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ARCHAEOLOGICAL INVESTIGATIONS AT PECICA "ŞANŢUL MARE": THE 2006 CAMPAIGN

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Introduction

The great settlement of Pecica "Şanţul Mare" is among the most important archaeological sites in the European Bronze Age. The site occupies a strategic location astride the river Mureş between the ore producing region of the Western Carpathian Mountains and the metal using societies of the Carpathian Basin and beyond. Similarly its deeply layered Bronze Age deposits have served as a chronological standard for the entire Bronze Age in Eastern Europe. In November of 2003, the Muzeul Banatului Timişoara, the Muzeul Judeţean Arad, and the Museum of Anthropology of the University of Michigan (USA) entered into a contract de colaborare to facilitate new archaeological research at the site. Following a brief planning visit in 2004, a major, multi-year field investigation was begun in 2005 with funding from the National Science Foundation (USA). The principle investigators for the research are Dr. John O'Shea (University of Michigan) and Dr. Florin Draşovean (Timişoara). Additionally, Mr. Pascu Hurezan (Arad), Dr. Alexandru Szentmiklosi (Timişoara), and Dr. Alexander Barker (University of Missouri) are also members of the research collective and were involved in the day to day management of the excavations. Other senior members of the research team include Dr. Sarah Sherwood, archaeogeologist, (University of Tennessee) and Dr. Susan Allen, archaeobotanist, (University of Cincinnati).

The research campaign in 2006 represented the initial season of layer-by-layer excavation at the site. This required the positioning of the excavation block adjacent to Stratigraphic Trench 1 (excavated in 2005)

which enabled excavation to progress into a visible profile (Figure 1) and to ensure that the excavation area was correctly located beneath the prior excavation blocks, so as to minimize damage to intact Dacian era site deposits. The specific goals of the 2006 season were 1) to establish the main excavation block, and excavate it to the level of intact Bronze Age deposits; and 2) to investigate the end of the Late Bronze Age sequence and determine the nature of the thick deposits separating the final Bronze Age from the later Dacian levels excavated in the 1960's. In addition to these specific goals, work in 2006 continued the program of off site geological testing and the development of a regional GIS site database.

Work at the site in 2006 began with the placing of a 10 x 10 m grid, which extended in a northerly direction off of Stratigraphic Trench 1 (Figure 1). Topsoil was cleared from an area of 12 x 12 meters, which included space for the excavation block and a passageway around the excavation area. The excavation block was divided into a series of 2 x 2m squares for the purposes of data recording and flotation sampling. With the removal of the topsoil, the edges of the prior excavation blocks and trenches could be clearly seen, as could a number of large pits, some dating to modern times, and others attributable to the Dacian occupation of the settlement. The exposure of these earlier trenches allowed the area of new excavations to be precisely located relative to Crisan's plan of the site (Figure 2).

The intact deposits found beneath Crişan's backfill are the continuation of his Dacian I layer. This relatively homogenous deposit was designated Layer B in the Trench 1 profile (*O'Shea J., et al, 2005*) and is roughly 1 meter thick. As reported in 2005, this layer was relatively homogenous and contained little cultural material. Immediately below the B layer are burned deposits confidently attributed to the Bronze Age.

In addition to the layer-by-layer excavation of the site units, visible features, primarily deep pits, were excavated as units using natural layers (Figure 3). A number of these pits represent episodes of looting at the site, but others are attributable to the Dacian occupation of the site and extended downward into Bronze Age Layers.

A total of nine new radiocarbon determinations were run, with an emphasis on dating the final Bronze Age occupation of the site, and establishing the age of deposits associated with the Dacian site levels (Table 1). One determination, Pecica Sample 06-113, dates a gray windblown deposit observed in an off-tell geological test unit. A second sample from

the same test unit, taken from a burned zone immediately beneath the gray layer had insufficient carbon for dating. An archaeomagnetic sample taken from the same deposit is pending. As will be discussed below, the two feature dates represent deposits attributable to the Dacian occupation of the site, while the remaining five dates can all be attributed to the final Late Bronze Age occupation. The very tight clustering of these Late Bronze Age dates suggests a rapid accumulation of site layers. This situation is ideal for the 'peel back' excavation strategy being employed, although the time spans may be too fine grained to be resolved by 14C dating.

Preliminary Results

Level-by-level excavation in Block 1 was completed into Stratigraphic Layer C and produced quantities of evidence relating to the prior excavation of the site, the character of the Dacian 1 (Layer B) deposits and additional information relating to the final Bronze Age occupation of the site.

The Archaeology of Archaeology

During the course of the 2006 field season, we were able to confirm the location of excavation blocks and trenches created during Crişan's excavations in the 1960's, as well as to observe trenches from yet earlier excavations. Overall, there was very good agreement between the published plans of excavation at Pecica and the traces of excavation features that were observed in 2006

In addition to confirming Crişan's site plan, the excavations also provided insight into modern damage to the site. Lootere pits cover the modern surface of the site and raise questions about the kind and amount of damage this activity is producing. Within the area of Block 1, the pits are large but typically are not very deep and do not extend into Bronze Age site layers. This may suggest that vandals are targeting Dacian or Medieval remains at the site and are having a minimal impact on the Bronze Age deposits. Alternatively, it may simply mean that the looters quickly realize they are excavated unproductive backfill and move on to more productive portions of the site.

As excavation proceeded through Layer B, looter pits gradually gave way to Dacian era pits. Some of these were excavated by Crişan and others were not. Several of the unexcavated pits, including Features

1, 2, 3, 4, and 9, contained large chunks of intact site strata slumping into them (Figure 4). The layered material is similar to a standing block of strata (Feature 8) that was left in place during Crişan's excavation. The strata appear to represent remnants of the Dacian 2 level deposits. While it is possible that these deposits were pushed or otherwise moved into open pits during backfilling, it seems more likely that the slumping occurred in antiquity, and that the series of pits with these deposits contain intact and unexcavated material dating to the Dacian occupation. Most of the pits with slumped material are not represented in Crişan's plan of his excavation and, as will be described below, this interpretation finds further support from both carbon dates taken from the features and in the character of the faunal remains found within the pits.

A second, unexpected, find was the occurrence of a large number of well preserved, but disarticulated, human remains. The remains were pervasive in the fill of the excavation block and represented individuals of both sexes and all ages. More than 160 large human bones were mapped (Figure 5), representing at least 50 individuals.

As can be seen, the human bone was concentrated in four features. Three, Features 19, 20, and 29 are portions of Crişan's trenches, and the fourth, Feature 14, is a small pit that was excavated and backfilled during Crişan's excavations. It is clear from the pattern of spatial association, and from the manner in which the bones were deposited, which included a degree of sorting by element, that the human remains had been excavated by Crişan and had been cast back into the trenches in advance of backfilling. It is our assumption that the remains are attributable to the small medieval cemetery that was located on the site. The human remains were packaged separately from other site materials, and were transported to the Muzeul Judeţean Arad for biological analysis and curation.

Characterizing Stratigraphic Layer B

A major focus of the 2006 field season was Stratigraphic Layer B (Figure 6). This is the deposit termed Dacian 1 in Crişan's report (*1978*). Excavations in 2005 found the gray Dacian 1 layer to be massive but largely devoid of cultural material, and it was suggested that it might represent deposits associated with site preparation undertaken prior to major Dacian construction at the site. It was also hypothesized that the upper portion of

the final Bronze Age deposits were truncated andremoved during this preparation phase, since the latest Bronze Age carbon dates are about 100 years older than expected. A preliminary analysis of micro-morphology samples collected in 2005 indicates that the gray layer is probably of aeolian origin, although it has been intensely bioturbated during the subsequent occupation on the settlement. The discovery in 2006 of similar appearing deposits in off-tell and off-site areas by the regional augering program, challenges the site preparation hypothesis, and raises the possibility that local drought-like conditions may have occurred at the end of the final Bronze Age occupation.

Once the backfill from Crişan's excavations was removed it was clear that the Dacian 1 layer had not been excavated to its base anywhere in the block. A lack of cultural materials in this layer no doubt contributed to Crişan's decision to halt excavation. At the base of the deposit, this changed. The base of the B1-3 level yielded a high concentration of ceramics and animal bone, laying flat as though representing an occupation surface. The character of these remains suggests a Bronze Age, rather than Dacian, association.

Radiocarbon dates collected from the B1-3 site level support a Bronze Age attribution for the level. Dates run on this layer from three different portions of the excavation block all yielded solid LBA dates (1720, 1730, 1880 BC) and are statistically indistinguishable from two sample run from the top of the burned LBA Layer C (1690, 1750 BC). Faunal evidence from this level (see below) also supports a Bronze Age association for the materials. These results undermine the idea of an intentionally created pre-construction layer, and are consistent with some manner of wind blown deposition beginning at, or just prior to, the end of the Bronze Age occupation of the site

While currently only a hypothesis, the potential role of local drought and environmental degradation at the end of the Bronze Age occupation is intriguing. The hypothesis might also help explain the current discrepancy in the end of the Bronze Age Mureş Culture, which seems to occur at Pecica a century before a similar abandonment at the down river settlement of Klárafalva Hajdova.

Faunal Exploitation at Pecica

While detailed analysis of the materials excavated during the 2006 field season is underway, a preliminary analysis of recovered faunal material from the site provides a tantalizing first glimpse of the subsistence

and productive economy of the site during the Late Bronze Age and Dacian periods. The results summarized here are based on a sample of 7399 bones and bone fragments identified during the 2006 field season, and represent materials recovered via opportunistic collection during excavation and from screened samples (*Nicodemus n.d.*). Small bones recovered during flotation do not figure in these estimates. The discussion here will briefly summarize differences in the site levels between the lower gray deposits, levels B1-2, B1-3, and the top of the burned Bronze Age layer C1 (table 2), and will then consider contrasts in the samples deriving from Dacian and Bronze Age layers. All values in the discussion that follows are based on the number of identified specimens (NISP).

Like other Bronze Age sites in the region, domestic mammals comprise the majority of the identifiable fauna in all these levels. When compared against all wild vertebrates, livestock make up between 66 and 73% of the animal remains. When domesticates are compared with wild mammals, there is a significant trend for livestock to increase and wild mammals decrease over time. A statistical analysis of residuals indicates that livestock do not change significantly over time, but that wild mammals are significantly more common in the Bronze Age deposits (C1) and are rarer than expected in the upper B1-2 deposits.

In terms of the particular species, pigs are common in all levels analyzed, while ovicaprids increase in assemblage proportion over time. Cattle and red deer both decrease in frequency over time. Fish, mostly carp, are relatively common at the site. The occurrence of fish as a proportion of the entire assemblages grows from 8% in C1 to 15-16% in layers B1-2 and B1-3. Horse, dog, aurochs, roe deer, wild boar, beaver, hare, fox, wolf, birds, and turtle all comprise less than 5% of the identifiable fauna by layer. The trends observed in site fauna may support an emerging model of environmental degradation and site abandonment at the end of the Bronze Age.

At a more general level, radiocarbon dates indicate that the large circular pits, Features 1 and 3, contain deposits derived from the Dacian Period.[1] Given the similarity in form, matrix, and general content, Features 2, 4, and 9 likely date to the same period. The fauna from these features has been analyzed together to gain a preliminary view of Dacian animal exploitation. This is then compared against general patterns found in the Bronze Age layers B1-3 and C1 to examine differences in species utilization and butchery patterns Table 3).

Despite the similar appearance of the five large Dacian pits, the fauna recovered from them is extremely varied in terms of the species represented and their relative abundance. For example, pig remains comprise 79% of the identifiable fauna in Feature 2, but only 9% in Feature 9. The proportions of ovicaprids, cattle, red deer, fish, and mollusks are also highly variable. Combining the features provides a more representative view of the Dacian material.

The Bronze Age fauna from levels B1-3 and C1 are similar to one another both for species present and their relative abundance. The differences between the Dacian and Bronze Age fauna are highly significant.[2] In the Dacian pits, pig, fish, and snails are significantly more frequent than expected while ovicaprids, cattle, dog, red deer, and mussels are significantly under-represented.

Domesticates are more abundant in the Dacian material, especially when comparing only mammals. The percentage of domesticates for the Dacian fauna are 57.8%, 75.2%, and 94.1% when compared against all wild fauna, wild vertebrates, and wild mammals respectively. For the Bronze Age, the percentages are 46.5%, 66.6%, 77.5%. As expected, the same domestic species are observed in both periods except for domestic chicken, which is only found in the Dacian sample. The wild fauna differs considerably. As mentioned above, red deer are infrequent in the Dacian material. Additionally, aurochs, beaver, wels, catfish, pond turtle, and wild birds are completely absent, indicating relatively low species diversity, despite the larger overall sample size. The only wild species found exclusively in the Dacian material is pike.

In addition to the dissimilarity in species composition, there are striking differences in butchery patterns. In the entire Bronze Age faunal assemblage, there are only three bones that show evidence of butchering in terms of cut, scrape, or chop marks (.05%). This is a common pattern at other pre-Iron Age sites, and is indicative of a butchery method which cuts through joints, rather than through the bones themselves. The overall level of processing is relatively low, as demonstrated by the rarity of cut marks at major ligament and tendon insertion points.

In contrast, cut bones are relatively common from the Dacian pits, comprising over 2% of the total assemblage, which is 42 times greater than in the Bronze Age. Cuts are frequent around areas of connective tissue indicating more intense processing, including meat removal across joints and element

separation. More importantly, hack and chop marks through the bones themselves are common, in contrast to the Bronze Age pattern of cutting between joints. For the Dacian material, hack marks are found on a red deer pelvis and on numerous vertebrae and ribs. These ribs and vertebrae are most likely pig given the abundance of this species in Feature 2, where most of these specimens were found. The cervical and lumbar vertebrae of several individuals were cleanly chopped along the sagittal plane (vertically). In contrast, the thoracic vertebrae are intact, but their corresponding ribs were chopped near their heads, separating the ribs into left and right racks. This heavy-duty chopping through bones is much easier with iron tools, which likely explains the absence of this method in the Bronze Age material.

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NOTES

1. There may be some mixing in the uppermost layers of some of these features. Nonetheless, it is all post-Bronze Age and will be examined together. The internal layers are also combined to maintain a sufficient sample size for analysis. Future work will more closely examine fauna within stratified features.
2. Chi-square 258.06, df=17, p=.000.

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Table 1: Radiocarbon determinations collected during the 2006 campaign

Sample Number	**Site Context**	**Age bp***	**Calibrated intercept**	**Calibrated Range****
06-105	E18N10 B1-1	3440 +/-40	1740 BC	1880-1650 BC
06-113	Geology Test 3, IL-1	410 +/- 40	AD 1460	AD 1430-1630
06-115	E10N18 B1-3	3430 +/-40	1730 BC	1870-1630 BC
06-116	E10N14 B1-3	3520 +/- 40	1880 BC	1940-1740 BC
06-118	Feature 1, IL-1	2170 +/- 40	200 BC	370-100 BC
06-126	Feature 3, IL-2	2100 +/- 40	110 BC	200-30 BC
06-129	E14N12 B1-3	3240+/- 40	1720 BC	1870-1620 BC
06-133	TR-1, N profile floor	3450 +/- 40	1750 BC	1880-1670 BC
06-136	E12N14 C1a	3400 +/- 40	1690 BC	1760-1610 BC

* Conventional radiocarbon age, corrected for 13C/12C ratio

** 2 sigma calibrated result (95% probability)

Table 2: Relative Frequency of Vertebrate Species by Context

Relative Frequency of Vertebrate Species by Context (Non-Mammal Species Combined)																
Species		**B1-2**	**B1-3**	**C1**	**F1**	**F2**	**F3**	**F4**	**F9**	**F14**	**F16**	**F20**	**F35**	**F39**	**F40**	**F42**
Sus scrofa	Pig	30.5	19.3	25.0	44.3	89.1	31.9	21.6	20.4	38.5	23.7	31.6		34.4	18.5	14.3
Ovicapridae	Ovicaprid	29.4	23.5	20.0	9.6	2.4	23.4	10.8	29.6	46.2	23.7	10.5	20.0	28.1	33.3	28.6
Bos taurus	Cattle	9.8	15.1	18.9	1.7	0.9	12.8	2.7	11.1		23.7	21.1	20.0	6.3	1.9	
Canis familiaris	Dog	1.4	4.5	3.3		0.5			1.9						11.1	
Equus caballus	Horse	2.2	3.2	1.1	0.9	0.5			7.4						1.9	
Cervus elaphus	Red Deer	9.2	13.5	18.3	4.3	1.4	12.8		3.7	7.7	5.3	36.8		21.9	7.4	
Capreolus capreolus	Roe Deer	0.8	0.6	3.9			4.3						20.0		3.7	
Sus ferrus	Wild Boar	0.3	0.3	0.6	0.9	0.5										
Bos primigeneous	Aurochs		0.3													
Castor fiber	Beaver		1.3	0.6										3.1		14.3
Lepus europaeus	Hare		1.0			0.5		2.7								
Vulpes vulpes	Fox	0.8														
Canis lupus	Wolf	0.3														
Small Rodents	Small Rodents		1.0		3.5			2.7	3.7							
Fish	Fishes	15.1	15.8	7.8	34.8	2.4	14.9	59.5	22.2	7.7	21.1		40.0	6.3	22.2	42.9
Birds	Birds			0.6		1.9					2.6					
Turtle	Pond Turtle		0.6													
TOTAL		**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3: Comparison of mammalian fauna from Dacian and Bronze Age layers

Species	**NISP Dacian**	**NISP Bronze Age**	**% NISP Dacian**	**% NISP Bronze Age**
Pig	273	105	59.7	21.6
Ovicaprid	47	109	10.3	22.4
Cattle	17	81	3.7	16.6
Hores	6	12	1.3	2.5
Dog	2	20	0.4	4.1
Chicken	4	0	0.9	0
Red Deer	16	75	3.5	15.4
Roe Deer	2	9	0.4	1.8
Wild Boar	2	2	0.4	0.4
Aurochs	0	1	0	0.2
Beaver	0	5	0	1.0
Hare	2	3	0.4	0.6
Fish	86	63	18.8	12.9
Turtle	0	2	0	0.4
Wild Bird	0	1	0	0.2

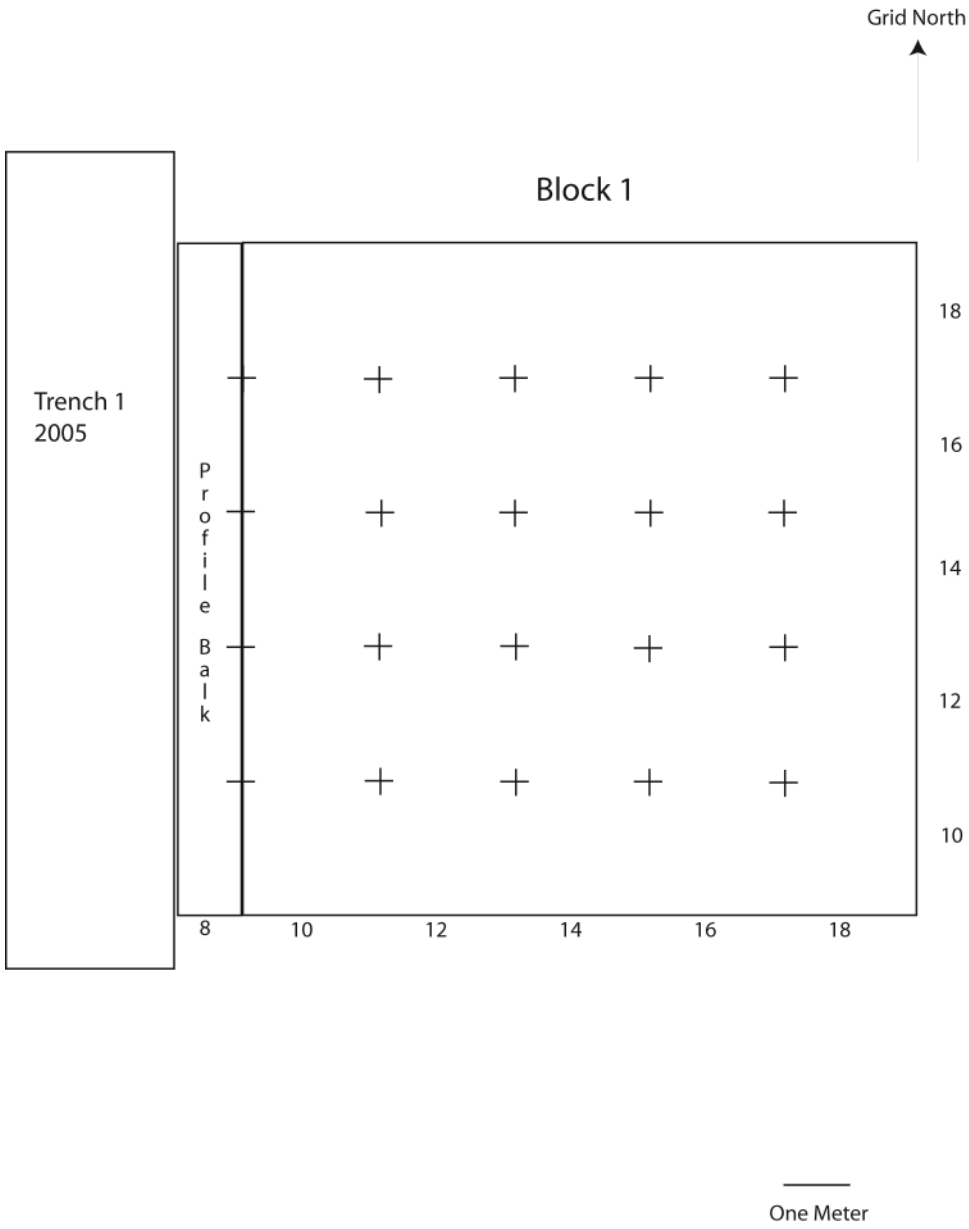

Fig. 1: Plan of Excavation Block 1 and its relationship with Stratigraphic Trench 1

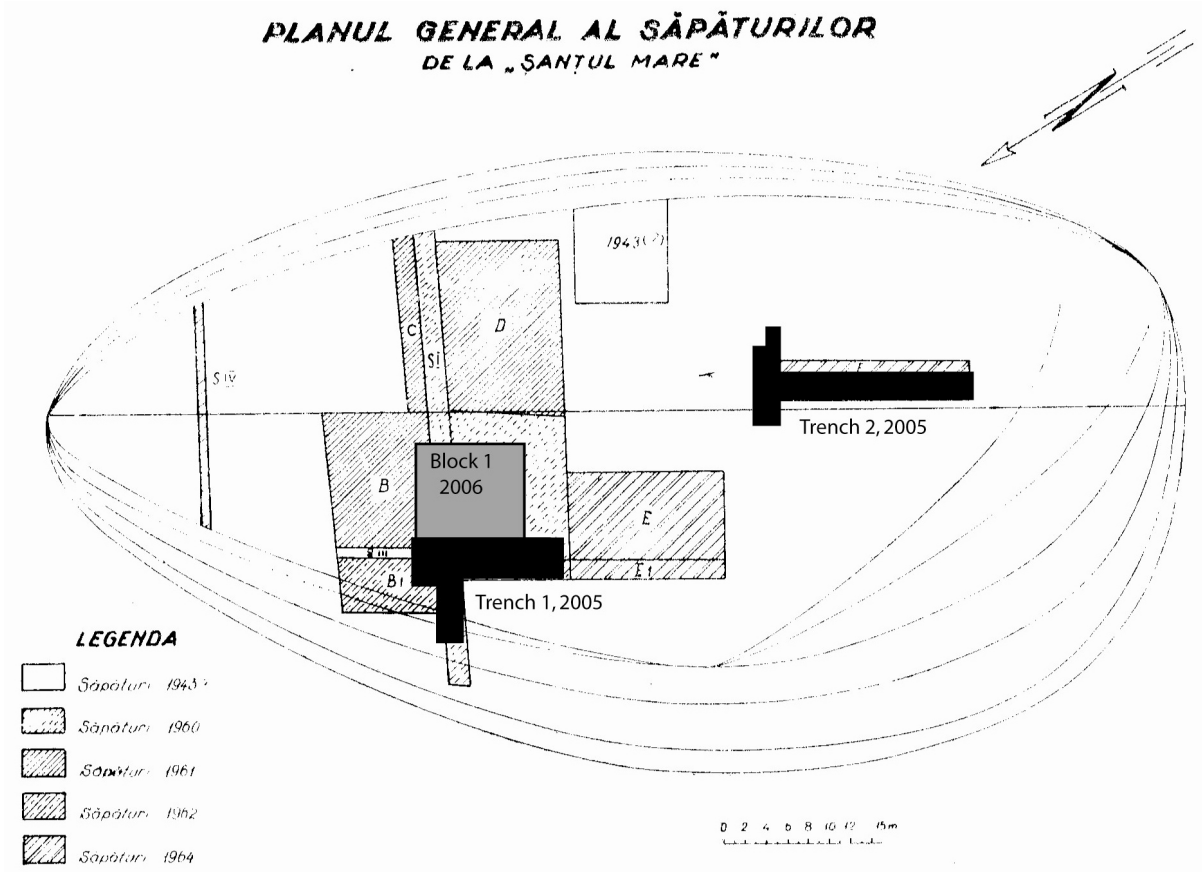

Fig. 2: Location of 2006 excavation units in relation to Crisan excavation blocks at Pecica "Șanțul Mare"

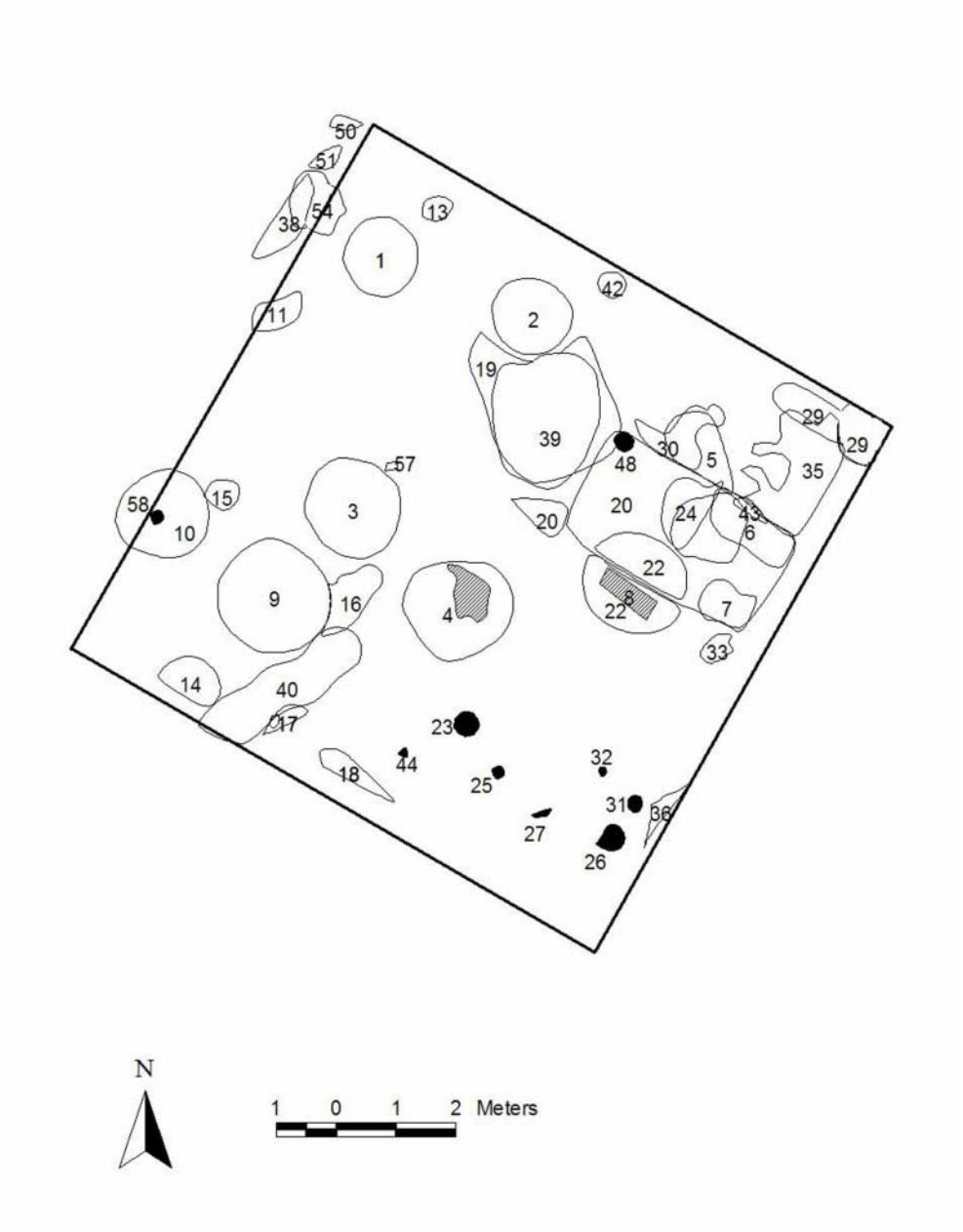

Fig. 3: Distribution of site features within Block 1

Fig. 4: Intact strata slumping into Feature 4

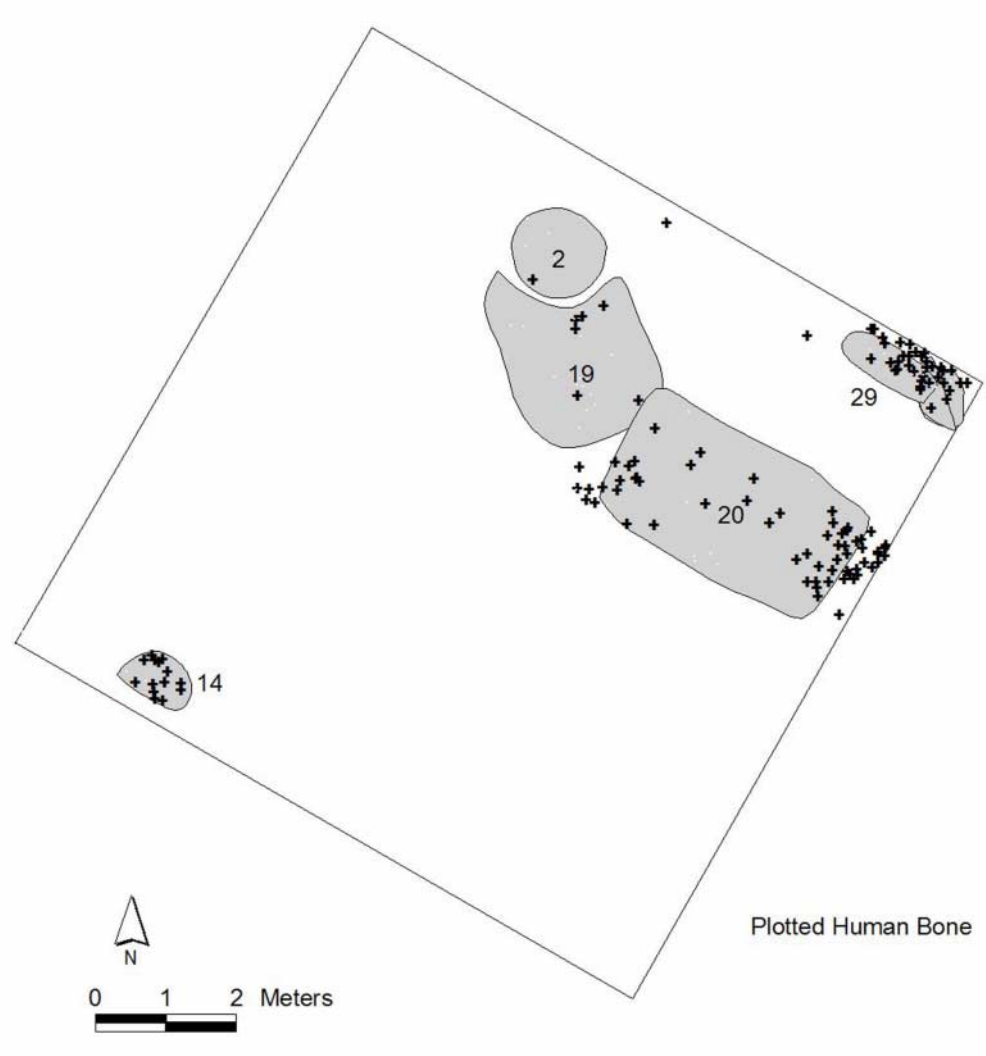

Fig. 5: Distribution of human remains and their relationship
to Crisan excavation features

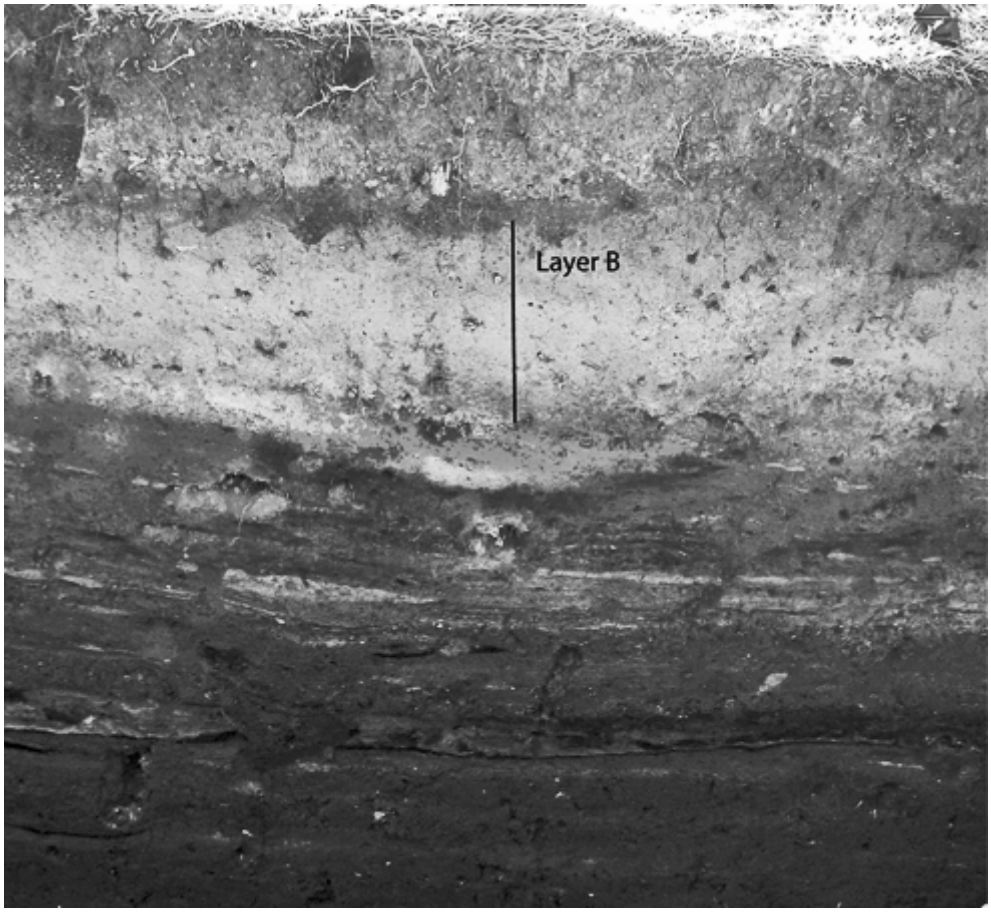

Fig. 6: Layer B/Dacian 1 as visible in Stratigraphic Trench 1