Early Copper Age Settlements in the Körös Region of the Great Hungarian Plain

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This article discusses research carried out by the Körös Regional Archaeological Project from 2000 to 2006 at Early Copper Age Tiszapolgár Culture sites on the Great Hungarian Plain. To build a model of social organization for the period, we incorporated information from regional geomorphological studies, soil chemistry analysis, archaeological surface surveys, remote sensing, and systematic excavations at Early Copper Age sites in the Körös Valley of southeastern Hungary. Previous models characterized the transition from the Neolithic period to the Copper Age as an abrupt shift from a tell-based, sedentary, agricultural lifeway to one based on mobile cattle herding. By studying the transition between these periods on multiple geographic and temporal scales, we have identified a more gradual process with widespread regional variation in cultural patterns. Similar social processes characterize the transition between chronological periods and cultural phases in other parts of the world, and we suggest that a multiscalar approach is effective for building comparative archaeological models of long-term social change.

Keywords: Copper Age, Fortifications, Neolithic, Surface survey, Tiszapolgár

Introduction

Most recent research on early village societies focuses upon how groups of mobile hunters and gatherers interacted with, were replaced by, or gradually became sedentary agricultural villagers. The process of Neolithization dominates archaeological research on early villages in Europe (Hodder 1991) and throughout the world (Flannery 1973; Smith 1995). Less research has been directed at understanding the significant changes that occurred within early village

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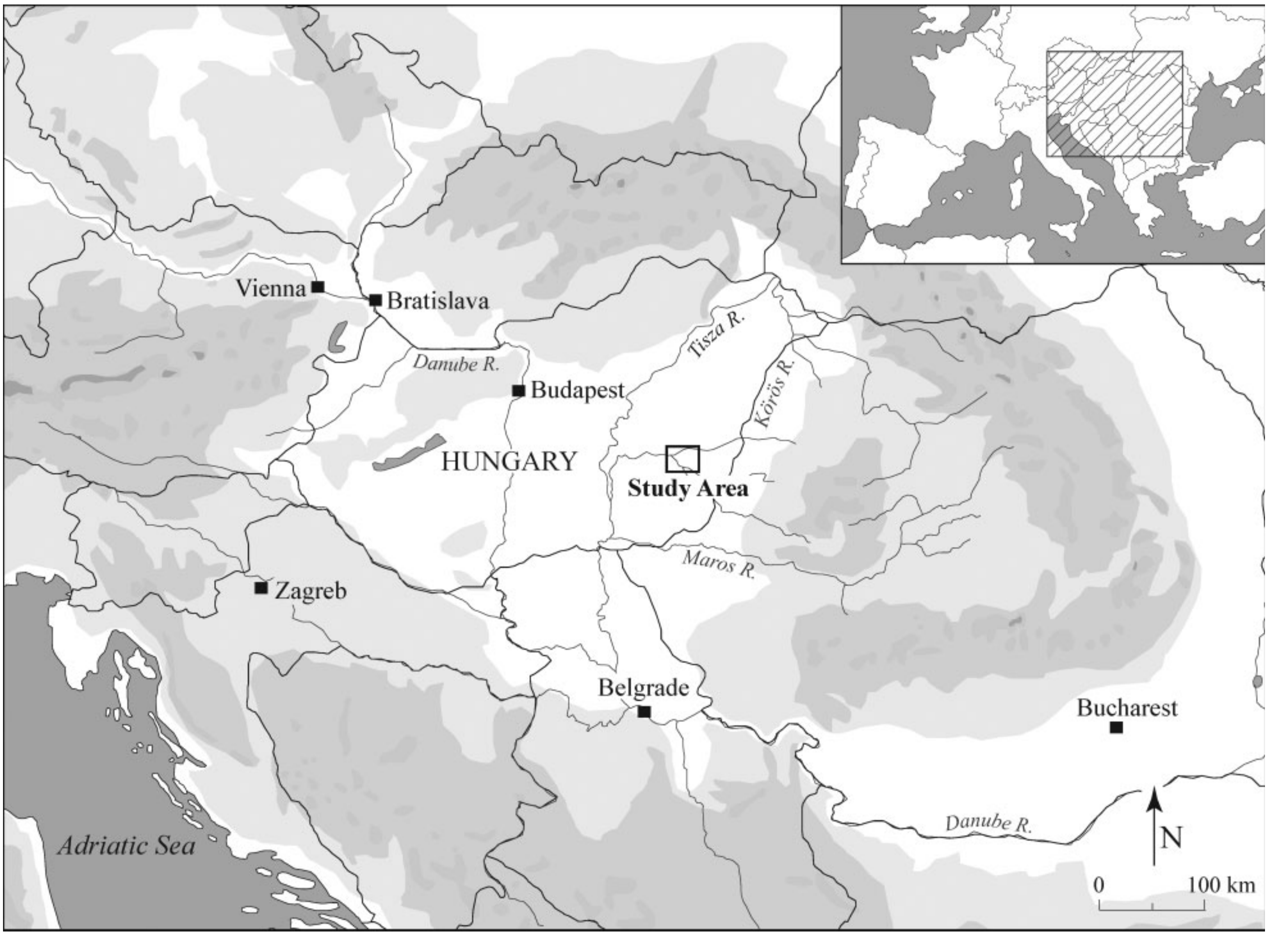

Figure 1 Map of the Körös Regional Archaeological Project study area on the Great Hungarian Plain in the Carpathian Basin. Adapted from Parkinson et al. (2004a: fig. 1) by Jill Seagard (The Field Museum).

societies after they were established, changes that led in many contexts to the emergence of economic and political complexity. In central and southeastern Europe, these changes include the emergence of regional settlement hierarchies and economic craft specialization, as well as the establishment of fortified tell settlements (Chapman 1981; Halstead 1999; Gogâltan 2003; Makkay 1982; Raczky and Anders 2008; Schier 2008; Runnels et al. 2009; Sherratt 1984). Our collaborative, international, multidisciplinary research project—the Körös Regional Archaeological Project—is exploring these issues by examining long-term patterns in the Körös River Valley from the establishment of agricultural villages at the end of the 7th millennium B.C. to the end of the Bronze Age.

This article synthesizes our research from 2000 to 2006 at four Early Copper Age Tiszapolgár Culture settlements located near the modern town of Vésztő (FIGS. 1, 2). We reexamine the characteristics that traditionally have been used to separate the Late Neolithic from the Early Copper Age. What previously seemed to be two discrete cultural patterns attributed to a shift from tell-based, sedentary farming to mobile cattle herding, can be viewed as a sequence of social changes that began in the Late Neolithic and gradually developed into a new pattern during the Copper Age. Our multiscalar approach reveals that these patterns emerged earlier and took place at different paces in different parts of the Great Hungarian Plain.

Previous research by Hungarian (Bognár-Kutzián 1972; Ecsedy et al. 1982; Jankovich et al. 1998, 1989; Kalicz and Raczky 1984; Raczky et al. 2002), British (Sherratt 1983, 1984), and American (Parkinson 1999, 2002, 2006a) teams documented a dramatic social transformation in the agricultural societies of the Great Hungarian Plain during the 5th millennium B.C. On the larger, regional scale, there was a reorganization and reorientation of trade networks, the establishment of formal cemeteries away from settlements, and the abandonment of large, nucleated tells that contained large, multi-roomed houses (Bognár-Kutzián 1963, 1972). The three regionally discrete Late Neolithic cultures of the Tisza-Herpály-Csőszhalom Complex gave way to the more stylistically homogeneous Early Copper Age Tiszapolgár Culture (Kalicz and Raczky 1987). At this regional scale, nucleated Late Neolithic site clusters were replaced with dispersed distributions of smaller settlements in the Early Copper Age. In the Körös region, for example, the number of sites increased nearly seven-fold (Parkinson 2006b: 36; Parkinson et al. 2002, 2004a; Parkinson et al. 2004b; Gyucha

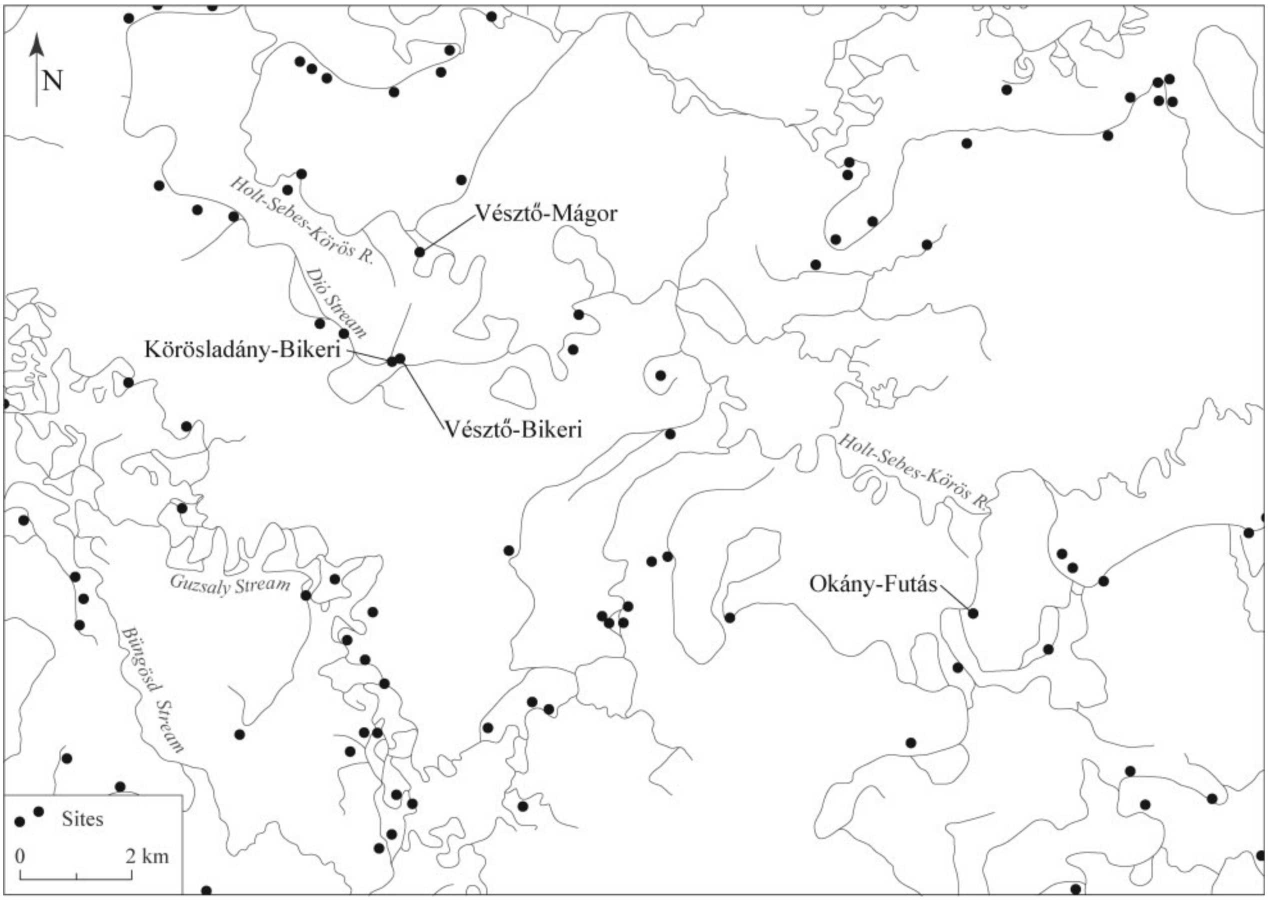

Figure 2 Map of the Vésztő microregion showing the Early Copper Age settlements of Vésztő-Mágor, Vésztő-Bikeri, Körösladány-Bikeri, and Okány-Futás, as well as other Early Copper Age sites in the vicinity. Map by Attila Gyucha (Field Service for Cultural Heritage, Hungary) and Jill Seagard (The Field Museum).

et al. in press). At the local scale, these patterns seemed to be associated with changes in settlement layout, activity patterns, and the length of time that the sites were inhabited (Yerkes et al. 2009).

Before our investigations, the Early Copper Age on the Great Hungarian Plain was known primarily from analyses of burials and cemeteries (Bognár-Kutzián 1963, 1972; Chapman 2000; Derevenski 1997; Meisenheimer 1989; Skomal 1983). Only a few Tiszapolgár settlements had been excavated and little was known about their internal organization (Goldman 1977; Parkinson et al. 2002, 2004a; Siklódi 1982, 1983, 1984). Almost all the information about Early Copper Age economic organization was based on analyses of faunal remains from mortuary contexts, and not from settlements (Bökönyi 1974; Parkinson 2006b: 53–54; Siklódi 1983: 30). More was known about the excavated Neolithic and Bronze Age tells and settlements (Bóna 1995; Kalicz and Raczky 1987), and the lack of information about Early Copper Age sites produced a gap in our understanding of the long-term trajectory of settlement changes in this area (FIG. 3).

To fill the gap in the trajectory of settlement changes, and to learn more about the Neolithic-Copper Age transition, we initiated a systematic investigation of Early Copper Age settlements in the Körös River drainage in 2000 (FIG. 1). We sought to learn about the size and internal organization of the settlements and how long they were occupied. We also wanted to assess the relationship, if any, between environmental changes and social transformations at the end of the Neolithic. Data from Parkinson's (1999, 2006a) systematic surface collections led us to a small cluster of Early Copper Age sites in the Vésztő region. From 2000 to 2006, we conducted archaeological investigations at four of these Early Copper Age sites. Here, we summarize the results of our research since our interim report published in this journal (Parkinson et al. 2004).

We examined the organization of four Early Copper Age Tiszapolgár Culture settlements located near the Vésztő-Mágor tell in the Körös River Valley of the Great Hungarian Plain (FIGS. 1, 2). Surveys by the Magyarország Régészeti Topográfiája (Archaeological Topography of Hungary) Project (Ecsedy et al. 1982; Jankovich et al. 1998, 1989), excavations at the Vésztő-Mágor tell (Hegedűs 1977, 1982; Hegedűs and Makkay 1987; Makkay 2004), and later work by Parkinson (1999, 2006a) provided a foundation for our recent investigations. We employed systematic surface collection, soil chemistry studies, geophysical survey, excavation, and geomorphological research to document the chronology, layout, and internal organization of four sites that date to the 5th millennium B.C.: Vésztő-Mágor, Vésztő-Bikeri, Körösladány-Bikeri, and Okány-Futás.

Absolute chronology (CAL B.C.)	*European chronology*	*Central and Southern Plain*	*Northern Plain*	*Eastern Plain and Körös-Berettyó*
ca. 3500–3000	Late Copper Age	Baden Boleráz	Baden Boleráz	Baden Boleráz
ca. 4000–3500	Middle Copper Age	Bodrogkeresztúr Hunyadihalom	Bodrogkeresztúr Ludanice Hunyadihalom	Bodrogkeresztúr Hunyadihalom
ca. 4600–4000	Early Copper Age	Tiszapolgár	Tiszapolgár	Tiszapolgár
ca. 5000–4600	Late Neolithic	Tisza	Tisza Csőszhalom	Tisza Herpály
ca. 5400–5000	Middle Neolithic	Alföldi Vonaldíszes Kerámia (Alföd Linear Pottery, or AVK) Szakálhát	Alföldi Vonaldíszes Kerámia (Alföd Linear Pottery, or AVK) Tiszadob Esztár Bükk Szilmeg	Alföldi Vonaldíszes Kerámia (Alföd Linear Pottery, or AVK) Szakálhát Esztár

Figure 3 Simplified Neolithic and Copper Age chronology of the Great Hungarian Plain including phases. Adapted from Parkinson (2006: figure 4.4) and Gyucha (2007: 234). Illustration by William A. Parkinson (The Field Museum).

Our results reveal significant variation in these Early Copper Age settlements, even within a small geographic area. The four sites were occupied for different lengths of time during the Early Copper Age, and the size of the sites, as well as their internal organization, also varied considerably. The Vésztő-Mágor tell and two Copper Age villages located along the same river channel, Vésztő-Bikeri and Körösladány-Bikeri, were enclosed by palisades and ditches, but the smaller hamlet, Okány-Futás, was not. Many features of the Early Copper Age occupations at these sites reveal strong cultural ties to Late Neolithic groups in the region, while other characteristics demonstrate how Neolithic traditions were modified and new cultural practices emerged at the beginning of the Copper Age. By working at multiple geographic and temporal scales, we can more accurately model how the Neolithic became the Copper Age in this region.

Paleohydrological and Geomorphological Studies in the Körös Region

Frolking (2004) examined the local geomorphology and pedology of the eastern Körös Valley to assess the likelihood that shifts in prehistoric settlement locations were the result of abrupt changes in paleohydrology (e.g., changing river courses, expansion and contraction of wetlands). He studied sediment cores from paleomeanders near Vésztő-Mágor, Vésztő-Bikeri, Körösladány-Bikeri, and in several other locations (FIG. 4). At Vésztő-Mágor, Frolking documented a mean mid- to late-Holocene channel migration rate of about 300 cm per 100 years for the meander of the Sebes-Körös River that surrounded the tell. Before lateral channel migration began, the meander loop was located adjacent to Vésztő-Mágor (during the Middle Neolithic Szakálhát Phase). This suggests that the Holocene landscape was stable, and large rivers such as the Sebes-Körös migrated very slowly across the flat landscape. Suitable locations for settlements would not have changed since river courses were stable with little alteration throughout the Holocene. Frolking concluded that changes in settlement patterns in this region, therefore, must be attributed to other natural or social factors.

Using Frolking's results, and historical and modern maps of topography, hydrology, and archaeological site locations, Gyucha and Duffy (2008, in press) created a GIS-based reconstruction of the regional paleohydrology, relating it to the distribution of settlements during different prehistoric and historical periods. No sites were located in the marshlands shown on the 19th-century maps, suggesting that these areas remained uninhabited since Early Neolithic times. From the Neolithic to Medieval periods, there are archaeological sites on the banks of the same Holocene meanders, indicating that the local landscape was stable.

Published pollen cores from the Great Hungarian Plain have yielded little information about climate or vegetation changes during the Neolithic or Copper Age in the Körös region (Chapman et al. 2009; Gardner 2002; Sümegi 2004; Willis 1997; Willis et al.

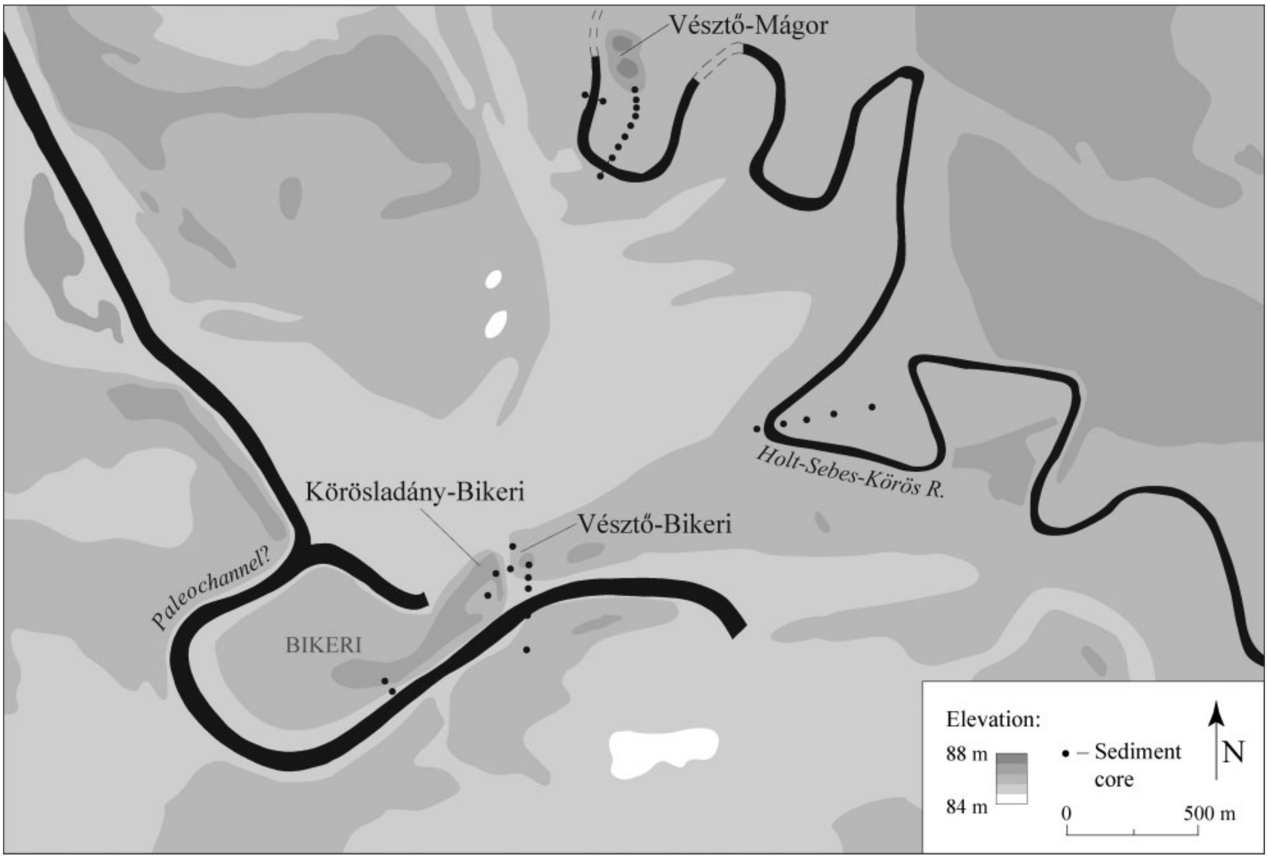

Figure 4 Topographic map showing Vésztő-Mágor, Vésztő-Bikeri, and Körösladány-Bikeri. Dots indicate the location of geological cores extracted from the Holt-Sebes-Körös River meander and the Bikeri paleomeander. Adapted from Frolking (personal communication 2009) by Jill Seagard (The Field Museum).

1995); however, Willis (2007) recently published a core from Kiri-tó (Kiri Lake), an oxbow lake that formed along the Berettyó River near Ecsegfalva at the end of the Pleistocene (ca. 35 km NW of the Vésztő region). She recognized a decline in tree pollen (especially oak and hazel) around 4600 CAL B.C. with a corresponding increase in pollen from grasses and other open-ground plants, including cereals (Willis 2007: 90). This reversed a trend of increasing pollen from broad-leaved trees that had begun about 6200 CAL B.C. The decline in tree pollen ca. 4600 CAL B.C. is associated with an increase in charcoal and total organic nitrogen in the core, suggesting significant human impact on the landscape, but this decline was short-lived. Between 3900 and 3700 CAL B.C., tree pollen again increased (and open-ground plants decreased), indicating that the woodlands recovered at the end of the Early Copper Age (Willis 2007: 97).

The reduction in woodlands near Kiri-tó at the beginning of the Early Copper Age may be a cultural response to climate change; it may have resulted from the widespread dispersal of settlements and more tree-felling over a larger forest area at that time, or it may be due to the establishment of a new Copper Age system of land use where more trees were felled for fields, pastures, and groves (Gardner 2002). Since the decline in tree pollen is a local phenomenon, it was probably the result of local-scale anthropogenic processes. The data from other parts of the Carpathian Basin do not indicate significant climate changes at the beginning of the Early Copper Age (Chapman et al. 2009; Gardner 2002; Sümegi 2004, 2007; Willis 1997, 2007; Willis et al. 1995).

Research at Early Copper Age Sites in the Vésztő Region

We conducted geophysical and soil chemistry surveys at four Early Copper Age sites near Vésztő (FIG. 2). Excavations at two of the sites—Vésztő-Bikeri and Körösladány-Bikeri—clarified the layout and internal organization of those settlements and provided the radiocarbon dates that permitted us to assess the duration and chronology of the Copper Age occupations (Yerkes et al. 2009).

Geophysical surveys were carried out by Sarris at all four sites (Sarris 2003, 2004, 2006; Sarris et al. 2004) by establishing rectangular grids and using fluxgate gradiometers to measure the vertical gradient of the local magnetic fields, taking measurements every 1 m, 0.5 m, or 0.25 m. Wider sample intervals were employed for identifying settlement boundaries, while closer intervals were used for mapping architectural details within settlements. Interpretation maps of feature distributions were based on identified anomalies. Sarris and his colleagues (2004) provide detailed descriptions of the data collection and analytical methods.

Systematic surface collections were also conducted at all four sites. In 1998, Parkinson used systematic surface collections at Okány-Futás, Vésztő-Bikeri, and Körösladány-Bikeri to estimate the size of the settlements and to identify activity areas (Parkinson 2006a: 81–121). In 2005, gridded surface collections were conducted at Okány-Futás and Körösladány-Bikeri to provide more precise information about site boundaries, settlement layouts, and activity patterns. Employing a technique adapted from intensive surveys in the Aegean (e.g., Davis et al. 1997), all surface artifacts in each grid square were collected, recorded, and analyzed.

Soil chemistry studies were conducted at three of the Early Copper Age sites, Okány-Futás, Vésztő-Bikeri, and Körösladány-Bikeri. Cores were extracted using an Oakfield hand coring device, and samples were collected from the plowzone at depths of 15–20 cm below surface (cmbs) and from soil horizons below the plowzone at depths of 45–50 cmbs. The Okány-Futás samples were tested for extractable phosphorous with Ring Chromatography, or spot tests (Salisbury 2008). Although this method is qualitative, Eidt (1973, 1977) and others have applied spot tests to gain a general understanding of the vertical and horizontal limits of human occupation and identify general activity areas, since high phosphorous levels are found where manure and organic refuse accumulated. Spot tests are thus particularly useful as a quick and inexpensive field test for site identification and delimiting vertical and horizontal site boundaries. The analysis of total phosphorous produces quantitative results and is regarded as a reliable index of human activities that result in phosphorous deposition when compared to natural background levels (Holliday and Gartner 2007). At the larger, multicomponent Körösladány-Bikeri site, samples were analyzed for total phosphorous, percent of organic content, magnetic susceptibility, and pH (Sarris et al. 2004; Yerkes et al. 2007). Phosphate levels for the samples from the initial chemical survey at Vésztő-Bikeri were determined using a colorimetric technique for Molybdate Reactive Phosphorous, described in detail in Murphy and Riley (1962).

Guided by the results of these noninvasive studies, systematic excavations were conducted at Vésztő-Bikeri and Körösladány-Bikeri. Several large blocks were laid out and excavated by natural stratigraphic levels to clarify the chronological and cultural relationships between the two adjacent Early Copper Age settlements and the nearby Vésztő-Mágor tell, which is about 2 km away (FIG. 4). Vésztő-Bikeri is a single-component fortified village where all features date to the Early Copper Age—with the exception of two intrusive burials from the Hungarian Conquest period (10th century A.D.). Located only 70 m to the west, Körösladány-Bikeri was also a fortified Early Copper Age village, but the site was reoccupied during the Bronze Age (Gáva culture, 1300–900 CAL B.C.) and the Sarmatian period (ca. 2nd–4th centuries A.D.) (Parkinson et al. 2004b).

Vésztő-Mágor (Vésztő 15): a fortified multicomponent tell settlement

The Vésztő-Mágor tell is located inside an abandoned meander loop of the Holt ("Dead") Sebes-Körös River (FIG. 4) on a small rise of redeposited alkaline loess that covers an area of ca. 4.25 ha. The tell rises to a height of ca. 9 m above the river terrace (Hegedűs 1977, 1982; Makkay 1986; Hegedűs and Makkay 1987) and was occupied from the Middle Neolithic to the Middle Bronze Age. An Árpád period monastery was constructed on the southern part of the tell at the beginning of the 2nd millennium A.D.

Early Copper Age levels at the tell contain burials and features from two Tiszapolgár phases. Graves of the later phase cut into the earlier level that contained several domestic structures (Hegedűs and Makkay 1987: 91; Makkay 1986, 2004). Parkinson (2006b) conducted stylistic analyses of the Early Copper Age ceramic assemblage from Vésztő-Mágor and found significant differences between the ceramics from the tell and assemblages from Vésztő-Bikeri and Körösladány-Bikeri, which were very similar to one another. Cattle bone from one of the Early Copper Age levels yielded an AMS date of ca. 4350–4050 CAL B.C. (Parkinson et al. 2004a: 106, table 2; Yerkes et al. 2009).

Geophysical survey of a 46,600 sq m area at Vésztő-Mágor was conducted in 50 cm intervals. The application of directional derivatives and directional filters revealed the presence of several anomalies that correspond to different phases of occupation at the tell (Sarris 2006). The most significant features are a series of rectilinear anomalies (FIG. 5; M5, M6, M7, and M8) that enclose the northern section of the tell. The symmetry of these anomalies is not as obvious to the south. Based on excavations of anomalies with similar magnetic signatures at Vésztő-Bikeri and Körösladány-Bikeri (Parkinson et al. 2004b; Yerkes et al. 2009), we believe the anomalies to be associated with a prehistoric fortification system of concentric ditches and a palisade; however, since similar ditched features occur at Late Neolithic, Copper Age, and Bronze Age settlements in the region (Bóna 1995; Horváth 1988; Raczky et al. 2002, 2007; Schier and Draşovean 2004), the fortifications at the tell could date to any of those periods. The outer trench is defined by anomaly M6 (FIG. 5). The inner trench (M7) runs parallel to the outer trench, about 20 m to the south. A third trench (M5) is located about 2–3 m to the north of M6. Another curvilinear feature (M22) extends from the southern edge of the tell for at least 100 m in a W–E direction and then continues further to the north (M19). A rectangular feature (M20) is located at the northwestern edge of anomaly M19, close to the museum at the tell. Two strongly magnetic segments M14 and M13, similar to that of M19, are

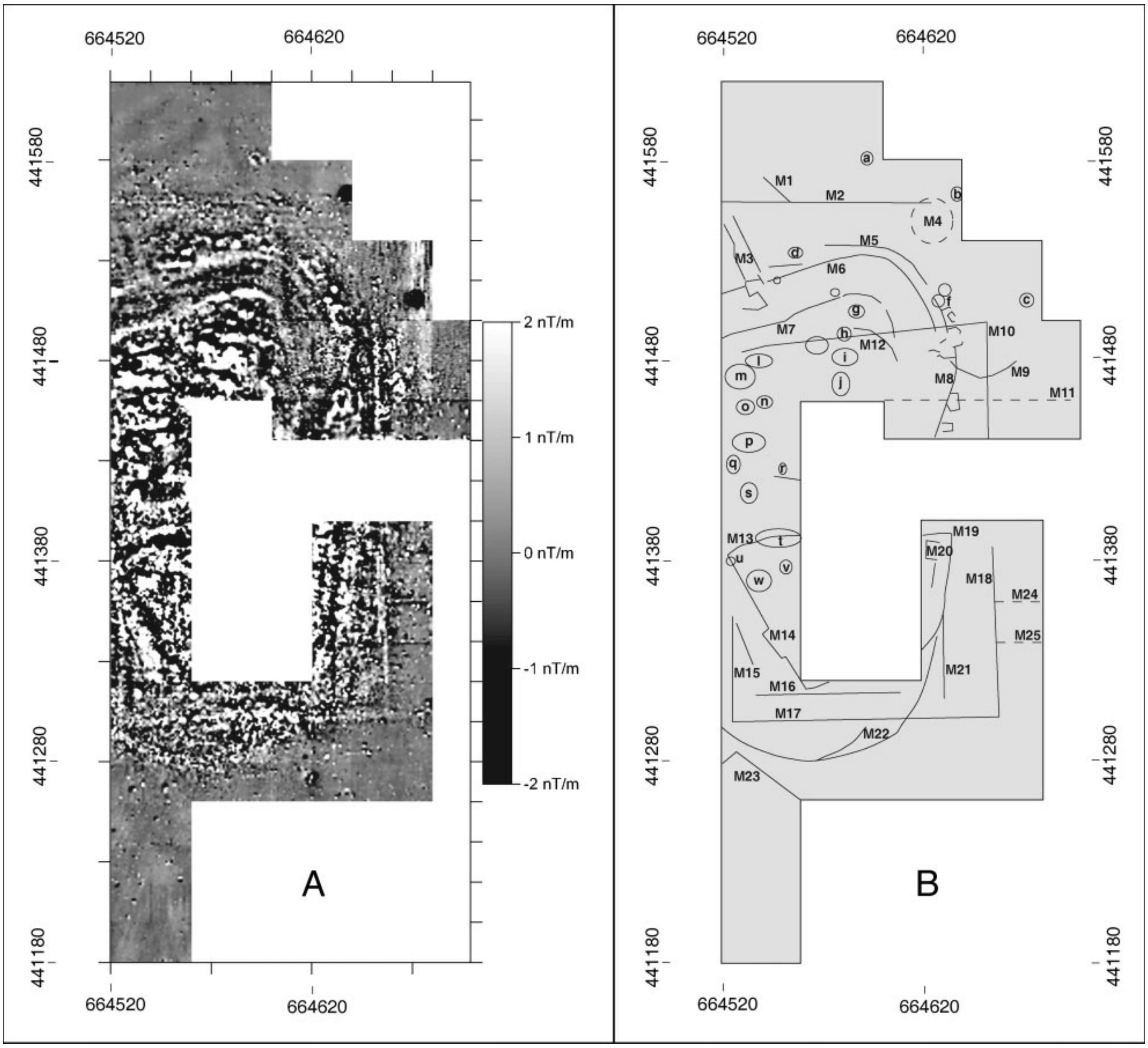

Figure 5 Map of magnetic anomalies at Vésztő-Mágor. A) Vertical magnetic gradient; B) Diagrammatic representation of magnetic anomalies. Adapted from Sarris (2006: 30, fig. 4.1.16) by Jill Seagard (The Field Museum).

located on the southwestern slopes of the tell. If M13, M14, and M19 are parts of the same feature, they may define a wall around the yard of the Árpád period monastery. The large rectangular anomaly enclosing the entire tell (M2, M10, M15, and M18) may mark the outline of an historical fence.

Earlier excavations at Vésztő-Mágor and our recent geophysical survey suggest that it was a large settlement complex established at the end of the Middle Neolithic, during the Szakálhát phase. The site expanded both vertically and horizontally throughout the Late Neolithic period to form a tell. At the time of the initial Middle Neolithic settlement, a river channel ran along the southern end of the tell. The channel began to migrate southwards at a rate of approximately 300 cm per century and formed a u-shaped meander loop that enclosed the tell and a flat river terrace. The tell was abandoned before the end of the Late Neolithic and appears to have remained unoccupied, as indicated by a paleosol (marked by a buried A horizon) that formed on its surface. The tell was reoccupied during two phases of the Early Copper Age by Tiszapolgár groups who built domestic structures and later dug several graves that cut through the abandoned houses. Use of the tell by later Middle Copper Age Bodrogkeresztúr Culture villagers ended with a second occupation hiatus marked by another paleosol with a buried A horizon. The tell was reoccupied during the Middle Bronze Age (Gyulavársánd Culture). The ditches and palisades were probably constructed during one or more of these phases.

Okány-Futás (Okány 16): a small Early Copper Age farmstead

Approximately 11 km SE of Vésztő-Mágor, Okány-Futás lies on a small rise ca. 150 m SE of an abandoned meander of the Holt-Sebes-Körös River. Ecsedy and his colleagues (1982: 136) collected daub and Tiszapolgár Culture artifacts at the site. Later, Parkinson (2006a: 112–113) found a denser concentration of artifacts in a small ca. 0.21 ha area, and a more dispersed artifact scatter extending over ca. 0.61 ha. In 2005, our controlled surface collection at

Okány-Futás came from 10 × 10 m squares on the same grid as Sarris' geophysical survey. Crops of different heights were standing on the surface during these surveys (wheat in the north, maize in the middle, and alfalfa in the south), generating different visibility ranges across the site during the surface collection. In 2006, 59 cores were taken at 10 m intervals on the site grid to collect soil samples. Salisbury revisited the site in 2007 and extracted 98 more cores for soil chemical analysis (Salisbury 2008). Samples were collected from 13,000 sq m of the site and 50 m transects extending beyond the site. Six additional off-site control samples were taken to establish culturally sterile chemical signatures. From each core, samples were taken at the base of the plowzone (30–40 cmbs), and from the top of the subsoil (45–55 cmbs).

The gridded surface collection yielded a low-density scatter of primarily Early Copper Age (Tiszapolgár Culture) pottery and daub that extended over an E–W area of about 100 × 40 m (FIG. 6). A total of 3058 sherds were collected from 171 grid squares covering 17,100 sq m at Okány-Futás, generating an overall ceramic density across the site of 18 sherds per 100 sq m (sherd density by weight was 112 g per 100 sq m). Distributions of ceramics and daub were similar across the site, with the exception of an area in the north central part of the grid where higher densities of both daub and ceramics were recorded. This location is associated with a rectilinear anomaly (O6) identified during Sarris' geophysical survey, interpreted as a house measuring ca. 10 × 7 m (see below).

Sarris' magnetometry survey was conducted in 0.5 m intervals along transects 1 m apart, and covered a total area of 15,200 sq m of the Okány-Futás site. Extreme dipolar magnetic values were identified in the north and a few more clusters of high values were recorded in the eastern and western portions of the site (Sarris 2006). Surface artifacts suggested that several anomalies in the eastern portion of the site (O1, O2, O3, O4, and O5) are modern features. The most distinctive anomaly is O6 (FIG. 6), which is approximately 10 × 7 m. Based on similar anomalies at Vésztő-Bikeri (see below), O6 probably marks the wall foundation trenches of a structure oriented NW–SE that may have been divided into more than one room. The NE end of the structure terminates at a circular anomaly, and another is located outside the SW corner of the structure. Both of these anomalies may mark the locations of residues from firing, perhaps cleaned-out hearths or ovens. Outside the SW corner of the O6 structure, another rectangular structure of lower magnetic strength was identified (O7). It has an orientation similar to O6 and approximate dimensions of 10 × 9 m. Another possible structure may be indicated by O8, but it lacks the clear geometric attributes of O6 and O7. The Tiszapolgár Culture artifacts from the surface near these structures suggest that they date to the Early Copper Age (FIG. 6A). No anomalies associated with defensive enclosures were identified during the geophysical survey.

Phosphorous levels in the core samples from Okány-Futás reflect elevated values within the site boundaries when compared to the background samples. The higher levels of phosphorous are from the north-central area, near the rectilinear anomaly (O6) and the concentration of ceramics and daub. A spike in phosphorous values also occurs to the SE, away from the paleochannel (FIG. 6C).

Our research at Okány-Futás reveals a small, single-component, Early Copper Age hamlet with one to three structures. Excavations at Vésztő-Bikeri suggested that Copper Age houses were rebuilt, in one case even reusing the foundation trench of an earlier building (see below). If a similar process occurred at Okány-Futás, it is likely that only one of the structures would have been occupied at a time. The hamlet seems to have been inhabited by a small group for a short period of time. This interpretation is supported by the low density of surface artifacts, as well as the pattern of phosphate levels; these data complement the location of the magnetic anomalies and surface concentrations of ceramics and daub, which do not seem to have been disturbed by later occupation (FIG. 6). The settlement layout at Okány-Futás differs significantly from the Early Copper Age occupations at the multicomponent Vésztő-Mágor tell site, as well as the two fortified Early Copper Age villages, Vésztő-Bikeri and Körösladány-Bikeri.

Vésztő-Bikeri (Vésztő 20): a fortified Early Copper Age village

Vésztő-Bikeri is located on a low rise of redeposited loess along the north bank of an abandoned tributary of the Sebes-Körös River. It lies 2 km south of the Vésztő-Mágor tell and 70 m east of the Körösladány-Bikeri site. These two sites are divided by the modern Dió-éri Canal (FIGS. 2, 4). Vésztő-Bikeri was first identified during surveys by Ecsedy and his colleagues (1982: 188). A later survey conducted by Parkinson identified surface remains over ca. 0.4 ha (Parkinson 2006b: 117). The high degree of spatial patterning in surface material indicated that sub-plowzone cultural layers probably were intact. Features identified from surface collections included two dense burned daub concentrations with Tiszapolgár ceramics, a scatter of human bone, and a concentration of faunal remains—all parts of a single-component Early Copper Age village. Four 2 × 2 m test units excavated in 2000 to identify the extent and integrity of subsurface layers revealed a stratified Copper Age occupation extending 0.6–1 m below the modern surface, an unusually thick occupation layer for an Early Copper Age site. From 2001 to 2005, several

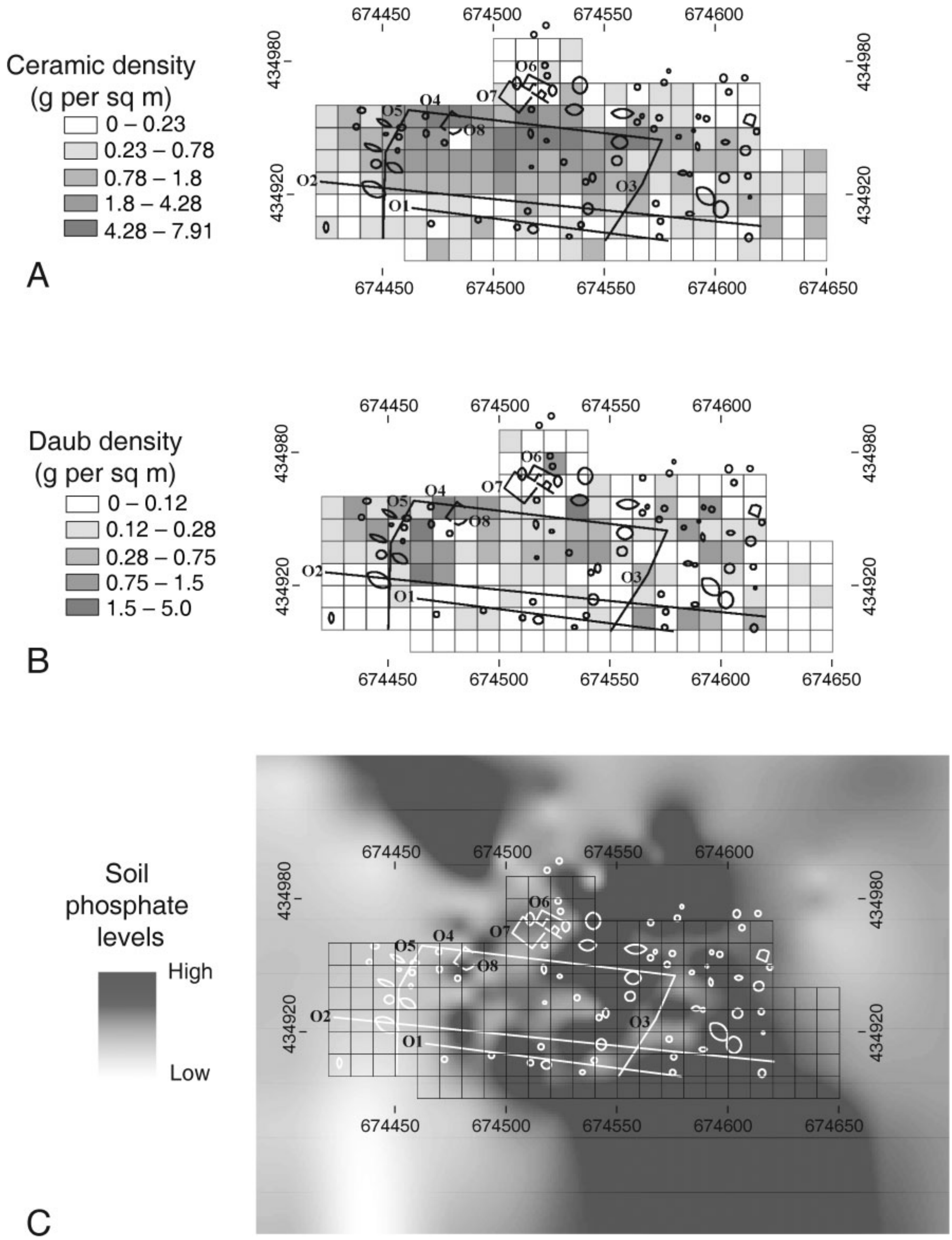

Figure 6 Maps of Okány-Futás. A) Sherd density (g per sq m) overlain with magnetic anomalies; B) Daub density (g per sq m) overlain with magnetic anomalies; C) Soil phosphate levels (recorded by field spot tests, low-0, high-5) overlain with magnetic anomalies. Maps by Margaret Morris, Roderick Salisbury, William Parkinson, and Jill Seagard (The Field Museum).

large blocks covering ca. 500 sq m were excavated. In 2002, sediment samples were collected for soil chemistry, and a geophysical survey was conducted.

At Vésztő-Bikeri, samples for soil chemistry were collected in 10 m intervals within a 9400 sq m grid. In addition, two transects were extended 100 m to the east and south and samples were taken from nine control points to establish natural background levels (Sarris et al. 2004). The phosphorous levels at the site were higher than the surrounding area. Highest phosphorous values were concentrated in a donut-shaped distribution around the lower phosphorous values at the center of the site containing several structures. The high phosphorous values correspond to a ring midden around the perimeter of the settlement (FIG. 7). We attribute this clearly defined, donut-shaped distribution to a short but intensive occupation of the site during the Early Copper Age.

Magnetometry survey at Vésztő-Bikeri was conducted at 0.5 m intervals with resurvey at 0.25 m

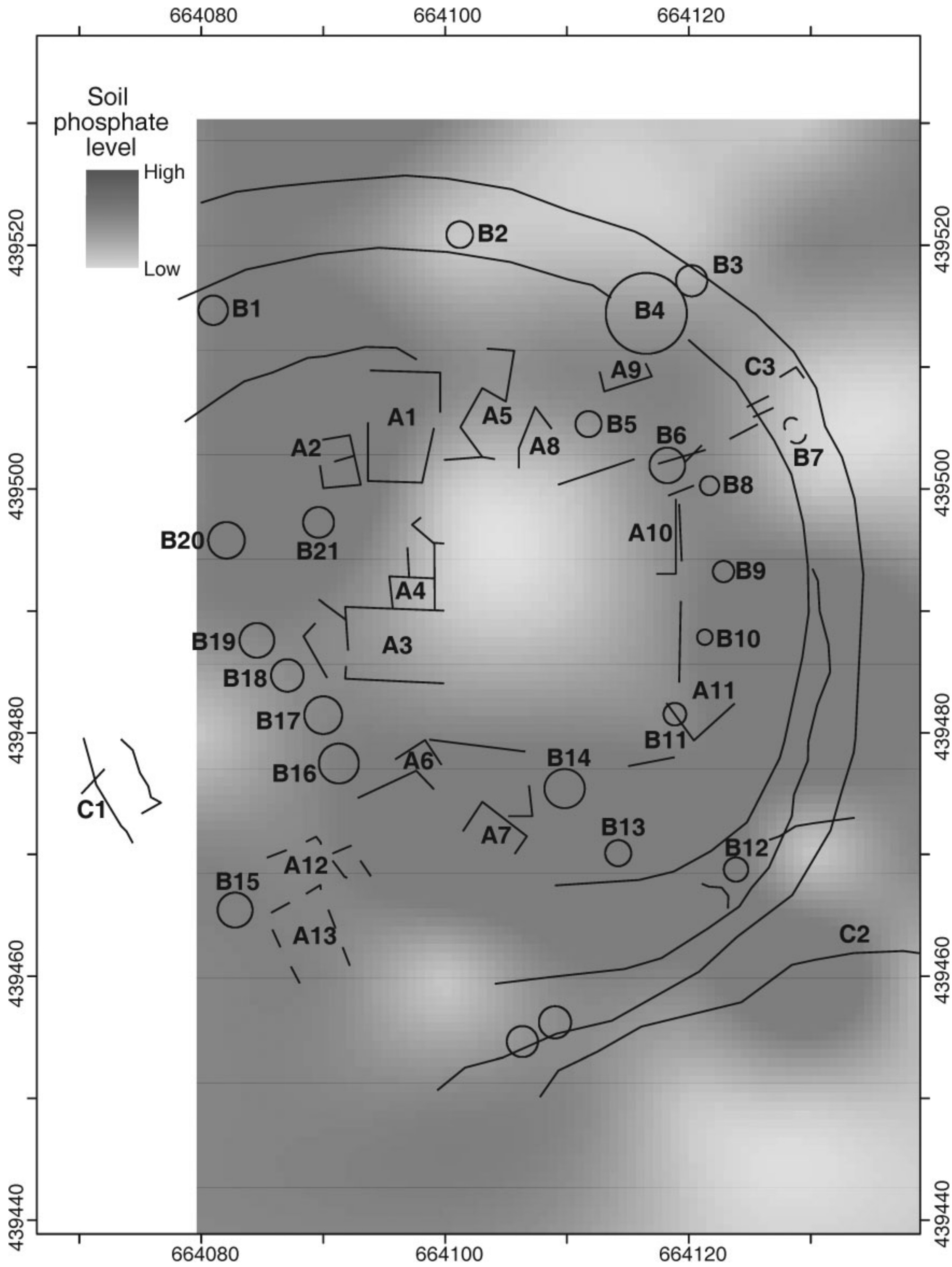

Figure 7 Magnetic anomalies and soil chemistry at Vésztő-Bikeri. Soil phosphate values are based on colorimeter readings from high phosphorous content (1% light transmission) to low content (81.5% light transmission). Adapted from Sarris (2003: 20, fig. 5.8) by William Parkinson and Jill Seagard (The Field Museum).

intervals to increase the resolution of some features. Large circular and rectilinear anomalies and smaller dipolar anomalies were recorded (FIG. 6). Three large concentric anomalies encircled the entire site. Excavations in Blocks 5, 6, and 7 revealed that these were trapezoidal ditches, a palisade, and a ring of large, deep postholes—a substantial defensive system enclosing the site (FIGS. 8, 9). The inner ditch was 0.4–0.75 m wide with a diameter of 65 m. The outer ditch was trapezoidal or v-shaped in cross-section, 0.4–1.6 m wide, and ca. 75 m across. It extended up to 1.6 m below the present ground surface. There were many closely spaced postholes in the inner palisade ditch (0.2–0.3 m in diameter) extending up to 1.7 m below the surface. A third shallow ditch (0.4 m wide, 0.8 m deep) was exposed midway between the inner palisade and outer ditch in Blocks 5 and 6, but it was not detected by the geophysical survey. The fill in the inner and outer ditches contained Tiszapolgár ceramics, burned daub,

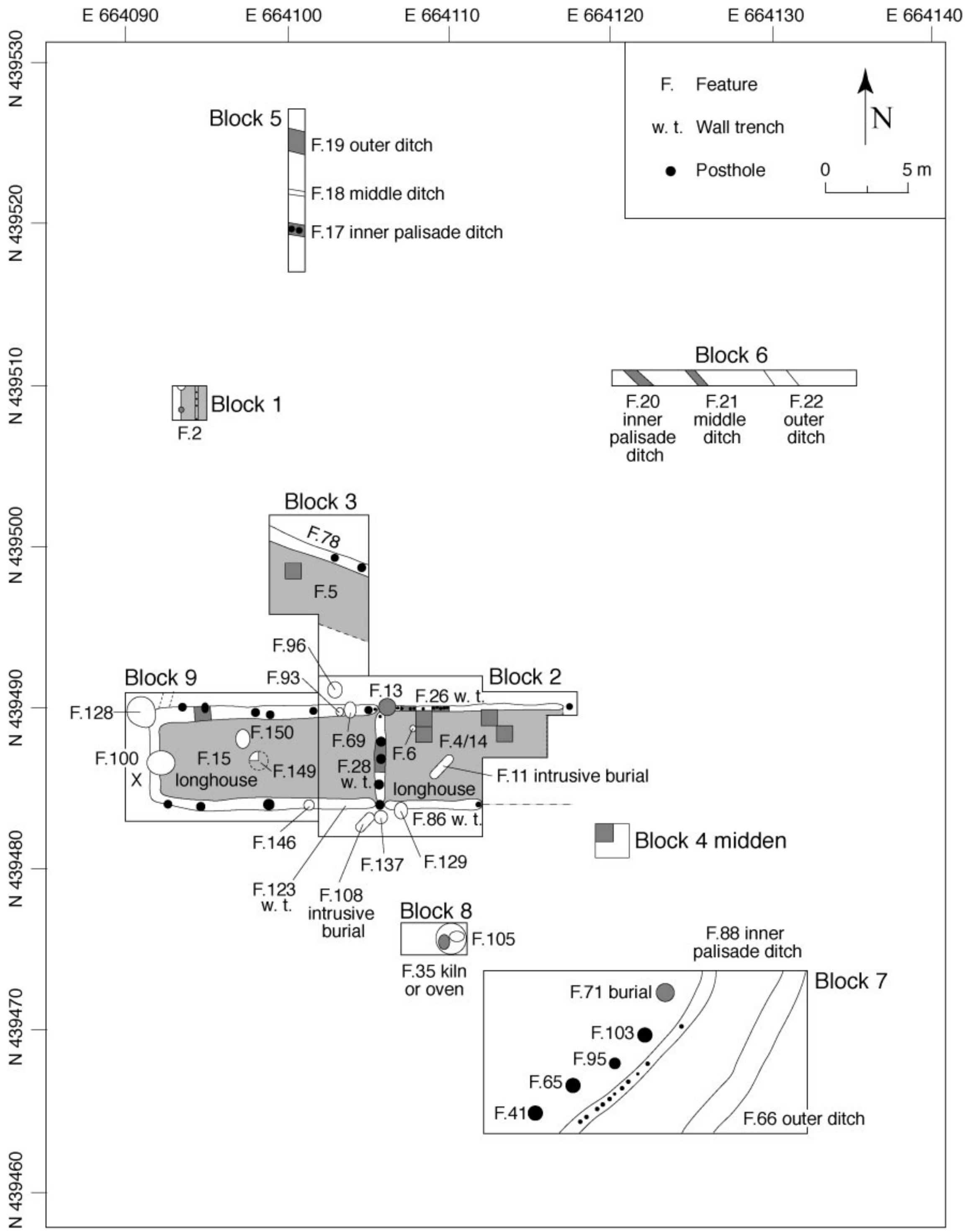

Figure 8 Plan of Excavation Blocks and Early Copper Age features at Vésztő-Bikeri. The shaded areas indicate features and excavation units sampled for radiocarbon dating. Plan by Richard Yerkes and Jill Seagard (The Field Museum).

bone, charcoal, and shell. Discontinuities near anomalies C3 and B12 may be gates (Parkinson et al. 2004b; Sarris et al. 2004; Yerkes et al. 2007).

The enhanced magnetic signals of 11 architectural features at Vésztő-Bikeri (A1–A11) are due to burned daub and artifacts in the fill of deep wall trenches. Excavations in Block 1 exposed segments of wall trenches associated with anomaly A1, which may be a structure measuring 10 × 5 m. A smaller 4 × 3 m rectangular anomaly (A2) was located to the sw of A1. To the south, 3 × 3 m (A4) and 5 × 8 m (A3) anomalies were recorded. Excavations in Blocks 9 and 2 exposed Feature 15, a longhouse indicated as anomaly A3 (FIGS. 7, 8). Its walls were constructed with large posts, mud, and wooden planks using a pisé technique (Gyucha et al. 2006). After Feature 15 was abandoned, its eastern foundation trench was reused as the west wall trench of Feature 4/14, a burned wattle-and-daub longhouse excavated in Block 2. Feature 78, a NW–SE oriented wall trench excavated in Block 3 may have been marked by a diagonal linear anomaly north of A4 (FIGS. 7, 8). The other anomalies (A5, A6, A7, A8, A9, A10, and A11) form an arc around the site center, but none overlap.

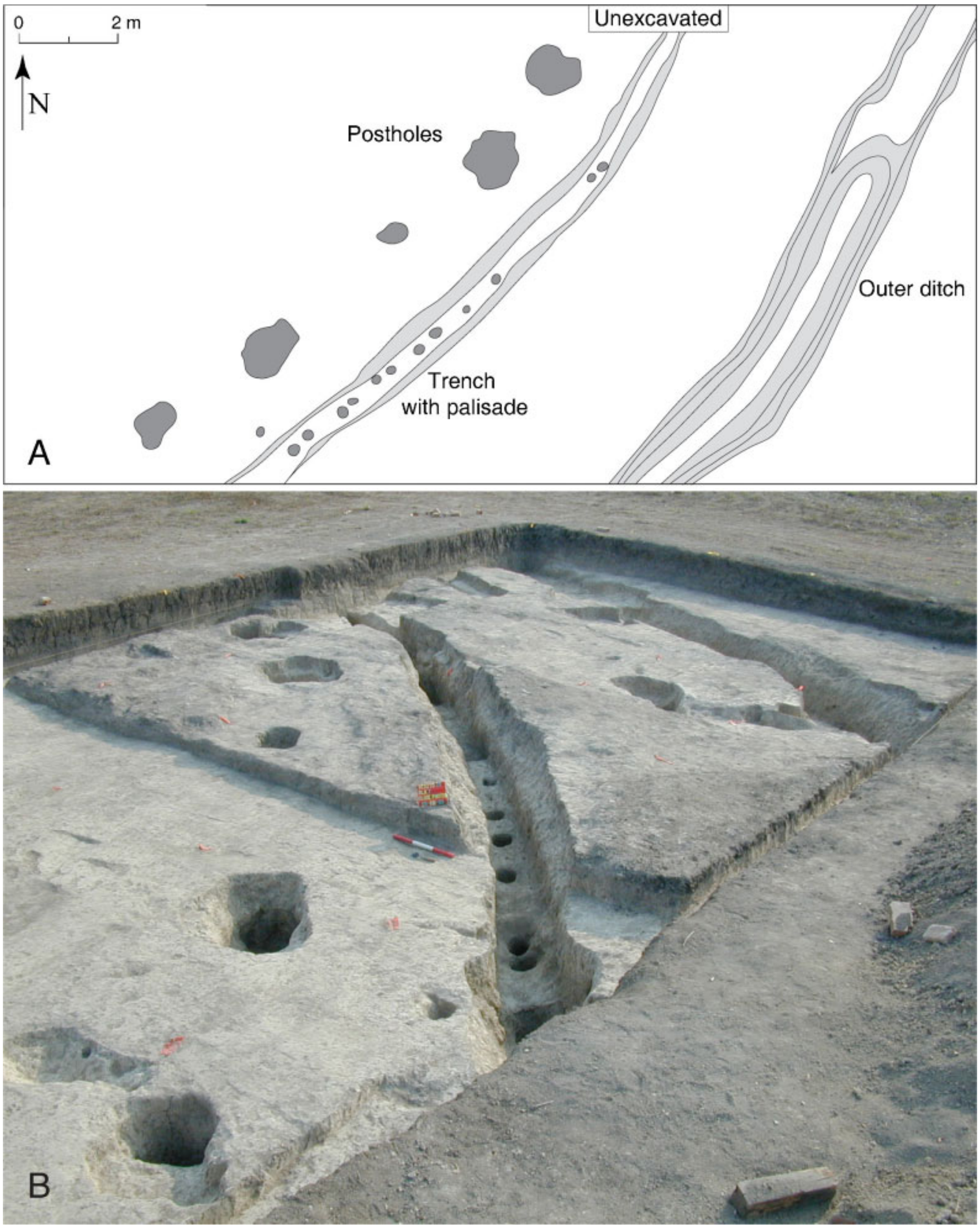

Figure 9 Block 7 at Vésztő-Bikeri showing the location of the ditches and palisade surrounding the settlement. A) Composite plan map of Block 7; B) Photo of Block 7 from SW, looking NE. Photo by William Parkinson, plan map by Dóri Kékegyi (Field Service for Cultural Heritage, Hungary). Illustration redrawn by Jill Seagard (The Field Museum).

Anomalies A12 and A13 are not as distinctive as A1–A11; they are located where human remains were found on the surface (Parkinson 2006a: 117).

Some of the strong dipole anomalies (e.g., B1, B3, and B5) are metal fragments or nails, and B4 is the metal datum point. Lower values of the vertical magnetic gradient at anomaly B14 suggested the existence of a kiln, oven, or hearth. Excavations at this location (Block 8) revealed a 3 m-deep, circular pit with a diameter of 1.8 m that may have been a well or cistern, filled in with burned daub. At the top of the daub fill, several small rectangular ovens or kilns were constructed just below the surface (FIGS. 7, 8). Cores through the fill encountered gleyed clay deposits at the bottom (Parkinson et al. 2004b; Yerkes et al. 2007). The weaker monopole anomalies (B6, B8, B9, B10, B16, B17, B18, B20, and B21) along the eastern and western edges of the center are interpreted as pits or hearths, since their magnetic signature is similar to excavated features of this type (Sarris 2003; Sarris et al. 2004). A few isolated anomalies outside the central cluster (B2, B7, B12, B22, and B23) may be associated with the inner palisade and outer ditch.

Unlike Vésztő-Mágor and Okány-Futás, the Early Copper Age settlement at Vésztő-Bikeri was a single-component fortified village that was occupied for several generations at the very beginning of the Copper Age. The absolute dates from the site overlap with dates for the transitional Proto-Tiszapolgár phase at tell Berettyóújfalu-Herpály located in the adjacent Berettyó Valley (Parkinson et al. 2004b: 69; Yerkes et al. 2009). The features at Vésztő-Bikeri exhibit characteristics that link Late Neolithic and

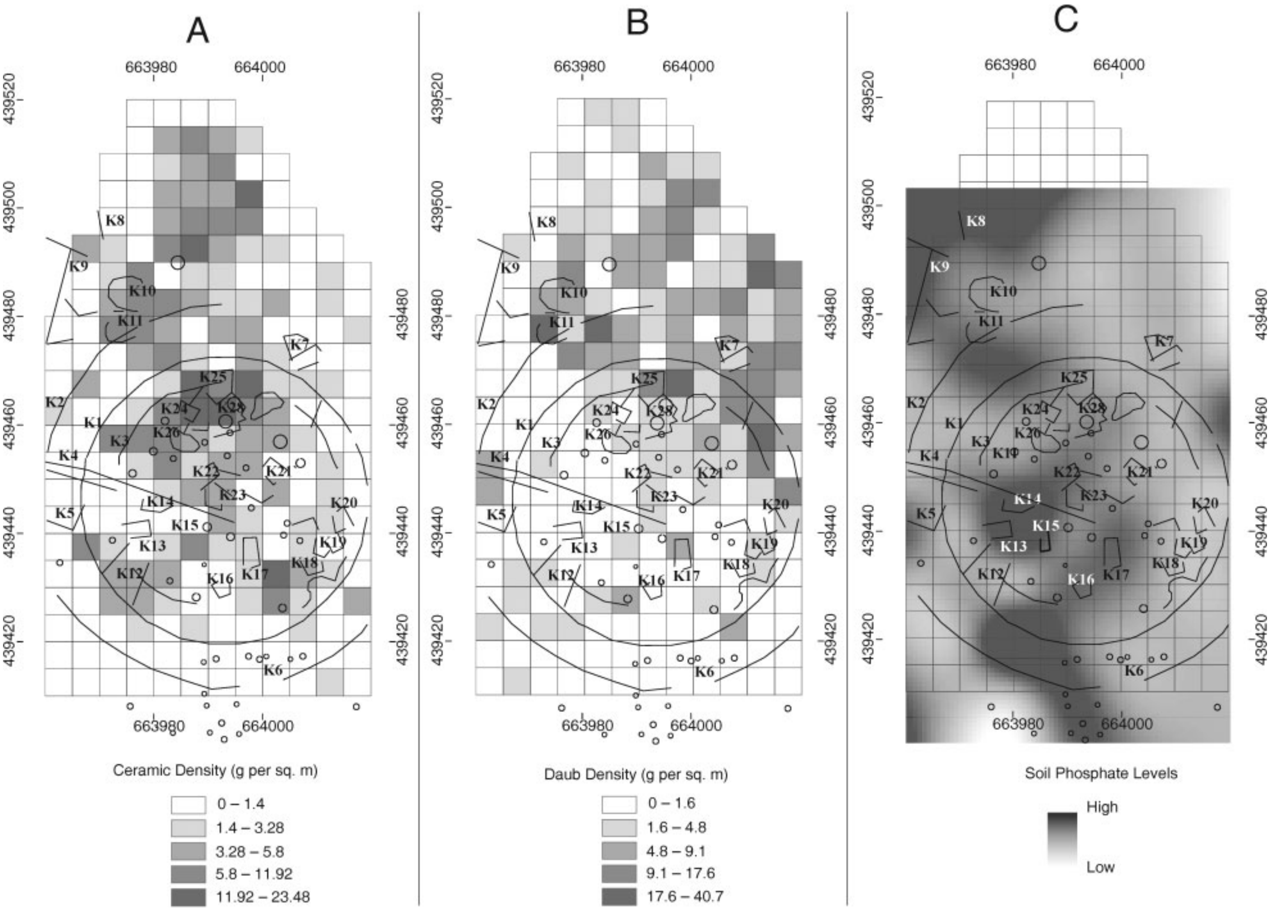

Figure 10 Maps of Körösladány-Bikeri: A) Sherd density (g per sq m) overlain with magnetic anomalies; B) Daub density (g per sq m) overlain with magnetic anomalies; C) Extractable soil phosphate levels (μm per kg) overlain with magnetic anomalies. Maps by Margaret Morris, Roderick Salisbury, William Parkinson, and Jill Seagard (The Field Museum).

Copper Age cultural traditions, including longhouses with deep wall trenches and fortifications consisting of palisades and ditches. The pisé house construction technique exhibited in Feature 15 at Vésztő-Bikeri was used on structures from Late Neolithic Tisza Culture layers at Vésztő-Mágor (Gyucha et al. 2006); but rather than rebuilding houses in the same location, in the tell-building tradition of the Neolithic, longhouses at Vésztő-Bikeri Features 15 and 4/14 were constructed adjacent to each other, reusing a common wall trench. This same Copper Age tradition—relocating horizontally rather than vertically—also applied to the settlements themselves.

Körösladány-Bikeri (Körösladány 14): a fortified Early Copper Age village

Körösladány-Bikeri is located on a low loess ridge 70 m west of Vésztő-Bikeri across the Dió-éri Canal. Hungarian survey teams recorded a scatter of Tiszapolgár material at the site, with only a few Sarmatian sherds (Ecsedy et al. 1982: 106). Parkinson (2006a: 102, fig. 6.9) noted that most of the surface finds came from an area of ca. 0.5 ha, while a lower-density artifact scatter of 2.4 ha extended to the south. The northern extent of the artifact distribution was truncated by overburden from canal dredging. Surface daub scatters suggested that the Copper Age levels at this site also retained their stratigraphic integrity, although the surface features were not as distinct as they were at Vésztő-Bikeri. Later excavations revealed that unlike Vésztő-Bikeri, where only the burials from the Hungarian Conquest period disturbed the Copper Age deposits, Körösladány-Bikeri had several intrusive Late Bronze Age and Sarmatian features (Parkinson et al. 2006; Yerkes et al. 2007). Also, while the settlement at Vésztő-Bikeri was used for several generations at the beginning of the Copper Age, there were two discrete Early Copper Age levels at Körösladány-Bikeri. This complex occupation sequence complicated the interpretation of surface artifact distributions, soil chemistry patterns, and geophysical survey results.

In 2001, guided by the earlier surface surveys, we excavated two 2 × 2 m test units (Blocks 1 and 2, K10 and K11 on FIG. 10) at the northern edge of the site where daub scatters were clearly defined. No intact Copper Age features were identified in these test excavation units, which were located just beyond the northern edge of the fortification ditches identified during the later geophysical survey at Körösladány-Bikeri (FIG. 10). Samples collected in 2003 for soil chemistry analysis were extracted from cores taken at 10 m intervals on the site grid over an area of 4800 sq m, and from transects extending off-site 100 m to the west and south for background chemical data. Six cores were taken from randomly selected points to provide additional off-site samples. As at Vésztő-Bikeri and Okány-Futás, phosphorous levels were substantially higher within the Körösladány-Bikeri site than in the surrounding area, but unlike the donut-shaped pattern at Vésztő-Bikeri, variation in values were less clear at Körösladány-Bikeri (FIG. 10C). We attribute this to the multicomponent nature of the settlement.

Gridded surface collections at Körösladány-Bikeri covered an area of 5350 sq m (FIGS. 10A, 10B). A total of 1713 sherds were collected, with an average sherd density of 32 sherds per 100 sq m (average sherd density by weight was 286 g per 100 sq m). The sherd density by weight was considerably higher than at Okány-Futás, where average sherd density is only 112 g per 100 sq m, but these values represent only a moderate density of surface material at Körösladány-Bikeri when compared to other Neolithic and Copper Age sites in the area (Parkinson 2006a). The surface distribution of daub complements the pattern of ceramic density. The average daub densities (by weight) were significantly higher at Körösladány-Bikeri (369 g per 100 sq m) than at Okány-Futás (29.6 g per 100 sq m), suggesting that there were more burned structures at the larger site. Although it is tempting to elaborate on differences in surface densities between the sites, several postdepositional processes influenced the recovery of surface materials, including surface visibility and depth of plowing. The problem is compounded by the large Sarmatian pits dug through the Copper Age levels at Körösladány-Bikeri, which resulted in a higher concentration of daub and Early Copper Age ceramics on the surface of the site in those areas. As a result, the surface densities were misleading guides for locating subsurface features at Körösladány-Bikeri.

Geophysical data from Körösladány-Bikeri were collected in 0.5 m intervals on the site grid over an area of 5600 sq m. Several anomalies associated with the occupation phases at the site were recorded. Most striking are the three concentric anomalies (FIG. 10) that surround the site—which have direct parallels at Vésztő-Bikeri. The inner ditch at Körösladány-Bikeri (K3) was 40 m in diameter and 1 m wide. It exhibited non-uniform magnetic intensity, probably due to the postholes at its base. The middle anomaly (K1) was located 5 m out from the inner palisade ditch. It was 50 m in diameter and 2–2.5 m wide. The outer ditch (K2) was 10 m outside the large middle ditch. It was 70 m in diameter with a width of ca. 1 m. It also exhibited non-uniform magnetic intensity. The palisade and ditch system was confirmed by our excavations in Blocks 5 and 7. The narrow (0.4 m wide) inner ditch (K3) was similar to the inner palisade trench at Vésztő-Bikeri, with closely spaced postholes extending up to 1.7 m below the present surface. At Körösladány-Bikeri and Vésztő-Bikeri, the palisade posts were removed before the inner ditch was filled in. The middle ditch (K1) was trapezoidal in cross-section, ca. 3.8 m wide and 2.2 m deep. The outermost ditch was 2–2.3 m wide and 1.6 m deep, comparable to the outer ditch at Vésztő-Bikeri. The outermost ditch was trapezoidal in cross-section with a flat bottom cut in a series of steps, each about 1.3 m long (FIG. 11). An 18 m-long anomaly (K4) on the western edge of the site may be associated with a gate and pathway that led away from the settlement. Anomalies K5, K12, and K18 may also represent gates.

Several rectilinear anomalies (K13, K14, K15, K16, K17, K19, K20, K21, K23, and K24) were identified inside the palisade and between the palisade and the middle ditch at Körösladány-Bikeri, but unlike similar anomalies at Vésztő-Bikeri, which were larger, concentrated in the center of the site, and did not overlap, these smaller ($<5 \times 3$ m) anomalies were randomly distributed, overlapped frequently, and had weaker magnetic signals. The lack of similar magnetic intensity at Körösladány-Bikeri may mean that fewer houses were burned, or that the incidents of burning were less intense. Our excavations did not expose any foundation or wall trenches associated with these anomalies, and they dated to several different phases of occupation. The few monopole- or dipole-type magnetic anomalies at Körösladány-Bikeri may represent pits or hearths. The more pronounced dipole anomalies (K22, K18, and K6) near K10 and K11 are associated with metal fragments. Other strong isolated anomalies in the north (K26, K27, and K28) are probably associated with pits or kilns. Excavations at the location of these large monopole anomalies in Block 3 uncovered a Sarmatian pit over 2 m deep and 3 m wide, and a Late Bronze Age pit containing three nested Gáva culture ceramic drinking vessels. The large monopole anomalies may be related to intrusive features and later activities.

Our excavations in Block 7 also exposed an Early Copper Age well, Feature 48. The well was circular in plan with a diameter of 1.8 m at the top, ca. 2.5 m deep, and lined with planks. It filled in gradually during the final Early Copper Age occupation episode. Like the well or cistern at Vésztő-Bikeri, Feature 48 was located at the edge of the settlement, just inside the palisade wall. The fill layers of Feature 48 at Körösladány-Bikeri contained little burned daub and the pit was not reused after it was filled in.

Like the neighboring site of Vésztő-Bikeri, the Early Copper Age settlement at Körösladány-Bikeri was a fortified village. The two sites are also similar in size. Concentric external ditches and a palisade enclosed dwellings, storage/refuse pits, a well, and several infant burials that were laid on the surface

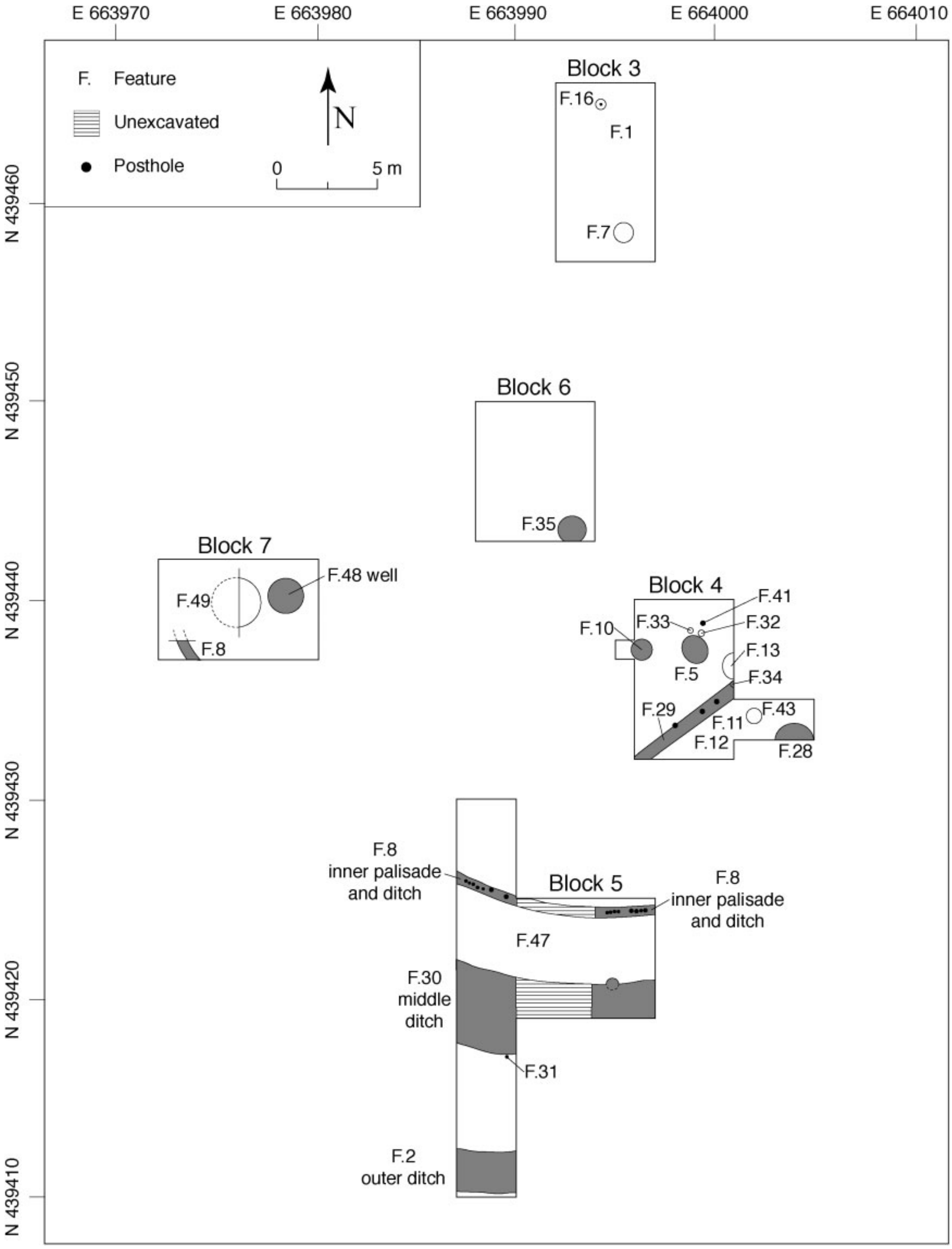

Figure 11 Plan of Excavation Blocks and Early Copper Age features at Körösladány-Bikeri. The shaded areas indicate features sampled for radiocarbon dating. Illustration by Richard Yerkes and Jill Seagard (The Field Museum).

before the villages were mounded over and abandoned (Yerkes et al. 2009). Instead of a roughly continuous occupation, there were two distinct Early Copper Age phases at Körösladány-Bikeri. Features associated with the final Copper Age occupation were dug through the sheet midden that mounded over the lower occupation level. These upper-level features are truncated by the plowzone. Features in the lower stratigraphic level at Körösladány-Bikeri cut through a thin cultural layer with low artifact density and a buried soil horizon that marks the elevation of the ancient land surface at the beginning of the initial Early Copper Age occupation. At both sites, defensive ditches were excavated and palisades were constructed when the villages were established. A thin cultural layer, which may include spoil from the ditches, accumulated above a buried soil horizon at both sites. Features associated with the initial occupation at both sites were dug through this lower cultural layer and the buried soil horizon.

The calibrated radiocarbon dates for the early occupation episode at Körösladány-Bikeri (summed probabilities for two samples: 4445–4341 CAL B.C., 1σ; 4459–4273 CAL B.C., 2σ) overlap the dates for the main phase at Vésztő-Bikeri (summed probabilities for 15 samples: 4448–4269 CAL B.C., 1σ; 4528–4173 CAL B.C., 2σ). The main occupation at Vésztő-Bikeri seems to have lasted for ca. 75 years, based on Bayesian modeling of 15 dates (Yerkes et al. 2009). Since only two dates are available from the early occupation episode at Körösladány-Bikeri, it is unclear how long it lasted. Vésztő-Bikeri may have been built first, but use of the Körösladány-Bikeri site, including the construction of the palisade and middle ditch, seems to have begun before Vésztő-Bikeri was completely abandoned. When the initial occupation phase at Körösladány-Bikeri ended, the palisade was dismantled and the inner palisade and middle ditches were filled in. During the final phase at Körösladány-Bikeri (summed probabilities for six dates: 4336–4173 CAL B.C., 1σ; 4349–4052 CAL B.C., 2σ), which may have lasted 45 years, the settlement seems to have expanded, and the outer ditch was constructed. This appears to have occurred after the main settlement of Vésztő-Bikeri was abandoned, but four younger dates from Vésztő-Bikeri (summed probabilities: 4335–4079 CAL B.C., 1σ; 4340–4047 CAL B.C., 2σ) suggest that parts of that site were still in use. Both settlements were abandoned around 4100 CAL B.C. (Yerkes et al. 2009).

Early Copper Age Settlement Formation, Duration, and Organization

During our research at four Early Copper Age sites in the Körös region, we identified changes in local and regional cultural traditions that separate the Neolithic period from the Copper Age on the Great Hungarian Plain. We identified several Late Neolithic cultural traditions that continued into the Early Copper Age—at least in this part of the plain. We also found that what were previously perceived to be abrupt cultural changes actually developed over several hundred years. Our results revealed a striking amount of variability in the formation, duration, layout, and organization of Early Copper Age settlements, even in a very small geographic area. Similar patterns of temporal and geographic variability likely characterized the transition between archaeological periods elsewhere in the world, but remain obscured due to a lack of systematically collected archaeological data.

Dating the transition to the Copper Age

The Late Neolithic-Early Copper Age transition in the Vésztő region began during the first half of the 5th millennium B.C. (TABLE 1; FIG. 3). The first settlement at Vésztő-Mágor was established at ca. 5300 CAL B.C., but the site was abandoned before the end of the Late Neolithic period, sometime after 5000 CAL B.C. (there are only four radiocarbon dates; summed probabilities: 5283–4795 CAL B.C., 1σ; 5308–4727 CAL B.C. 2σ). A small Early Copper Age settlement was established at Vésztő-Mágor between 4350 and 4050 CAL B.C. (based on a single sample, Beta-162061, with age ranges: 4345–4081 CAL B.C., 1σ; 4364–4046 CAL B.C., 2σ). During the interval between the end of the Late Neolithic Tisza Culture occupation and the beginning of the Early Copper Age Tiszapolgár Culture habitation at Vésztő-Mágor, some Early Copper Age groups may have visited Vésztő-Bikeri and Körösladány-Bikeri, since the earliest dates from both villages fall in that interval (Yerkes et al. 2009). Two of these early dates came from deposits on or in the floor of an Early Copper Age longhouse (Feature 4/14) in the center of Vésztő-Bikeri (Beta-162066 and Beta-162069). The third is from the fill of a circular pit (Feature 2) associated with another structure (Beta-162065). The summed probabilities for these three dates are: 4582–4456 CAL B.C. (1σ) and 4777–4372 CAL B.C. (2σ). These samples could be from older charred materials incorporated into the pit fill and floor deposits, or they may have come from an earlier occupation at Vésztő-Bikeri when a structure in Block 1 (Feature 2) was in use. At Körösladány-Bikeri, two radiocarbon dates on charcoal in posthole fill in the inner ditch (Beta-214597) and in fill from the middle ditch (Beta-234310) had summed probabilities of: 4666–4524 CAL B.C., 1σ and 4689–4464 CAL B.C., 2σ. These dates could also be from older charred materials incorporated into the ditch fills at the end of the initial occupation phase at Körösladány-Bikeri, but they may indicate that the earliest activities at that site took place at the end of the Late Neolithic period (ca. 4700–4500 CAL B.C.)

We did not excavate the site of Okány-Futás, so we cannot determine when the site was settled and how long it was inhabited. It seems to have been a small farmstead, and similar to those that may also have been established at Körösladány-Bikeri and/or Vésztő-Bikeri at the end of the Late Neolithic period. The only evidence in support of this interpretation is the calibrated range of five early radiocarbon dates from those sites; but these early dates are associated with Early Copper Age rather than Late Neolithic materials, although they overlap calibrated dates from Late Neolithic Herpály Culture and transitional Proto-Tiszapolgár levels at the Berettyóújfalu-Herpály tell located in the adjacent river valley (Parkinson et al. 2004b: 69; Yerkes et al. 2009). The single radiocarbon date from Early Copper Age levels at the Vésztő-Mágor tell had a range of ca. 4350–4050 CAL B.C., suggesting that the settlement on the tell was reestablished later in the Early Copper Age, contemporary with the final occupation phase at Körösladány-Bikeri, ca. 4350–4050 CAL B.C. (Yerkes et al. 2009), but after Vésztő-Bikeri was abandoned.

Settlement formation, duration, and organization

The results of our research indicate a striking amount of variation in Early Copper Age settlement size, layout, organization, and duration. There were several cultural links between Neolithic and Early

Copper Age groups in the region, including fortifications at Late Neolithic and Early Copper Age settlements; longhouses constructed with similar techniques in Late Neolithic Tisza Culture levels at Vésztő-Mágor and at the Early Copper Age Vésztő-Bikeri village (and possibly also at Okány-Futás); the relatively long duration of the settlement at Vésztő-Bikeri (like many Late Neolithic sites); and the mounding-over of abandoned Early Copper Age settlements (in a Neolithic tell-like fashion). Three of the Early Copper Age sites—Vésztő-Mágor, Vésztő-Bikeri, and Körösladány-Bikeri—continued the Late Neolithic tradition of intramural burial. Other features indicate a break in Neolithic traditions, such as a dispersed settlement system, more frequent relocation of settlements, and smaller dwellings (no longhouses in the later phases of the Early Copper Age). One of the most profound changes was the shift to small Early Copper Age settlements that replaced the larger Late Neolithic sites, with a reorganization of the households within those settlements (Parkinson 2002; Parkinson and Gyucha 2007).

Most Late Neolithic tells in SE Europe were fortified (Bailey et al. 1998; Gogâltan 2003; Horváth 1988; Parkinson and Duffy 2007; Raczky et al. 2002, 2007; Runnels et al. 2009; Schier 2008). On the Great Hungarian Plain, remote sensing surveys and new excavations have demonstrated that many Early Copper Age sites were also enclosed by palisades and ditches (Kovács et al. 1987; Raczky and Anders 2009). In the absence of excavation, we cannot be certain whether the multiple-ditched enclosure at Vésztő-Mágor dates to the Neolithic period and/or the Copper Age, but the configuration of the concentric enclosures resembles dated Neolithic and Copper Age fortifications rather than the Bronze Age defenses that usually consist of one large ditch (Bóna 1995). No fortifications were identified at the Early Copper Age farmstead at Okány-Futás. That site may have been occupied by a smaller group, or for a shorter length of time than the other Early Copper Age sites. Okány-Futás is located at the middle of an Early Copper Age settlement cluster and fortifications may have been limited to sites on the perimeter, such as Vésztő-Bikeri and Körösladány-Bikeri (FIG. 2).

Longhouses with deep foundation/wall trenches occur in Late Neolithic levels at Vésztő-Mágor (Gyucha et al. 2006; Parkinson and Gyucha 2007: 50–53), and similar houses were built during the initial occupation episodes at the Early Copper Age site of Vésztő-Bikeri (Yerkes et al. 2009). Although our excavations revealed extensive evidence from the later habitation phase at Körösladány-Bikeri, including bell-shaped storage pits filled with refuse and a filled-in well, we did not identify longhouses with deep wall foundation trenches at the site. Our geophysical survey identified a longhouse at the Okány-Futás farmstead, but excavations are required to date this feature. The absence of longhouses at Körösladány-Bikeri and in the Tiszapolgár levels at Vésztő-Mágor suggests that by the late Early Copper Age (4350–4050 CAL B.C.) construction methods had changed, and perhaps the Late Neolithic tradition of building longhouses with deep wall foundation trenches had been replaced by building less substantial dwellings.

Characteristics that link Early Copper Age settlements to their Neolithic predecessors include the continuous use of sites (e.g., Vésztő-Bikeri) and the repeated use of sites (e.g., Körösladány-Bikeri); this is how Neolithic tells were created, by prolonged use of favored locations, and through repeated construction and destruction of buildings on successive levels. Early Copper Age settlement organization was different, with small farmsteads (e.g., Okány-Futás) dispersed in larger, regional settlement clusters. There are examples of small Late Neolithic sites, but they are far less common and often located near tells or large, flat sites (Parkinson 2006b: 136).

Relationships between the sites

Parkinson's (2006b) analyses of stylistic patterns in the ceramic assemblages from the sites near the Vésztő-Mágor tell provide insight into the organization of social interaction between the settlements. The ceramic assemblages from Vésztő-Bikeri and Körösladány-Bikeri were nearly identical, suggesting that they may have been produced by the same group of potters, or by potters who were frequently exchanging ideas. The similarities include both high-visibility iconological or emblemic attributes, that may have been used to convey intentional expressions of group identity, and low-visibililty attributes that may be related to isochrestic variation, which results from enculturation and learning traditional styles almost unconsciously (Parkinson 2006b: 36–38; Sackett 1982; Voss and Young 1995). By contrast, the Copper Age ceramic assemblage from Vésztő-Mágor differs considerably from the Vésztő-Bikeri and Körösladány-Bikeri assemblages. This may indicate that the Early Copper Age group at Vésztő-Mágor was more distantly related to those groups. The variation could also be temporal, reflecting changes that developed within the same community over time, with the earlier Copper Age patterns expressed at Vésztő-Bikeri and Körösladány-Biker and the later patterns at Vésztő-Mágor (Parkinson 2006b: 52–53).

Elemental and petrographic studies of ceramics, carried out by Sam Duwe and Timothy Parsons (personal communication 2007), from Early Copper Age settlement sites in this region suggest a great deal of exchange. Analyses of 286 ceramic, daub, and clay samples from six different Early Copper Age sites demonstrated that a surprisingly large number of ceramics were exchanged among these sites. In their studies, nearly half the ceramics in the assemblages from each site were made with clay from distant sources, frequently from clay located near other sites. This high degree of interaction helps explain the increase in homogeneity that characterizes Early Copper Age material culture—especially in pottery—throughout the Great Hungarian Plain.

While there is evidence for frequent interaction between sites in the region, there is little evidence to suggest that groups in the Vésztő region were in regular face-to-face contact with groups living beyond the Great Hungarian Plain. Very little copper was recovered during our excavations at Vésztő-Bikeri and Körösladány-Bikeri. The lithic artifacts from the sites were small, heavily curated, reworked, and greatly reduced, suggesting only sporadic, indirect access to lithic raw material sources in Transdanubia, the Carpathians, and the Balkans (Gyucha and Parkinson 2008). Starnini et al. (2007) recognized a significant fall-off in the size of the lithic assemblages at Hódmezővásárhely-Gorzsa during the Late Neolithic (between the Classical and Late Tisza phases). This may be a trend that began during the Neolithic period and continued into the Early Copper Age in the Vésztő region.

The farmer-herders in the Körös region seem to have moved from nucleated tells to more autonomous farmsteads and villages at the beginning of the 5th millennium B.C., but they still interacted with the dispersed members of their social networks who lived in the scattered clusters of sites across the plain. As in other parts of southeastern Europe (Parkinson and Duffy 2007; Runnels et al. 2009), the fortifications at some villages suggest that interaction may not have been peaceful.

Conclusion: Multiple Scales and Long-Term Trajectories

Our study of Early Copper Age settlement formation, duration, and organization in the Körös region indicates that the characteristics traditionally used to differentiate Late Neolithic from Early Copper Age settlements on the Great Hungarian Plain occurred slowly and sequentially over several generations, culminating in new traditions with different archaeological signatures over several generations, and they also happened earlier in some regions than in others. Our results are not surprising; we did not expect to find that there was a specific moment 6500 years ago when the inhabitants of the Great Hungarian Plain agreed that the Neolithic was over and it was time to put away the incised ceramics, start burnishing pots, and abandon the tells. Still, we were only able to document and understand these changes by incorporating multiple geographic and temporal scales of analysis that built upon decades of systematic archaeological research. Although these results are not surprising, we believe they are informative for researchers interested in understanding the cultural processes that affected long-term trajectories of village societies elsewhere in the world.

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