settlement at Tápé-Lebö-A. The average total thickness of the layers is 2.10 m; the site contains 17 levels and covers 5 m^2. The radiocarbon dates in Table 1 represent the ages of the levels. We consider a date to be in full concordance with both the time sequence and the relative (stratigraphic) sequence when its position on the time scale corresponds to the place of the sample within the profile from which it has been collected. Agreement is also acceptable when the date

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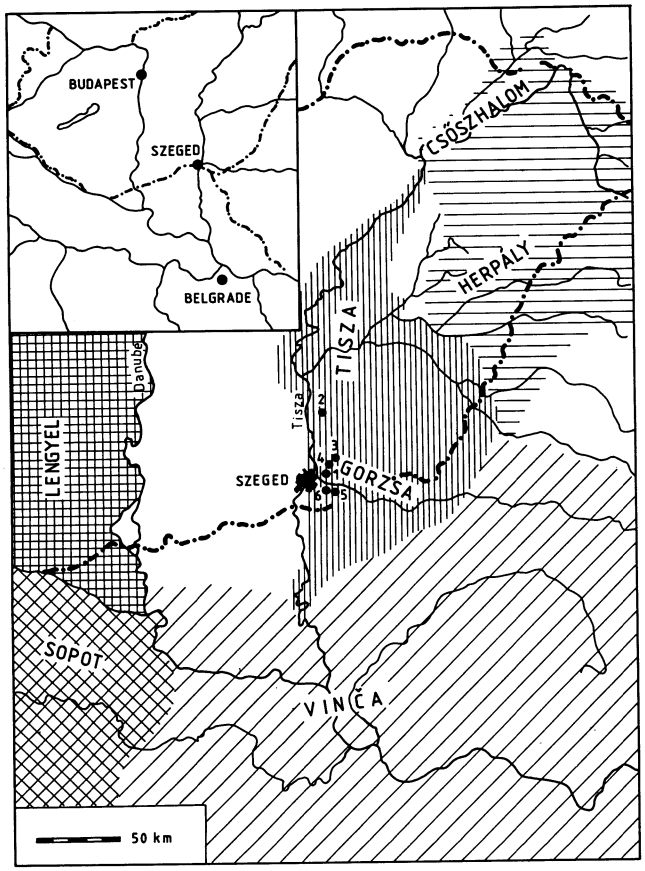

Fig. 1. The Tisza sites examined and the neighboring cultures: 1. Tápé-Lebö; 2. Szegvár-Tüzköves; 3. Hódmezövásárhely-Kökénydomb; 4.Hódmezövásárhely-Gorzsa; 5. Deszk-Ordos; 6. Deszk-Vénó

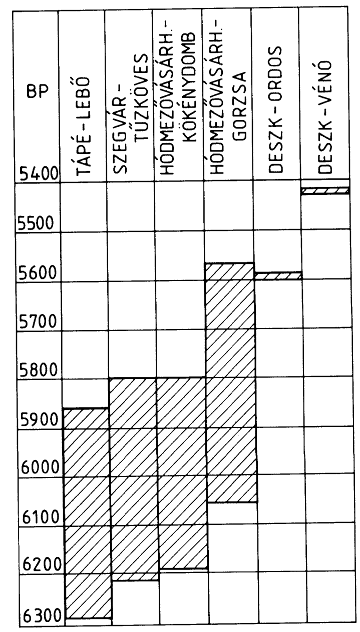

Fig. 2. Time sequence of the Late Neolithic settlements in Hungary.

of the sample collected from a pit, or from any kind of feature dug into the underlevels, falls on a point of the time scale that is within the time span corresponding to the depth of the given feature. The date obtained, in this case, is the time of the level in which the sample was originally deposited before the excavation. In five cases, contradictions exist between the relative stratigraphic position of the samples and the locations of their dates on the time scale. Archaeologically, only one interpretation seems to be possible: the properly collected samples were found in secondary positions. The correction of the position of such data, *i.e.*, the original stratigraphic position, can be determined with high probability by drafting a diagram of the excavated square. Figure 3 illustrates the levels, together with the depth of the features that have cut them, in an ideal, theoretically condensed single plane. Since 11 consistently correct (concordant) dates place the layer sequence on an absolute time scale, we are able to determine the real level of the sample, which was found in a secondary position. The reliability of this method is in direct proportion to the number of measurements. This correction can be applied only in the case of detailed stratigraphic excavations, when the proper associations between the levels and the features are precisely documented. This method is important when establishing the internal chronology and the settlement phases of a site. Changes in settlement structure on the style of the artifacts and their proportions, *e.g.*, give a relative sequence of the settlement phases. Determining and clustering the dates among stratigraphic levels help to place them into the framework of an absolute chronology (Fig. 4).

TABLE 1. ^{14}C ages from Tápé-Lebö-A, Szegvár-Tüzköves, Hódmezövásárhely-Kökénydomb, Hódmezövásárhely-Gorzsa and Deszk-Vénó

Context	Deb no.	$\delta^{13}C_{PDB}$ ± 0.1 (‰)	Age (yr BP) 1 σ	Age (cal BC)
Tápé-Lebö-A				
Level 1–2	-1186	–25.07	5860	4892 – 4884*
				4842 – 4814
				4798 – 4714
				4700 – 4678
Level 8	-1211	–26.12	5900	4896 – 4876*
				4850 – 4772
				4756 – 4726
Level 16	-1356	–25.48	5950	4934 – 4926*
Ditch 14				4902 – 4788
Ditch 14	-1363	–19.00	6050	4975**
Level 5–6	-1176	–25.39	6060	4990**
Level 12–13	-1264	–25.00	6100	5030**
Level 6				
Pit 24	-1196	–24.48	6130	5060**
Level 14				
Pit 41	-1267	–24.48	6150	5085**
Level 10	-1188	–25.66	6160	5090**
Level 12				
Pit 35	-1200	–24.32	6170	5100**
Level 12				
Pit 37	-1265	–25.00	6170	5100**
Level 12				
Pit 32	-1197	–25.03	6200	5130**
Level 14–15	-1195	–25.28	6210	5140**
Level 12–14	-1189	–25.17	6230	5150**
Level 16				
Pit 53	-1366	–19.00	6290	5210**
Szegvár-Tüzköves				
Level 20				
Pit 93	-1221	–26.22	5800	4776 – 4744*
				4736 – 4666
				4640 – 4594
Level 10–12				
Grave 1	-1355	–25.00	5830	4786 – 4670*
				4636 – 4614
Level 19–20	-1256	–25.52	6010	4930*
Level 26–27	-1229	–25.20	6050	4975*
Level 29				
Pit 105	-1420	–19.20	6100	5030*
Level 23–24	-1254	–24.90	6210	5140*

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TABLE 1. (Continued)

Context	Deb no.	δ13C$_{PDB}$ ± 0.1 (‰)	Age (yr BP) 1σ	Age (cal BC)
Hódmezövásárhely-Kökénydomb				
Level 3 House 1	-1222	−25.00	5800	4776 – 4744* 4736 – 4666 4640 – 4594
Level 3 House 1	-1411	−25.26	5850	4838 – 4822* 4794 – 4708 4706 – 4674 4630 – 4622
Level 3 House 1 (control)	-1255	−25.00	5890	4894 – 4880* 4846 – 4766 4762 – 4726
Level 3–4	-1364	−27.20	5870	4892 – 4882* 4844 – 4718
Level 3–5	-1513	−19.35	5900	4896 – 4876* 4850 – 4772 4756 – 4726
Pit 2	-1367	−26.30	5970	4940 – 4918* 4906 – 4832 4826 – 4790
Level 3 House 1	-1388	−25.00	6090	5020**
Level 6	-1412	−25.69	6100	5030**
Pit 1	-1365	−26.33	6150	5085**
Level 3 House 1	-1263	−25.00	6190	5120**
Hódmezövásárhely-Gorzsa				
Square IX Level 2	-1389	−21.70	5570	4462 – 4360*
Square XI Level 10	-1238	−24.19	5750	4716 – 4688* 4686 – 4576 4558 – 4538
Square VI Level 10	-1171	−25.12	5760	4720 – 4578* 4554 – 4540
Square VIII Level 16–17b	-1175	−28.50	5760	4554 – 4540* 4720 – 4578
Square X Grave 16	-1413	−19.12	5790	4774 – 4748* 4730 – 4662 4642 – 4586
Square VIII Level 17 c–e	-1384	−25.96	5780	4772 – 4754* 4728 – 4656 4646 – 4582

TABLE 1. (Continued)

Context	Deb no.	$\delta^{13}C_{PDB}$ ± 0.1 (‰)	Age (yr BP) 1σ	Age (cal BC)
Square X	-1354	−19.12	5830	4786 – 4670*
Grave 16				4636 – 4614
Square VIII	-1386	−28.50	5840	4830 – 4828*
Level 16–17b				4790 – 4670
				4634 – 4616
Square VIII	-1172	−25.35	5850	4838 – 4822*
Level 12–13				4794 – 4708
				4706 – 4674
				4630 – 4622
Square VIII	-1174	−25.96	5860	4892 – 4884*
Level 17 c–e				4842 – 4814
				4798 – 4714
				4700 – 4678
Square XI				
Level 10	-1173	−24.19	5880	4892 – 4882*
Ditch 1				4844 – 4722
Square IX	-1240	−26.97	5900	4896 – 4876*
Grave 42				4850 – 4772
				4756 – 4726
Square XI				
Level 10	-1387	−24.19	5900	4896 – 4876*
Ditch 1				4850 – 4772
				4756 – 4726
Square XVIII				
Level 24–25	-1191	−26.02	5910	4898 – 4874*
				4856 – 4774
				4750 – 4730
Square IX	-1187	−26.97	5990	4990 – 4976*
Grave 42				4946 – 4838
				4820 – 4794
Grave 42	-1202	−26.97	6050	4075**
Deszk-Vénó				
Square II				
Pit 3	-1201	−25.95	5420	4348 – 4236*
				4182 – 4178

*Calibrated according to Pearson *et al.* (1986) using a computer program of Plicht and Mook (1989)
**Calibrated according to Clark (1975)

A SHORT OUTLINE OF CULTURE HISTORY

Most prehistorians have accepted the Körös-Alföld Linear Pottery (ALP)-Szakálhát-Tisza sequence as characteristic for southeastern Hungary. On the basis of new excavations exposed over a larger area (besides the sites discussed in this paper: Battonya-Gödrösök and Parázstanya, Vésztö, Öcsöd, Herpály), archaeologists have placed the emergence of the Tisza culture within the time span covered by the Szakálhát culture (earlier MNA late Szakálhát, or Szakálhát-Tisza transition period, presently Tisza I). Such a division has been found necessary because of the appearance of a tell-based economy and tell settlements in this period (Makkay 1982; Kalicz & Raczky 1987). The MNA Szakálhát culture has been equated with the B1, the LNA early Tisza period with the B2

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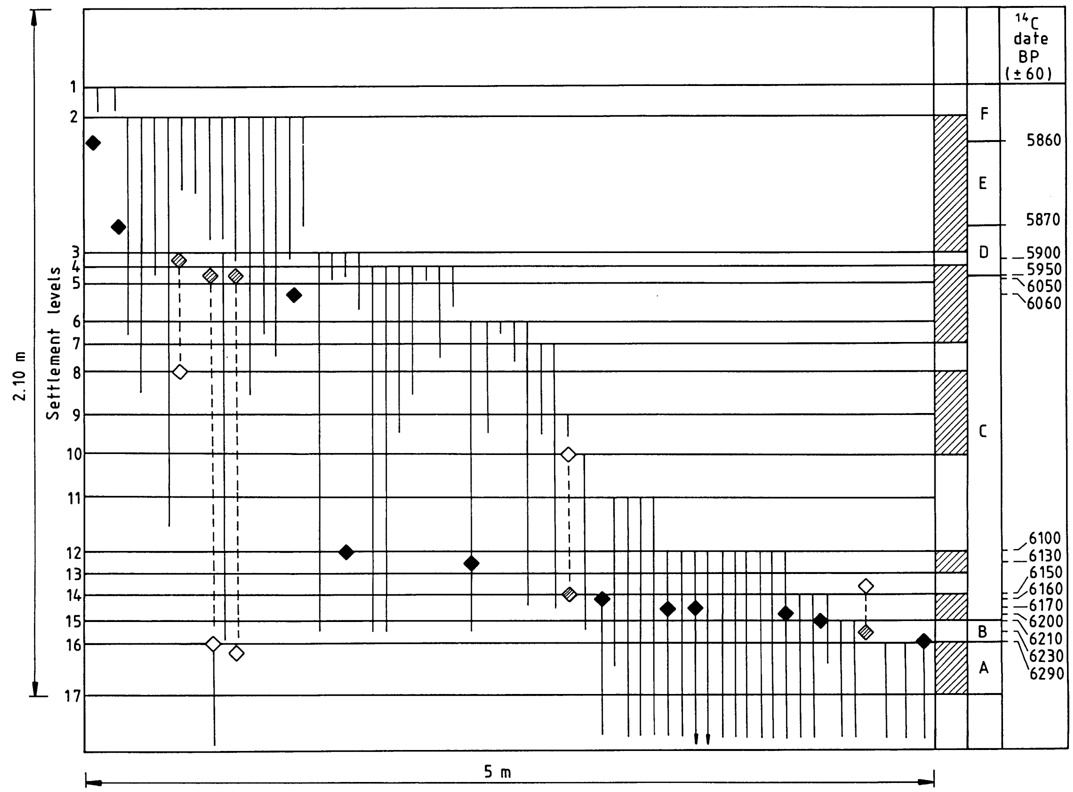

Fig. 3. An ideal diagram on the stratigraphic profile of Tápé-Lebö-A. ◆ dates agree with the archaeological time scale and the relative profile; ◈ the corrected dates do not agree with the stratigraphic position of the samples; ◇ dates do not agree with the stratigraphic position of the samples; ▨ layers; A–F settlement phases derived from ^{14}C dates and associated layers.

phase of the Vinca culture. The middle (I-II,II) Tisza period has been regarded as contemporaneous with the end of Vinca B2 and the total span of C, and the latest (Tisza III) with Vinca D1. The Proto-Tiszapolgár and Tiszapolgár cultures have been placed into the Vinca D2 period (Kalicz & Raczky 1987).

Discussion

Figure 4 presents a summary of ^{14}C dates available for southeastern Europe. The MNA sequence appears to go as follows: the Karanovo I/II-Körös-Starcevo period in southeastern Hungary was followed by a surviving Körös-Starcevo period, parallel to the ALP in Karanovo III-Butmir I-Vinca A time. (For the Vinca sequence, we refer to Chapman (1981)). These associations validate the chronology based on both earlier analyses of ^{14}C dates and the latest results of archaeological cross-dating (Quitta 1967; Raczky 1988). The increasing quantity of dates from central Europe, however, casts doubt on the primary emergence of Late Paleolithic culture in the middle Danube region. Dates from Moravia, Lower Austria, Lower Saxony, and the Moldavian Bandkeramik, are considerably older than those for Transdanubia or for the ALP culture. The dates from Tápé-Lebö-A and Battonya-Parázstanya make it probable that the Szakálhát culture emerged as early as the second part of the Vinca A period. Archaeological evidence supports this assumption (Szénánszky 1983). The appearance of the early Tisza culture at Hódmezövásárhely-Kökénydomb and Szegvár-Tüzköves between 6210 and 6190 BP, parallel to the beginning of the Vinca B phase, needs more attention. This period marks the end of Battonya-Parázstanya (site of the early Szakálhát culture),

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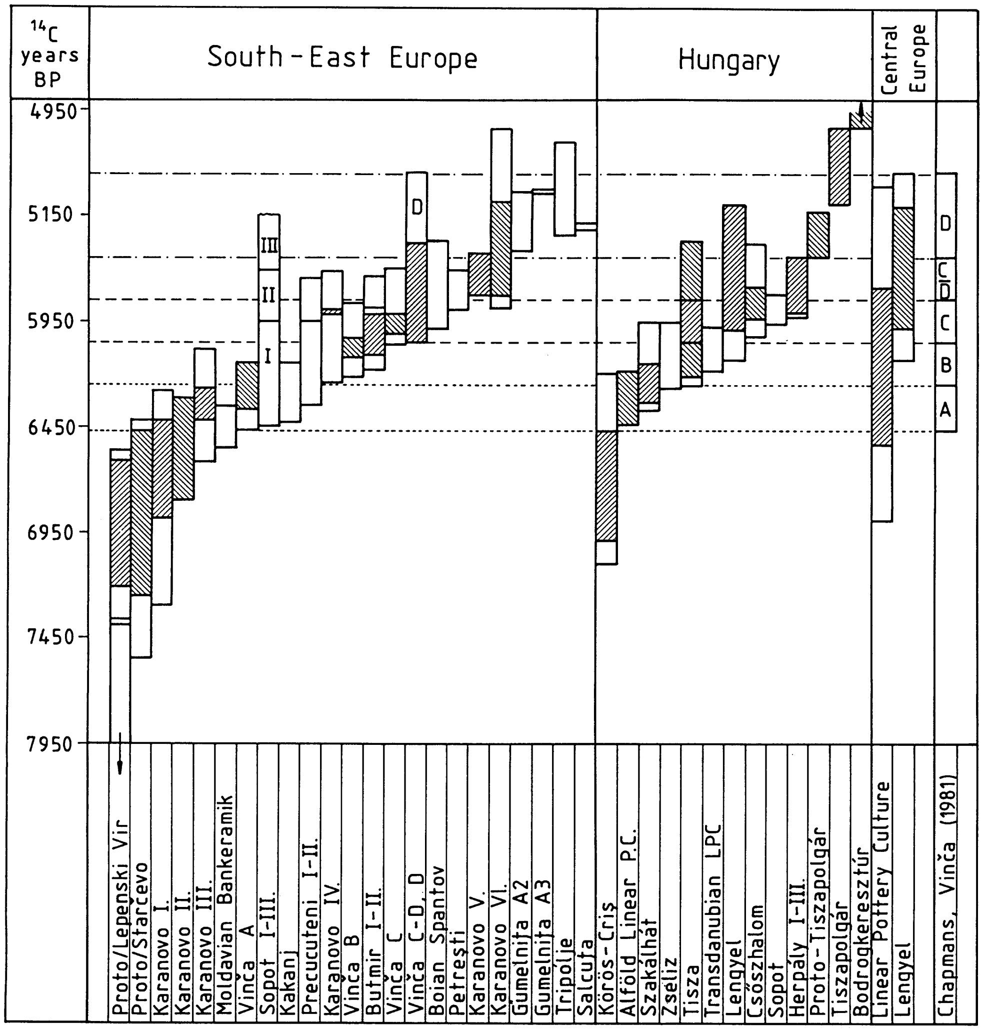

Fig. 4. Chronology of the southeast European Neolithic in the order of the ^{14}C dates

and the layer sequence of Tápé-Lebö-A shows a definite change in the settlement structure. However, later Szakálhát dates are contemporary with early Tisza during the Vinca B period. From this synchronism, it appears that most of the Szakálhát sites are contemporaneous with the early Tisza period, *i.e.*, both the Szakálhát and the Tisza occurred gradually within the span of the Vinca B1 period. If we compare these changes with those in the Balkan series, we can see that the emergence of the Szakálhát and the Tisza cultures coincide with the beginning of Karanovo IV at Sitagroi II. On the basis of our new ^{14}C measurements, we are able to define the beginning of the middle (classical) period of the Tisza culture at around 6050 BP, and its end at 5800 BP. The first date coincides with the beginning of the Vinca C and the Gomolava Ia phases, whereas the latter date marks the end of this period at every examined site representing this period of the Tisza culture. This horizon is identical with the beginning of Vinca D1 and Karanova VI (Azmak). The time span of the Gorzsa Group is between 6050 and 5570 BP, parallel to the Csöszhalom Group in the northern Tisza region. Its end is contemporaneous with Tripolje AII-Precucuteni III (Novye Rusesty), and with the last reliable date of the Vinca D1 culture from Gornja Tuzla.

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