

Archaeological Investigations at Pecica “Șanțul Mare” 2013–2014

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Abstract: Pecica “Șanțul Mare” is one of the most important Bronze Age sites in the eastern Carpathian Basin. During the Middle Bronze Age (c. 1850–1700 cal. BC), Pecica was the dominant Mureș settlement, serving as a center for both bronze metallurgy and horse rearing. However, little is known about how the site achieved regional prominence. This paper describes new research from the 2013–2014 excavations, which focused on the earliest Bronze Age occupation phases to document the settlement’s initial founding and factors that led to its florescence. A revised site chronology and ceramic sequence is presented, along with an overview of substantive changes within the subsistence economy, craft manufacture, and trade networks.

Keywords: Pecica “Șanțul Mare,” Bronze Age, tell.

Introduction

Pecica “Șanțul Mare” is a major fortified tell overlooking the Mureș River in Arad County. It is one of the most important Early-Middle Bronze settlements¹ within the Carpathian Basin, being the focus of archaeological study since the late 1800s². The site has been central to both the definition of the Mureș (Periam-Pecica) Culture³ and to the creation of Bronze Age chronologies broadly⁴. Recent excavations from 2005 to 2011⁵ examined Pecica during its height of regional prominence and subsequent collapse. While this campaign was successful in documenting the history of a Bronze Age center in unprecedented detail, several important questions remained. In particular, how did Pecica come to be the dominant settlement among Middle Mureș communities?

In 2013 and 2014, systematic excavations resumed in the main block (Fig. 1), following methods outlined in O’Shea *et al.* 2011. The primary goals were to investigate settlement organization in the periods immediately preceding Pecica’s florescence and to identify the timing and tempo of changes that lead to the settlement’s rapid rise as a regional center. In addition, the adjacent stratigraphic trench was deepened in 2014 in order to determine when the Bronze Age occupation was first established. This paper summarizes major findings from these new excavations. As analyses are still ongoing, the results must be treated as preliminary.

Site Chronology and Architectural Phases

To date, roughly 500 years of Bronze Age habitation have been documented at Pecica “Șanțul Mare.” There are seven principal Bronze Age occupation phases (Table 1), which correspond to changes in stratigraphic deposits, site layout and architectural construction sequences, occupation intensity, and the range of artifactual materials recovered (including ceramic types). In addition, Middle Copper Age layers were exposed in the lower deposits of Trench 1 in 2014. 71 radiocarbon dates establish tight chronological control over site phases. Summaries of Phases 1 through 5a can be found in O’Shea *et al.* (2011). Here we focus on new findings of the 2013–14 excavations, which entail primarily Phases 5a, 5b, and 7 (Bronze Age)⁶, as well as the newly encountered Copper Age deposits.

¹ There are also significant Copper Age, Dacian, and Medieval occupations (see Table 1).

² Including work by L. Dömötör from 1898–1902, M. Roska in 1910 and 1923–1924 (Roska 1912, 1924), D. Popescu in 1943, and I. Crișan from 1960–1964 (Crișan 1978). Overviews of Pecica’s excavation history can be found in Dörner 1978; Barbu *et al.* 1999; and Hügél *et al.* 2012.

³ Also known as the Maros or Pérjamos Culture in Hungarian, including the Szöreg Group.

⁴ Bóna 1975; Childe 1929; Soroceanu 1991.

⁵ O’Shea *et al.* 2005; O’Shea *et al.* 2006; O’Shea *et al.* 2011.

⁶ Phase 6 deposits were exposed only in Trench 1 during the 2005 campaign (O’Shea *et al.* 2005). They will be excavated within the main block in 2015.

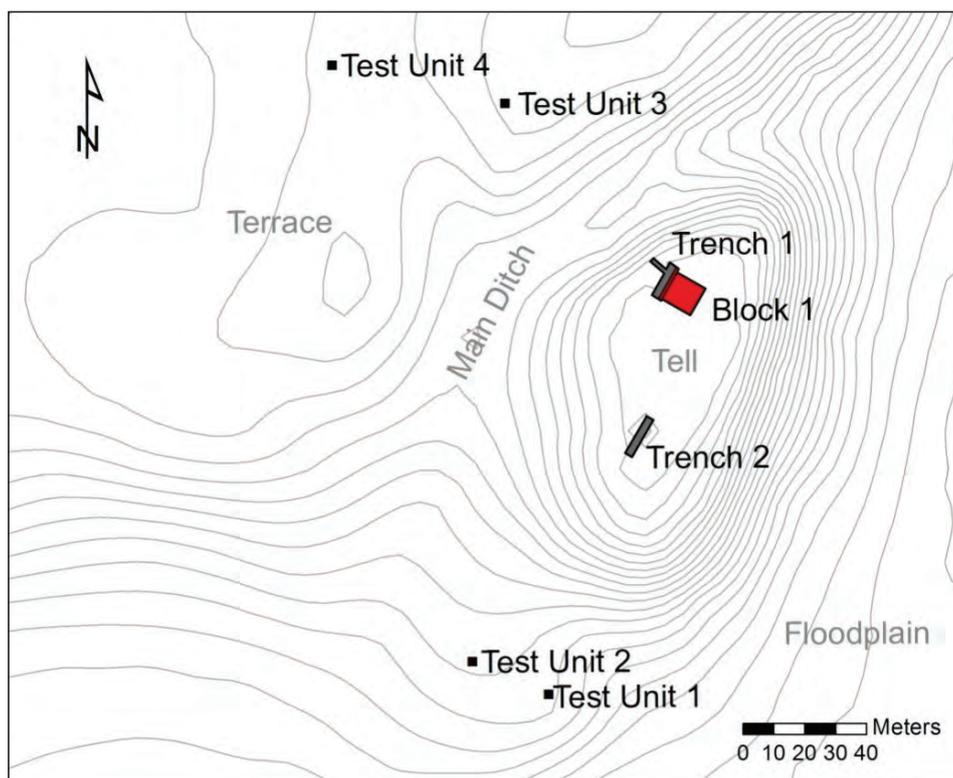


Fig. 1. Pecica excavation areas (2013–14 in red).

Table 1. Pecica “Șanțul Mare” site chronology.

	Pecica Period	Phase	Date (cal. BC)	Site Layers	Structures	Major Developments
Medieval	Árpád		AD 1000-1100*		Str. 9	
Iron Age	Dacian		300-100	(intrusive pits)**		
Middle Bronze Age	Late Period	1	1600-1500	B1-3	Str. 0	final MBA occupation
		2	1720-1600	C1-3	Str. 0, 1	decline in occupation intensity, settlement contraction
	Florescent Period	3	1770-1720	C4-5/ D0-2	Str. 2, 4, 10	peak metalurgical production, platform construction, settlement expansion
		4	1820-1770	D3, E1	Str 3, 4	peak horse breeding, ritual bone deposits
		5a	1850-1820	E2-3	Str. 5-8	increase in occupation intensity; final combed ware, initial baroque ceramics
	Early Period	5b	1900-1850	E4-5	Str. 11	
		6		E6+		(2005 trench)
Early Bronze Age		7	2000-1900	I	Str. 12	(2014 trench) final rusticated ware ceramics
Middle Copper Age			3960-3760	J-L		(2014 trench)

*date from off-tell Medieval Structure 9 (in test unit 3)

**Medieval and Dacian layers and features previously excavated in block area by Crișan (1978), only several deep Dacian pits cutting into Bronze Age deposits left *in situ* and dated

Phase 5a deposits have been exposed throughout the excavation block (Fig. 2). This period dates to c. 1850–1820 cal. BC (initial Florescent Period), comprising the intermediate E Layer deposits (E2–3) and its associated features. It is marked by an increase in occupation intensity and changes in major ceramic types (see below). It is also at this time that we first see the construction of two adjacent structures in the western portion of the block, a pattern which is maintained throughout the rest of the Florescent Period⁷. Structure 5 is the initial construction in the southwestern block, only a corner of which lies within the excavation area. To the north is Structure 8, which differs from previously excavated structures in its small size and that it was burned after abandonment. Given the unique and elaborate oven/furnace complex within it, Structure 8 may have had a special function, perhaps some type of workshop. After a fill layer was deposited, two ephemeral, single floor constructions (Structures 6 and 7) were built over Structure 8; these were excavated in 2009.

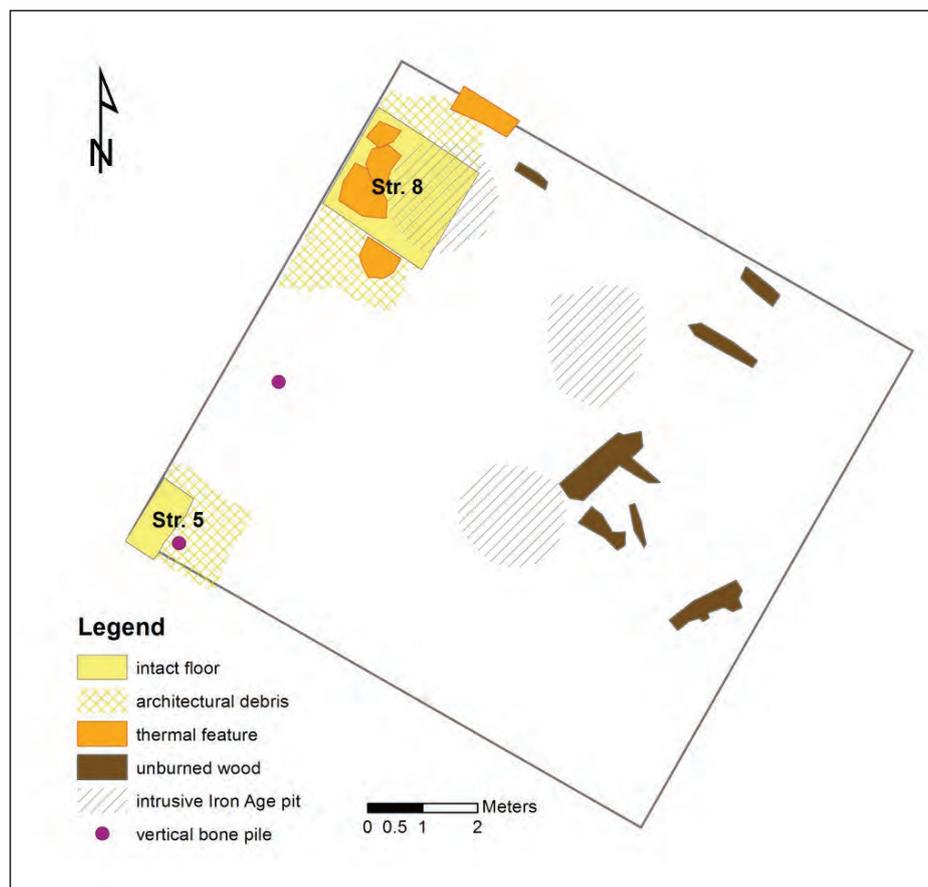


Fig. 2. Principal features in Phase 5a (Layers E2–3).

A large, plaza-like open area lies to the east of these structures, lacking any formal architectural or domestic features⁸. Notably, a series of unburned wood planks were found here, which, unlike the previous wood encountered at the site, are not directly associated with wall trenches or floors of known structures. Some of the wood planks overlap at right angles (Fig. 3) while others are scattered and randomly oriented. Currently, it is not clear from what types of features or structures this wood ultimately derived. Portions of these planks were taken as micro-morphological samples or preserved with B-72 for further study.

In Phase 5a, we also see first appearance of small pits with vertically oriented bones of (primarily) horses and other large mammals, deposited in the area between the houses and the open plaza. These unusual features are thus far unique to Pecica and are considered in detail elsewhere⁹.

⁷ O’Shea *et al.* 2011, Fig. 3.

⁸ In later phases, a burned platform (Layer D0) was constructed over this area (see O’Shea *et al.* 2011, Fig. 3).

⁹ Nicodemus *forthcoming*.



Fig. 3. Unburned wood planks and concretion pile (Phase 5a).

Phase 5b dates to c. 1900–1850 BC, immediately preceding Pecica’s Florescent Period, and contains the lowest E Layer deposits encountered in 2014 (E4–5). At this time, there was only a single house, Structure 11, which spanned much of the western portion of the block (Figs. 4 and 5). It is the largest house exposed at Pecica to date. Like Structure 8, its final occupation was intensely burned, preserving many architectural elements, including wattlework from a collapsed wall. It has two rooms divided by a small internal partition. There are a series of large, unburned planks along its eastern wall which may be collapsed wall planking or flooring.

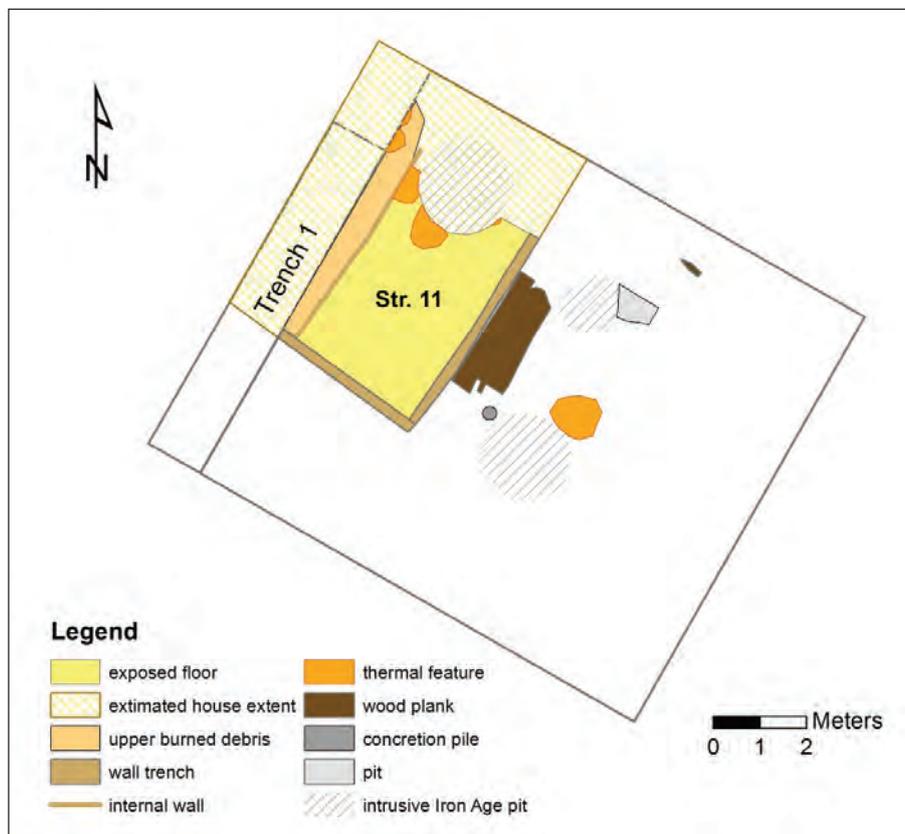


Fig. 4. Principal features Phase 5b (Layers E4–5).

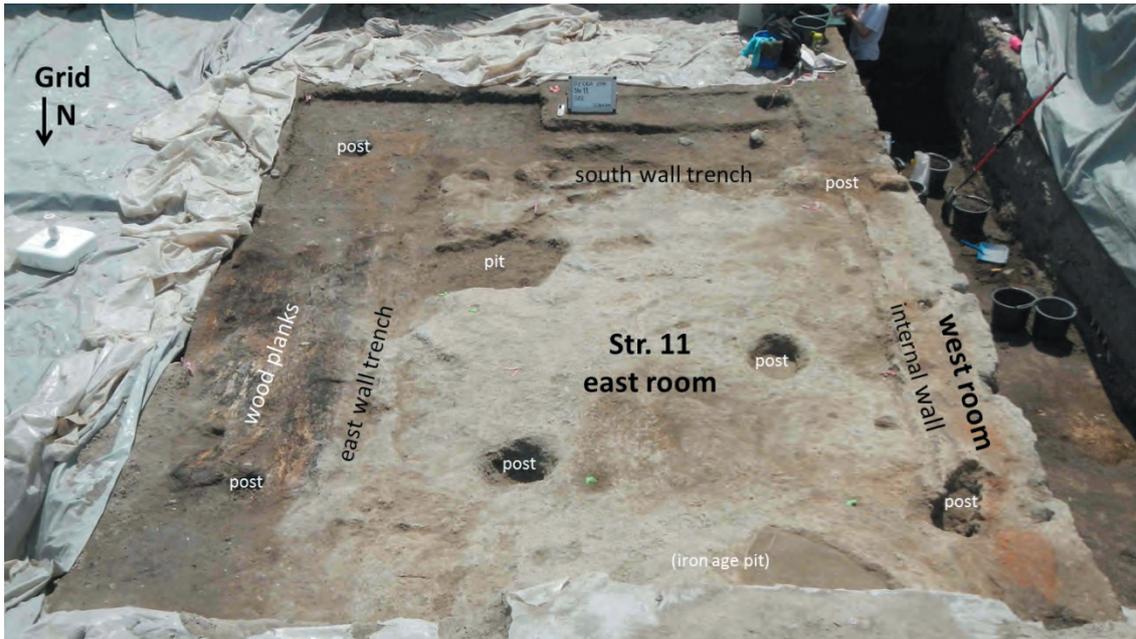


Fig. 5. Structure 11 overview, base floor layer (internal layer 9), view to grid south.

As in the subsequent phase, the eastern part of the block was maintained as an open, public area¹⁰. However, unlike in Phase 5a, only a single unburned wood piece was recovered in the lower E levels, but there is at least one pit and a hearth¹¹ present. Other than these, the area is devoid of formal features other than post holes.

Phase 7 represents the earliest Bronze Age occupation at Pecica (Layer I), dating to c. 2000–1900 cal. BC. It stands out from later deposits by the presence of ‘rusticated’ wares (see below) and house orientation. Structure 12 (Fig. 6) is the only Bronze Age house encountered through 2014 that is not

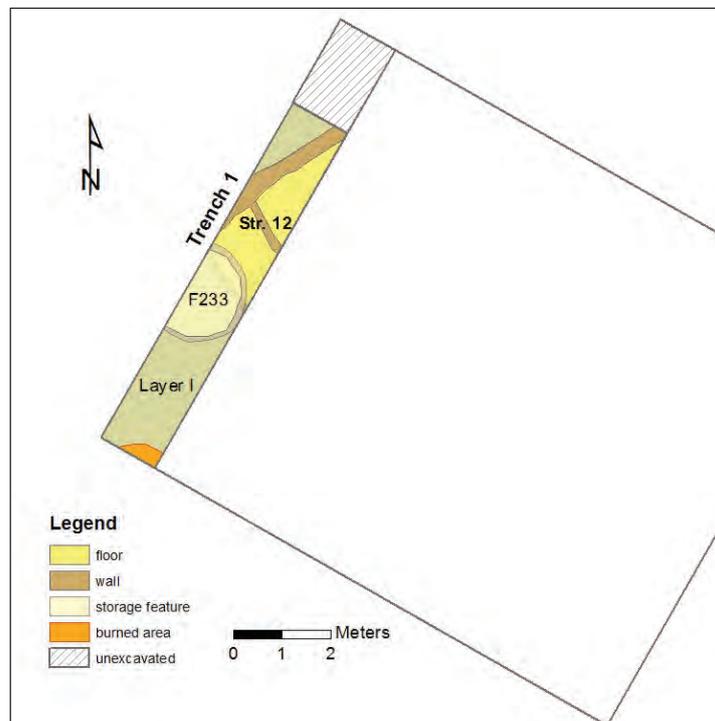


Fig. 6. Structure 12 and contemporary features in Trench 1 (Phase 7).

¹⁰ In the areas exposed through the 2014 campaign. Layer E4 was excavated throughout the entire block except for the easternmost tier of 2 × 2 m units along the east profile wall. Layer E5 was removed in all units adjacent to Structure 11.

¹¹ This hearth, Feature 239, contains a large amount of elderberry seeds (see also below).

oriented along long axis of the tell¹². It has two rooms and it was burned after abandonment like other the early houses mentioned above. During its latest construction phase, a unique circular clay-walled storage feature (Feature 233) was built over the smaller room and into the southern wall. There are also several additional architectural features and post molds external to the structure.

Middle Copper Age deposits were found in the deepest layers of the trench excavated in 2014. These date to c.3960–3760 cal. BC and consist of Layers J through L¹³. Note that there is nearly a 2000 year hiatus in occupation between the Copper Age and Bronze Ages, and the uppermost Copper Age stratum, Layer J, was truncated and leveled by the Bronze Age population as part of the initial construction activities (i.e., Layer I and Structure 12).

No formal Copper Age structures were identified in this campaign, but there was architectural debris and a large number of posts throughout, particularly in Layer L, and an oven in Layer J. Layer K has a very high artifact density, especially of large animal bones and chipped stone, and may represent a midden deposit. As most of the Copper Age materials are still under study, they are not treated in detail in the following summary sections.

Ceramics

As the excavations at Pecica have progressed, an increasingly large and well provenienced sample of ceramics has been amassed. While this sample is not as photogenic as the earlier collections recovered by Roska¹⁴, consisting primarily of sherds rather than whole vessels, it nevertheless has great potential to inform on the technology and methods of ceramic production and inter-regional connections. It also provides important insight into the internal organization of the Pecica settlement and larger patterns of chronological change. While the details of the ceramic analyses are ongoing, it is possible to summarize the general patterns of change that are observed in the materials recovered during the 2013–14 field seasons.

The time periods represented by the 2013–14 excavations are critical, and comprise the beginning of the Middle Bronze Age at the site, as well as the final Early Bronze Age, representing the time period during which the Bronze Age settlement was established. As mentioned above, Middle Copper Age deposits were also encountered in the deep trench.

Within the Bronze Age sequence, three trends are observed. The first concerns the appearance of 'baroque' style fine ware ceramics. These baroque style vessels are typically finely finished and have high arched handles and spouts in the '*ansalunata*' and '*kantharos*' style and fall within the scope of ceramics classified by Bóna¹⁵ as Szőreg 4 and 5. This style of ceramic has traditionally been held to represent a later Middle Bronze Age form. This assessment is largely borne out in the Pecica sequence. Baroque styles are first observed in Phase 5b and become increasingly common in Phase 5a and later, representing Pecica's Florescent Period. There are relatively few examples of baroque forms in Phase 5b and, given the character of the deposit, may simply be sherds from later time periods that were mixed into the lower deposit. Similarly, no baroque style ceramics are associated with Structure 11, which is also attributed to Phase 5b.

This chronological placement of the baroque style fine wares has several important implications. First, it confirms Bóna's chronological assignment of the style into the later portion of the Mureş/Szőreg sequence, and likewise confirms the later chronological assignment of Mureş burials containing baroque ceramics. Yet the Pecica sequence similarly underlines the fact that non-baroque style fine wares, sometimes with elaborate decoration, continue to be manufactured and used throughout the Mureş sequence. A second important implication is the close association of the elaborate baroque styles with Pecica's period of florescence and its emergence as a major regional center.

The other two chronological trends noted in the Pecica ceramics concern differing surface treatments on the bodies of coarse ware vessels (Fig. 7). A horizon marker for Early Bronze Age coarse ware ceramics in the eastern Carpathian Basin is a very coarse roughening of the exterior surface, which is

¹² 55° versus 30° east of magnetic north.

¹³ Additional Copper Age layers, including lower levels of "L" remain *in situ* and will be exposed in 2015.

¹⁴ Roska 1912, 1924.

¹⁵ Bóna 1975, 94–95.

termed ‘rustication’¹⁶. This treatment may extend all the way to the lip of the vessel, or a vessel may have a smoothed neck, and a heavily rusticated lower body. This treatment is observed across the range of cultural entities associated with the Early Bronze Age, including neighboring Nagyrév groups. This style of body treatment is absent in Middle Bronze Age assemblages. Once again, the dated Pecica sequence largely confirms this assessment. Rusticated coarse ware ceramics are found in the Early Bronze Age portion of the Pecica sequence, corresponding to site Phase 7.

In addition to true rusticated sherds, the Pecica sequence also reveals a quantity of coarse ware ceramics that have an exterior surface treatment that is termed ‘combed’. Unlike rustication, where it appears that the drying, leather hard ceramic is coarsely roughened, combed surfaces appear to be the result of a comb-like tool which produced lighter and more organized striations on the ceramic surface, which was sometimes smoothed either before or after application of the combing. A similar surface treatment is associated with one variety of Weitenberg ceramics (group 1) in Transylvania and is found in varying quantities at other Early Mureș sites, including Kiszombor-Új-Élet and Smlac “Livadalui Onea”¹⁷.

Combing, as a surface treatment, is common throughout the Early Period of Pecica’s Bronze Age existence, and can be found in deposits associated with Phase 5a through Phase 7. In the Early Bronze Age, combed wares co-occur with rusticated wares and, indeed, both types are observed in Structure 12. Yet, unlike rusticated wares, combed wares continue into the Middle Bronze Age and in a few occasions are even found in association with baroque ceramics, as in Structure 8.



Fig. 7. ‘Rusticated’ (A) and ‘combed’ (B) surface treatments.

Rusticated wares found in later contexts generally display surface roughening that is lighter or more attenuated compared to those found in earlier deposits. It is possible that role played by these surface treatments changed over time, with rustication initially performing a function in terms of the thermal properties of the vessel, and gradually coming to serve more of a decorative or ornamental function on coarse ware vessels. Later in the sequence, combing is also abandoned in favor of smoothed exterior surfaces for coarse ware vessels.

In addition to Bronze Age materials, site Layers J-L exposed in the stratigraphic trench produced ceramics attributable to the Middle Copper Age. Despite the small size of the assemblage, several diagnostic specimens were recovered including “toartelor pastilate” or “pill” type handles and a small intact suspended vase (Fig. 8). These specimens have direct analogs at the site of Tiszalúc-Sarkad in

¹⁶ Also called “broom-brushed” or “tree-bark” style.

¹⁷ O’Shea *forthcoming*.

northeastern Hungary¹⁸. These ceramics suggest an association with the Hunyadhalom Culture in the eastern Pannonian Plain, a complex that post-dates the local Bodrogkeresztúr Middle Copper Age¹⁹. The radiocarbon dates recovered from Layers J-L at Pecica are consistent with this dating.



Fig. 8: Copper Age diagnostic ceramics.

Craft and Trade Goods

The 2013–14 excavations at Pecica also produced a rich assemblage of artifacts other than ceramic vessels, reflecting diverse local crafts and imported goods. Among the crafts represented are pot making, carpentry/wood working, hide processing, weaving, bone/antler working, chipped and ground stone manufacture, and metallurgy (Fig. 9). The worked antler industry is particularly vibrant at Pecica compared to contemporary settlements and a wide range of ornamental items and tools are present. Most frequent are scrapers and perforators associated with hide working and similar activities, as well as heavy-duty hafted antler implements such as picks and hammer-axes²⁰.

The manufacture of most utilitarian items is ubiquitous on site and there is little change from early to later occupation phases. However, metal working does differ substantially. In the Early Period, there are very few items associated with metal production (e.g., slags, crucibles, tuyères, molds, etc.) or finished items. This stands in sharp contrast to the Florescent Period when metalworking tools and by-products are frequent, underscoring Pecica's role as a center for bronze production at that time.

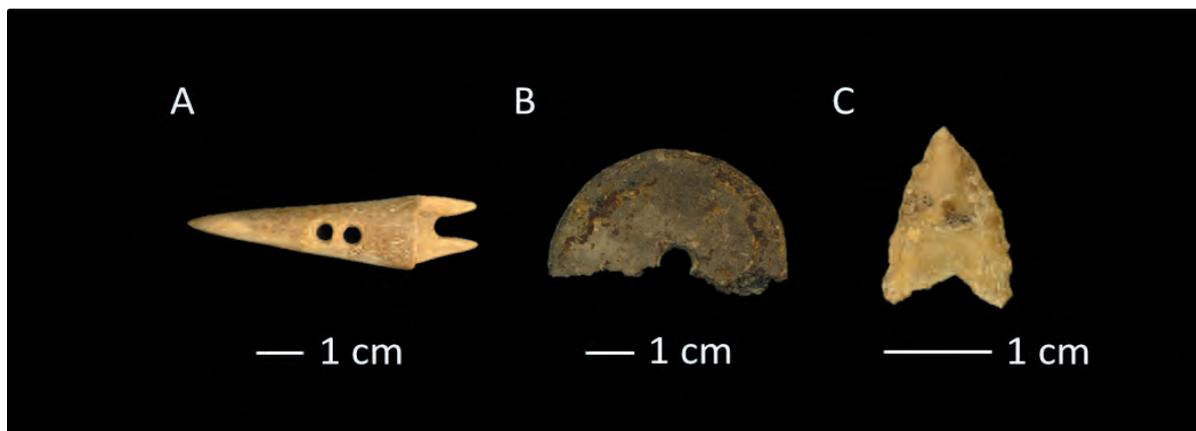


Fig. 9. Locally made craft items (scale units 1cm): A: antler harpoon head; B: ceramic spindle whorl, C: chipped stone arrow head

Import goods are represented by raw materials and finished items deriving from diverse and sometimes distant origins (Fig. 10). The most common types are mineral resources, including metal ores and high quality stone for chipped and ground stone manufacture. While analysis of our current metallurgical assemblage is in progress, work by Junghans *et al.*²¹ on previously excavated materials

¹⁸ Patay 1995, 113–114.

¹⁹ Horváth and Virág 2003, 127; Raczky 1995; Raczky, Siklósi 2013.

²⁰ Some of these heavy-duty antler implements were used as sockets or hafts for stone and/or metal axes.

²¹ Junghans *et al.* 1968.

suggests that copper was obtained from the Apuseni Mountains and southern Carpathians. Slags from two contemporary Mureș settlements in Hungary, Klárafalva-Hajdova and Kiszombor-Új-Élet, have similar compositions.²²

Preliminary assessment of the 2013–14 Bronze Age lithic assemblage²³ shows a similar range of raw materials to those present in the 2008–9 sample²⁴. These include Banat and Balkan flints, Szurdokpüspöki-Fony limnic quartzite, and Transdanubian radiolarite. In addition, high quality obsidian from sources near Vinicky, Slovakia was utilized (C1a source).²⁵

A small number of items imported from outside the greater Carpathian region are also present, notably amber (presumably Baltic) and marine shell from the Mediterranean and/or Black Seas. Notably, a lump of raw amber was recovered from a large post associated with Structure 11 (Phase 5b), suggesting at least some degree of local amber bead manufacture. The marine shells include several *Columbella* shells, one of which is an unworked raw specimen from Structure 12 (Phase 7), and a *Cardium* shell fragment found outside Structure 11 (Phase 5b).

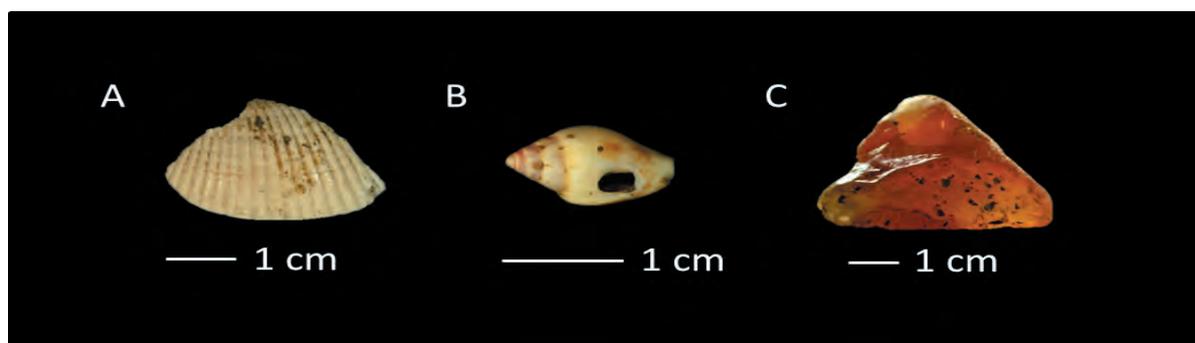


Fig. 10. Long-distance import goods from 2013 excavations (scale units 1cm):
A: *Cardium* shell fragment; B: *Columbella* bead, C: raw amber.

Subsistence

Systematic recovery methods, incorporating screening and large-scale flotation, allow the documentation of subsistence activities at Pecica “Șanțul Mare” to a fine degree. This includes production strategies, processing activities, and consumption practices for both plant and animal resources during the Bronze Age²⁶. The results are briefly summarized here.

Faunal Remains

The basic core of the agro-pastoral economy remains relatively stable throughout the Bronze Age occupation²⁷. The animal economy at Pecica is strongly focused on livestock production in all periods, with hunting, fishing, fowling, and mollusk collection playing secondary roles (Table 2). Ovicaprids, primarily sheep, are the most abundant domesticates, followed by pigs, cattle, horses.

However, there are some important changes over time. In the Early Period, there is somewhat greater emphasis placed on domesticates over wild resources. The importance of the individual livestock species is similar between the Early and Late Periods, with a preference for ovicaprids (primarily sheep). Both of these periods differ substantially from the Florescent Period, when horses are very abundant and the site likely served as a key horse producer within the region.

²² Papalas 1992, 2008.

²³ While not considered here in detail, it should be noted that more than half of the chipped from the 2014 season was collected from Copper Age strata, despite the much smaller area of excavations. Chipped stone tools and debitage are particularly dense in these deposits and obsidian is twice as common as in the Bronze Age sample (25% vs. 12%)

²⁴ Biró pers. comm. K. Biró of the Hungarian National Museum is analyzing the Pecica chipped stone sample, the results of which have been completed for the 2008 and 2009 collections.

²⁵ Rosania and Barker 2009.

²⁶ Analysis of Copper Age plant and animal remains is currently in progress. It can be noted here, however, that there is a much larger proportion of cattle in the Copper Age deposits, particularly within the bone-rich Layer K. Preliminary botanical data are presented in Table 3.

²⁷ Nicodemus 2011, forthcoming; O’Shea *et al.* 2011, 71–72.

The Early Period also differs significantly from later phases in terms of livestock management practices²⁸. Cattle and especially sheep are being raised in more generalized husbandry systems, in which secondary products, such as dairy, fiber, and labor, play a greater role. This is seen in the relatively large proportion of older animals being consumed. In later periods, animals are raised primarily for their meat, marked by a strong shift in off-take patterns towards younger, prime-aged individuals.

Table 2. Pecica fauna by period (% NISP)²⁹

	Ph 7	Ph 6	Ph 5b	Early Period	Ph 5a	Ph 4	Ph 3	Platform	Flor. Period	Ph 2	Ph 1	Late Period	Total
NISP	322	926	2626	3874	616	3266	1567	2514	8444	5136	2107	7243	19561
<i>% Fauna by Class</i>													
Mammal	76,4%	99,8%	92,9%	93,2%	94,6%	88,9%	89,3%	87,5%	89,3%	84,2%	86,4%	84,8%	88,4%
Mollusk	23,3%	0,0%	5,4%	5,6%	4,9%	9,6%	10,3%	12,4%	9,9%	14,1%	11,8%	13,4%	10,4%
Fish	0,3%	0,1%	1,8%	1,2%	0,2%	1,4%	0,4%	0,0%	0,7%	1,5%	1,8%	1,6%	1,1%
Bird	0,0%	0,1%	0,0%	0,0%	0,3%	0,2%	0,0%	0,1%	0,1%	0,1%	0,0%	0,0%	0,1%
Reptile	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,1%	0,0%	0,1%	0,0%
<i>% Domestic vs. Wild</i>													
Domestic Mammal	95,3%	95,0%	89,6%	92,4%	90,5%	88,2%	84,6%	86,1%	87,3%	80,2%	80,7%	80,3%	85,9%
Wild Mammal	4,7%	5,0%	10,4%	7,6%	9,5%	11,8%	15,4%	13,9%	12,7%	19,8%	19,3%	19,7%	14,1%
<i>% Livestock</i>													
Ovicaprid	37,8%	60,6%	47,4%	52,4%	42,1%	29,5%	36,1%	36,0%	34,6%	45,1%	38,3%	43,4%	41,5%
Pig	34,7%	24,0%	32,3%	28,8%	28,2%	25,1%	31,3%	26,9%	27,1%	29,6%	37,1%	31,5%	28,9%
Cattle	26,5%	15,2%	14,6%	15,9%	15,3%	17,9%	17,0%	23,5%	18,4%	19,7%	19,8%	19,8%	18,3%
Horse	1,0%	0,2%	5,7%	2,9%	14,4%	27,5%	15,6%	13,7%	19,9%	5,6%	4,8%	5,4%	11,3%

Botanical Remains

While the range of plants identified at Pecica is remarkable, accounting for 132 different taxa³⁰, evidence for agricultural practices focuses on an unusually limited choice of crops (Table 3). Einkorn wheat (*Triticum monococcum*) and hulled barley (*Hordeum vulgare*) are the main staple crops. Einkorn is the most ubiquitous and overall most abundant. Barley is generally considerably less frequent, however it was recovered in thousands of seeds concentrated in one domestic oven (Feature 27, 2005) associated with Structure 11 (Phase 5b). Emmer wheat (*Triticum dicoccum*) and cultivated millet (*Panicum miliaceum*) are represented by a handful of seeds only. The scarcity of pulses is noteworthy, with a total of 20 remains between peas and lentils (*Pisum sativum* and *Lens culinaris*) in all the samples analyzed.

Of the broad variety of plants that were possibly gathered from the wild, the most common are fat-hen (*Chenopodium album*) and elderberry (*Sambucus sebulus* and *S. racemosa*), which are particularly abundant in the Early Period, Phase 5b³¹. However, most of the wild plants occurring in the samples are weeds of the cultivated crops. Particularly numerous are *Bromus* sp. and *Festuca* sp. while-corn-cockle (*Agrostem magithago*), diagnostic species of the segetal plant community (i.e., arable fields) associated with autumn sown crops and otherwise regularly attested in the Carpathian basin since the Neolithic, only occurs once in the samples. Other represented species, such as *Chenopodium album*,

²⁸ Nicodemus 2011, forthcoming.

²⁹ Phases with new faunal data are marked in italics. Note that portions of general fill layers from trench contexts were hand collected from shovel scraping rather than small hand tool excavation, which may result in the under-representation of very small bones (especially non-mammalian taxa).

³⁰ About ten liters of sediment have been sampled from every internal layer from each excavated structure and feature while two samples have been taken for each 2 × 2m unit of the general layers. So far 124 samples have been processed and more than 10,000 charred plant macroremains have been identified. The samples are characterized by a very low density of charred material, with most of them containing less than 50 remains. The recovered material is generally in a rather poor state of preservation. It is very fragmented and often missing diagnostic traits and/or external surfaces. For this reason, a high proportion of it could be identified at the family level only, or was not identifiable at all (35% could not be identified at any taxonomic level).

³¹ The floristic composition of the external hearth, Feature 239, is extremely unusual, with a significant concentration of elderberry seeds mixed to crop processing debris.

Fallopia convolvulus and *Polygonum aviculare*, are instead more characteristic of spring sowing. The barley seeds found in Feature 27 (2005) are indeed associated with significant quantities of blackbindweed (*Fallopia convolvulus*), indicating that this cereal was sown in the spring. This species grows in sunny and well-drained soils, which suggests that cereal crops were not cultivated in the alluvial plain but rather in the upper drier fields.

Table 3. Pecica archaeobotanical assemblage by period (%NISP)

	Copper Age	Ph 7	Ph 5b	F.27*	Early Period	Ph 5a	Ph 4	Platform	Ph 3	Flor. Period	Ph 2	Ph 1	Late Period	Total
<i>n</i>	44	118	1311	687	2160	1539	905	349	1053	4533	565	11	576	7313
% Crops, Weeds, Wild Cereals total	73,6%	68,0%	50,1%	93,4%	64,1%	27,0%	45,0%	37,0%	69,0%	44,5%	43,0%	63,6%	53,5%	58,9%
Legumes	2,6%	1,0%	0,0%	0,0%	0,3%	0,0	1,6%	0,7%	2,0%	1,4%	0,5%	9,0%	4,7%	2,2%
Weeds	21,0%	28,7%	38,0%	6,5%	27,4%	72,0%	50,0%	58,0%	28,0%	52,0%	55,0%	27,2%	41,1%	35,3%
Gathered	0,0 %	2,0%	11,3%	0,0%	7,8%	1,0%	3,0%	4,0%	1,0%	2,2%	1,0%	0,0%	0,5%	2,6%
% Cereal Crops														
Einkorn	17,8%	9,3%	19,7%	0,0%	9,9%	1,0%	12,0%	8,0%	17,0%	9,5%	14,0%	0,0%	7,0%	11,5%
Emmer	0,0%	0,0%	2,2%	0,0%	1,1%	0,0%	0,5%	0,0%	0,5%	0,2%	0,0%	0,0%	0,0%	0,3%
Wheat NID	10,7%	1,5%	1,6%	0,0%	0,9%	0,2%	3,5%	4,0%	5,0%	3,1%	2,0%	16,6%	9,3%	6,0%
Barley Cereals NID	0,0%	6,2%	19,4%	99,8%	56,8%	1,4%	8,0%	13,0%	7,0%	7,4%	3,0%	33,3%	18,1%	20,6%
Chaff	0,0%	46,8%	18,1%	0,1%	11,5%	87,4%	44,0%	20,4%	20,4%	20,4%	20,4%	20,4%	20,4%	20,4%

Agricultural subsistence practices are consistent throughout the Bronze Age occupation of the tell. Staple crop choices, as well as their relative importance, do not change through time from the Early to the Late Period³². The analysis of plant remains supports some general considerations about patterns of crop processing and consumption activities in domestic structures and functional areas.

Overall, low proportions of processing debris characterize the plant assemblages. Chaff from glume wheat is present in less than 40% of the all analyzed samples but it is remarkably much more frequent in the samples from Phase 5a. The prepared surfaces excavated in Structures 6 and 7, almost exclusively contain chaff, together with a few weeds. In Structure 8, a considerable concentration of chaff is associated with fat-hen and an unusual variety of weeds, clearly representing the by-products of grain cleaning. This could be explained as evidence for crop processing on site, but, given the peculiarity of these structures and their non-domestic function, other interpretations are just as possible, since chaff can also be used as temper, tinder, fodder and for animal bedding. Despite these anomalies in Phase 5a, domestic structures generally show a high proportion of clean grains and a usual scarcity of chaff and weeds. Consumption activities seem to be prevalent, while the processing of crops was done elsewhere. This is particularly evident for Structure 11, immediately preceding the Florescent Period, and for the structures of Phase 3, the acme of the Florescent Period, while in the domestic structures of the Late Period there is a greater taxonomic variability and a slight decline in the proportion of processed grains. The absence of clearly identifiable storage features in all the excavated structures (except the earliest house, Structure 12) might suggest a communal or central storage in another area of the settlement.

³² Few samples from the earliest Bronze Age levels and even less from the Copper Age levels has been analyzed; further excavation of Phase 7 contexts and J-L Layers is needed to determine the degree of continuity or transformation in the agricultural economy at Pecica.

Conclusions and Future Directions

The 2013–14 excavations produced significant new information about the early occupation sequence at Pecica “Șanțul Mare”. The Early Bronze Age settlement was founded around 2000 cal. BC, constructed on top of a levelled Middle Copper Age site. There is considerable continuity in settlement organization between early and later Bronze Age periods encountered thus far³³ and most day to day activities remain more or less the same. Indeed, the basic organizational features all seem to have been in place since the initial founding of the Mureș Culture settlement. However, in the Florescent Period there is intensification of key economic sectors, notably local production of high value goods such as metals and horses, which corresponds to its rise in regional prominence.

Future work will expand the areal extent of excavations within the earliest Bronze Age occupation in order to better understand the circumstances that led to its establishment during the height of the Mureș Culture regional expansion around 2000 BC and the organization of this initial settlement.

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³³ At least within the main excavation block through Phase 5b. There is some suggestion that the earliest Bronze Age occupation may differ as Structure 12 has a unique, off-set orientation; further excavations in these deep layers will clarify larger-scale organizational patterns in these initial phases.

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