

# CONSIDERATIONS REGARDING THE MACROBOTANICAL REMAINS FROM CERAMIC VESSELS FOUND AT ȘOIMUȘ – LA AVICOLA (FERMA 2), HUNEDOARA COUNTY

Mihaela GOLEA

“Vasile Pârvan” Institute of Archaeology, Bucharest, Romania; e-mail: mihaela.golea@iabvp.ro, mihaelas.golea@yahoo.com

**Keywords:** ceramic vessels, Vinča culture, processing, macrobotanical remains, archaeobotany, *Triticum* sp.

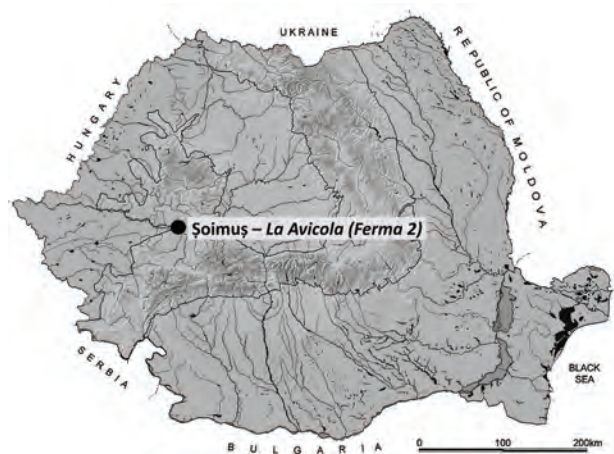
**Abstract:** In 2011, a joint team from various cultural institutions (“Vasile Pârvan” Institute of Archaeology, Museum of Dacian and Roman Civilisation and National Romanian History Museum) have collaborated in rescue excavations on the A1 highway (Lugoj–Deva). This research uncovered a multi-stratified settlement with occupations dated to the Neolithic, Bronze Age, Iron Age, Roman and Medieval periods. The Neolithic period (Vinča culture) is represented by two main layers. Radiocarbon dated the Neolithic occupation between the end of the sixth millennium and the beginning of the fifth millennium BC (Vinča culture, B and C phases). In this study, the contents of twenty-one complete and fragmented ceramic pots were analysed. The infill sediment from these vessels was wet sieved. The soil infill of eleven vessels yielded macrobotanical remains, mainly charred seeds. The context of these pots are as follows: five vessels were discovered in pits, two were found in dwellings, three came from the occupational layers, and one from an unknown context. The archaeobotanical samples recovered consist of fragments of caryopses, chaff of wheat (*Triticum* sp.) and einkorn (*Triticum monococcum*) and some seeds of weeds and shrubs.

**Cuvinte-cheie:** vase ceramice, cultura Vinča, procesare, semințe, carpologie, *Triticum* sp.

**Rezumat:** În anul 2011, mai multe instituții de cultură (Institutul de Arheologie „Vasile Pârvan”, Muzeul Civilizației dacice și romane și Muzeul Național de Istorie a României) au colaborat în efectuarea de cercetări arheologice preventive pe traseul viitoarei autostrăzi A1 (Lugoj–Deva). Aceste cercetări au adus la lumină o așezare multistratificată, dezvoltată de-a lungul epocii neolitice, bronzului, epocii fierului, perioadei romane și a epocii medievale. Perioada neolitică (cultura Vinča) este reprezentată de două straturi principale. Datele absolute o plasează la sfârșitul mileniului al VI-lea și începutul mileniului V BC (cultura Vinča, fazele B și C). Pentru acest studiu au fost analizate 21 de vase întregi sau fragmentare cu sediment prin cernere umedă. Din aceste 21 de vase, doar din 11 vase a rezultat material carpologic carbonizat. Cinci vase provin din gropi, două vase din locuințe, trei vase din nivelul de locuire și unul este *passim*. Materialul carpologic constă în fragmente de cariopse (boabe de cereale), resturi de spic de grâu (*Triticum* sp.) și alac (*Triticum monococcum*) și câteva semințe de plante ierboase și arbuști.

Between August and November 2011, an archaeological team consisting of specialists from the “Vasile Pârvan” Institute of Archaeology in Bucharest, the Museum of Dacian and Roman civilization in Deva and the National History Museum of Romania in Bucharest carried out preventive excavations on the route of the future A1 Highway (Lugoj–Deva) (Fig. 1). A multi-stratified settlement with various artefact types was uncovered. Most of the finds were attributed to the Neolithic period (Vinča culture), some of them being assigned to the Bronze Age, Iron Age, the Roman and Medieval periods. The settlement is known as *La Avicola (Ferma 2)* findspot, on the administrative territory of the Șoimuș commune, Hunedoara County<sup>1</sup>.

The Neolithic settlement consisted of two main layers (the lower layer was characterized by pit houses, ditches, and pits, while the upper layer yielded surface houses, ditches and pits). The two occupational layers were separated by a greyish-brown levelling horizon. Approximately 700 features were identified<sup>2</sup>. The



**Figure 1.** Geographic map of Romania with the location of the archaeological site of Șoimuș – La Avicola (Ferma 2) (Image by Cristian E. Ștefan).

radiocarbon dates place this settlement between the end of the fifth millennium BC and the beginning of the fourth millennium BC (Vinča, the B and C phases)<sup>3</sup>.

<sup>1</sup> Dobrescu et alii 2016; Niță et alii 2015; Ștefan 2016; Ștefan et alii 2013; 2015.

<sup>2</sup> Ștefan 2016.

<sup>3</sup> Ștefan 2017.

In 2016, the sediment from 21 ceramic vessels was analysed at the “Vasile Pârvan” Institute of Archaeology. The sediment was recovered by submerging the pots into water. The ceramic pots were weighted before and after the submersion in water to calculate the quantity of the processed soil samples. The soil was sieved using a 1 mm mesh, and water flow was used to recover the archaeological material. The total quantity of soil that resulted was 8.083 grams (Tab. 1).

After the recovery, the resulted material was sorted. This process lasted between two and three months and was conducted using a magnifying lamp of  $\times 2.25$  magnification and a Bresser ICD Advance incident microscope. Only 11 ceramic vessels yielded macrobotanical remains (seeds and fruits). Two vessels contained modern seeds that were not included in this study. The other nine vessels were dated to the Neolithic period (eight of them) and to the Bronze Age (one vessel). These pots were discovered in several features (Cpl. 345, Cpl. 462, L7 and L8) and in the Neolithic occupational layer. The Bronze Age vessel came from an occupational layer (see Table 1).

### ARCHAEOLOGICAL FEATURES

Feature 345 (Cpl. 345) was an oval pit ( $3 \times 1.9$  m and with a depth of 1.1 m) with a greyish-brown infill. The feature had the western and eastern walls cut in steps. The base consisted of multiple alveolar depressions. Near the centre, a burnt layer was discovered and under this layer at a depth of 0.2–0.3 m, another greyish-yellow layer was found<sup>4</sup>. Vessel number 14418 (Fig. 2/5) was discovered at the base of the pit, and pot number 12347 was found in the upper part of this feature (Tab. 1; Fig. 2/4).

Feature 462 (Cpl. 462) was a waste pit of  $3.50 \times 5.20$  m<sup>5</sup>. It had an irregular shape, and a depth of 1.20 m. It contained ceramic fragments, lithic tools, animal bones, mussel shells, daub with and without imprints, and unprocessed antlers. This feature yielded the ceramic vessels nos. 14394 and 14395 (Fig. 2/7, 8).

From the surface dwelling 7 (L7) came vessel no. 14979 (Fig. 2/3). This dwelling was  $6 \times 6$  m, with a treaded floor and walls made of wattle. Three post holes were identified, two along the southern wall while the third indicated the presence of a porch-type construction. A hearth of 0.8 m in diameter was also identified. The inventory of this dwelling consisted of ceramic fragments, anthropomorphic figurines, daub, flint and obsidian tools, a spindle-whorl, animal bones etc.

Surface dwelling 8 (L8) was  $6.5 \times 5.5$  m and had a depth of 0.4 m. It was observed at 0.2 m, without any constructive elements. The inventory of L8 consisted of ceramic fragments, animal bones and daub without imprints<sup>6</sup>.

Pots nos. 11454 (Fig. 2/2) and 12057 (Fig. 2/1) were discovered in two distinct occupational layers. Pot no. 11454 was identified at a depth of  $-0.3/-0.4$  m, in the second occupational layer. Vessel no. 9614 (Fig. 2/9) was at a depth of  $-0.3$  m, within an occupational layer attributed to the Bronze Age (the Şoimuş cultural aspect)<sup>7</sup>.

The archaeobotanical material was analysed under an incident microscope Bresser ICD Advance. The images were processed with the Bresser ICD Advance camera software. The taxonomical identification was made using different botanical atlases, identification keys and articles<sup>8</sup>. Two ceramic pots contained modern fat hen seeds (*Chenopodium album*). These were pot no. 7675 from pit Cpl. 171 and pot no. 14497 of unknown provenance. The first vessel yielded six fat hen seeds (*Chenopodium album*) and the second only three. These identifications do not appear in Table no. 2. In total, 58 macrobotanical remains were recovered, all charred.

Vessel no. 14979 from dwelling L7 yielded the largest quantity of remains (18), followed by vessel no. 9614 of the Bronze Age – Şoimuş cultural aspect, with 12 macrobotanical remains. The following pot, no. 14394 contained nine macroremains, while vessel no. 2347 from pit Cpl. 345 yielded seven. Vessel no. 14418 from the same pit (Cpl. 345) contained five seeds and fruits. Pot no. 12064 from surface dwelling L8 contained only two macrobotanical remains. The other vessels contained only one botanical remain each.

### ARCHAEOBOTANICAL IDENTIFICATION

All macrobotanical remains identified in the Şoimuş – *La Avicola* (Ferme 2) assemblage are charred (Tab. 2). The nine modern fat hen seeds (*Chenopodium album*) in vessels nos. 7676 and 14497 were not taken into consideration. Most of the caryopses identified are badly preserved. The taxonomic diversity is low. Only two species were identified and also one genus and one family level identifications were made. From the point of view of plant organs, the most common remains are of caryopses (fruits) with 20 whole and fragmented items (36%). They are followed by chaff (spikelet bases and glume bases) with 18 fragments (32%), and *Other* also with 18 fragments (where the Indet. = undetermined category was also included) (32%) (Fig. 3).

Taxonomically, einkorn (*Triticum monococcum*) yielded the largest quantity of remains, with a frequency of 27%, followed by wheat (*Triticum* sp.) with 25%. The

<sup>4</sup> Ştefan et alii 2015.

<sup>5</sup> Ştefan et alii 2015.

<sup>6</sup> Ştefan et alii 2015.

<sup>7</sup> Andriţoiu 1992.

<sup>8</sup> Hillman 2001; Hillman et alii 1996; Jacomet 2006; Jones et alii 2000; Schoch et alii 1988.

Sorting number	Vessel no.	Feature	Soil weight (grams)	Macrobotanical remains		Period
				charred	modern	
1	14394	462	558	x		Neolithic
2	14418	345	214	x		Neolithic
3	12064	L8	358	x		Neolithic
4	7675	171	752		x	
5	14979	L7	968	x		Neolithic
6	11454	occupation layer	310	x		Neolithic
7	14395	462	1208	x		Neolithic
8	7602	passim	0.5			
9	2105	L2	0.5			
10	8392	L2	0.5			
11	9549	239	0.5			
12	12020	occupation layer	0.5			
13	9573	239	0.5			
14	12057	occupation layer	0.5	x		Neolithic
15	8332	174	752			
16	9614	occupation layer	1164	x		Bronze Age
17	14964	L2	574			
18	9789	315	318			
19	12347	345	338	x		Neolithic
20	14497	passim	378		x	
21	5015	59	188			

**Table 1.** Archaeological information on the vessels and the respective soil weights.



**Figure 2.** Vessels from Şoimuş – La Avicola (Ferma 2) with charred macrobotanical remains: Pot no. 12057 (1); pot no. 11454 (2); pot no. 14979 (3); pot no. 12347 (4); Pot no. 14418 (5); pot no. 12064 (6); pot no. 14394 (7); pot no. 14395 (8); pot no. 9614 (9).

Indet. category holds 20%, the cereal category (Cerealia) 16% and the cornelian cherry (*Cornus mas*)/gathered plant category, 12% (Fig. 4). Einkorn (*Triticum monococcum*) is represented by various identifications: typical einkorn

(*Triticum monococcum*), one-grained einkorn, two-grained einkorn (*Triticum urartu*) and *Triticum* cf. *monococcum*. They originated in features L8 (pot no. 12064), Cpl. 462 (pot no. 14394) and surface dwelling L7 (pot no. 14979).

Archaeological context		TOTAL	Pot no. 12347, Cpl. 345	Pot no. 14418, Cpl. 345	Pot no. 14394, Cpl. 462	Pot no. 14395, Cpl. 462	Pot no. 12064, L8	Pot no. 11454	Pot no. 14979, L7	Pot no. 12057	Pot no. 9614, SIV
Volume of processed samples (grams)		5118.5	338	214	558	1208	358	310	968	0.5	1164
Number of processed samples		9	1	1	1	1	1	1	1	1	1
Concentration of plant per liter (unit/liter)											
Total number of remains		56	7	5	9	1	2	1	18	1	12
Species	Plant part	Preservation type									
Cereals											
Cerealia	Caryopses fragments	charred	6		1						5
Cerealia	Spikelet base	charred	2	1						1	
Cerealia cf. <i>Hordeum</i>	caryopse	charred	1	1							
Wheat											
<i>Triticum</i> sp.	caryopse	charred	10						5		5
<i>Triticum</i> sp.	Spikelet/ base glumes	charred	4						4		
Einkorn											
<i>Triticum monococcum</i>	Spikelet/ base glumes	charred	2	2							
<i>Triticum boeoticum</i> -2-grained	caryopse	charred	1								1
<i>Triticum monococcum</i> -one-grained	caryopse	charred	2			1					1
<i>Triticum</i> cf. <i>monococcum</i>	Spikelet/ base glumes	charred	10		4		1	1	4		
Gathered plants											
<i>Cornus mas</i>	fragments	charred	7	7							
Unidentified											
Indets	fragments	charred	11	1	4		1		5		

Table 2. Taxonomical list of identified species from Şolmuş – La Avicola (Ferma 2).



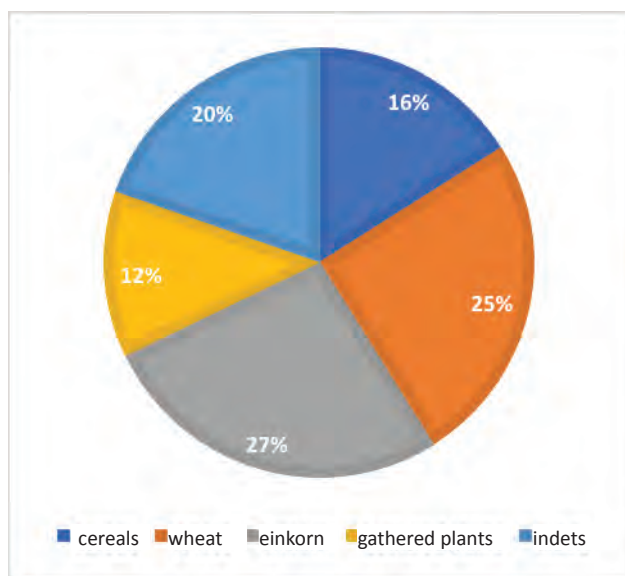


Figure 3. Percentage of identified plant parts.

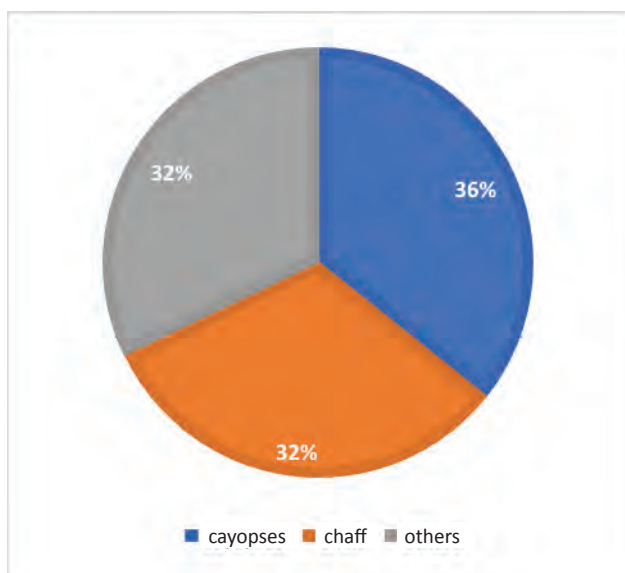


Figure 4. Percentage of identified plant categories.

A two-grained einkorn (*Triticum urartu*) was identified in pot no. 9694 found in the Bronze Age layer – the Şoimuş cultural aspect.

## DISCUSSION

Einkorn – *Triticum monococcum* is regarded as the first plant species domesticated, and it is part of the founder-crop packages from the Southwestern Asia<sup>9</sup>. Although plant remains of barley, emmer and einkorn do appear very early in the Fertile Crescent, only from the middle of the PPNB (Pre-Pottery Neolithic B) there is clear

evidence of the domesticated form of these species<sup>10</sup>. Therefore, domestication of einkorn is limited to the Karabağ area in Turkey<sup>11</sup>. Some of the settlements in which this species was found are Çatalhöyük<sup>12</sup>, Cafer Höyük, Abu Hureyra<sup>13</sup>.

Einkorn is a hulled diploid species, with colder and wetter ecological requirements for growth. Currently, einkorn is cultivated in isolated areas in France, India, Slovakia, and Romania and it is considered to be a relic species<sup>14</sup>. But recently, einkorn has started to be used more frequently, due to its nutritional values, even though more and more studies suggest that this species is not suitable for coeliacs. Considering the present-day climatic changes, einkorn may be further employed for its genetic background in the development of new hybrids with high nutritional values<sup>15</sup>.

Two-grained einkorn (*Triticum urartu*) has emerged as a domestic species since the Neolithic. Remains of this species were found in Syria, Turkey and Europe. Now, two-grained einkorn is an extinct plant species<sup>16</sup>. One-grained einkorn was domesticated in the Karacadağ region, in Southeastern Turkey<sup>17</sup> and the earliest evidence of this species go back to the early PPNB at Çayönü and Cafer Höyük<sup>18</sup>. At the tell settlement of Gusir Höyük, of the PPNA (Pre-Pottery Neolithic A), wild progenitors of one-grained einkorn and two-grained einkorn (*Triticum urartu*) were found in a burnt dwelling dated to ca. 10.500–10.300 cal BP<sup>19</sup>. In addition, macrobotanical remains of these two types of einkorn were found at Tell Qarassa, north of Southern Syria and were considered contemporary to those from Gusir Höyük. But there, the two-grained einkorn had more domestication characteristics than the one-grained einkorn<sup>20</sup>.

Barley (*Hordeum vulgare*) is another founder crop from the Southeastern part of Asia alongside einkorn, emmer, pea, lentil, bitter vetch, chickpea and flax<sup>21</sup>. Some of the earliest evidence of barley domestication comes from southern Levant at Tell Aswad, Jericho and Netiv Hagdud in the EPPNB period<sup>22</sup>.

Cornelian cherry (*Cornus mas*) is a shrub reaching heights up to 8 m<sup>23</sup>. This species develops at the outskirts of forest and prefers calcareous and permeable soils. It can endure extreme weather conditions, such as frost or

<sup>10</sup> Arranz-Otaegui et alii 2016; Tanno, Willcox 2012.

<sup>11</sup> Brandolini et alii 2016; Haldorsen et alii 2011.

<sup>12</sup> Fairbairn et alii 2002.

<sup>13</sup> de Moulines 1997.

<sup>14</sup> Ceapoiu et alii 1984, p. 58; Hajnalová, Dreslerová 2010.

<sup>15</sup> Hidalgo, Brandolini, 2014.

<sup>16</sup> López-Merino et alii 2015.

<sup>17</sup> Haldorsen et alii 2011.

<sup>18</sup> Nesbitt 2002.

<sup>19</sup> Kabukcu et alii 2021.

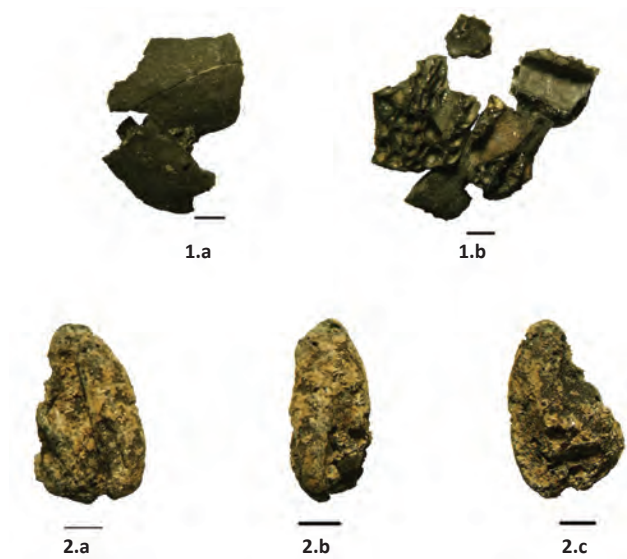
<sup>20</sup> Arranz-Otaegui et alii 2016.

<sup>21</sup> Gopher et alii 2021, Tab. 1.1.

<sup>22</sup> Arranz-Otaegui et alii 2016; Bard et alii 2000; Tanno, Willcox 2012; Willcox 2002; 2005.

<sup>23</sup> Săvulescu 1958, p. 317.

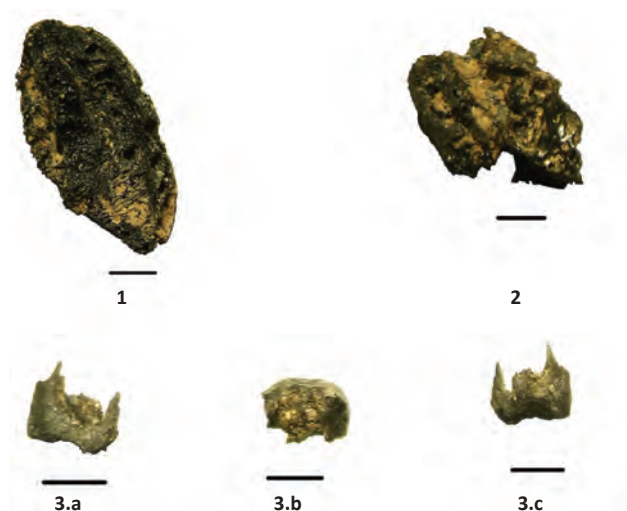
<sup>9</sup> Kabukcu et alii 2021; Pourkheirandish et alii 2018.



**Figure 5.** Macrobotanical remains from feature Cpl. 345: stony fragments of Cornelian cherry (*Cornus mas*) external part (1.a), internal part (1.b); barley-type cereal caryopse (*Cerealia* cf. *Hordeum*), ventral view (2.a), lateral view (2.b), dorsal view (2.c). All scales are 1 mm.



**Figure 6.** Einkorn caryopses from pot no. 9614 in the Bronze Age layer: one-grained einkorn, ventral view (1.a), one-grained einkorn, lateral view (1.b), dorsal view (1.c); two-grained einkorn (*Triticum urartu*), ventral view (2.a), two-grained einkorn, lateral view (2.b), dorsal view (2.c). All scales are 1 mm.



**Figure 7.** Macrobotanical remains with possible traces of processing: from pot no. 9614 of Bronze Age: Cereal grain (*Poaceae*) fragment with shiny appearance (1); cereal grain (*Poaceae*) with glassy part (2). From pot no. 12064 of dwelling L8: spikelet base of einkorn (*Triticum* cf. *monococcum*) abaxial view (3.a), cross-section (3.b), adaxial view (3.c). All scales are 1 mm.

drought<sup>24</sup>. The fruit contains vitamins B, C, and PP and is an ailment for enterocolitis, diarrhoea or dysentery<sup>25</sup>.

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At Șoimuș, when considering the frequency of macrobotanical remains in the various vessels, the richest pot is no. 14979 from surface dwelling L7. Most remains fall within the *Indet.* category. The pot contained wheat (*Triticum* sp.) and einkorn (*Triticum monococcum*), as well as some unidentified macrobotanical remains. Most of the plant material determined in this particular feature (L7) are chaff remains.

From feature Cpl. 345, two vessels yielded archaeobotanical material. Interestingly, pot 12347 from Cpl. 345 yielded all the cornelian cherry (*Cornus mas*) stone fragments identified (Fig. 5/1). In pot no. 14418, a barley-type cereal caryopsis (*Cerealia* cf. *Hordeum*) was identified. Bad preservation made possible the determination of this plant remain only at genus level (Fig. 5/2).

Pit Cpl. 462 yielded two pots with a total of 10 macrobotanical remains. In pot no. 14394, the most common botanical material was chaff remains of einkorn (*Triticum* cf. *monococcum*) and fragments from the *Indet.* category. In vessel no. 14395, the only caryopses identified were those of einkorn (*Triticum monococcum*, one-grained).

Bronze Age pot no. 9614 contained only cereal remains. The only two determined at species level were of two-grained einkorn (*Triticum urartu*) and one-grained einkorn (*Triticum monococcum*) (Fig. 6).

Chaff was identified in all pots except no. 12347 from Cpl. 345. This suggests that the processing of cereal took place in the area and indicates *in extenso*, the cultivation of cereals in the proximity of this settlement. The cornelian cherry fragments (*Cornus mas*) originated probably from the same seed.

Some fragmented cereal remains show processing marks. An example is the cereal grain from pot no. 12046, which has a shiny and opaque appearance (Fig. 7/1). These characteristics may be indicative of grinding but may also result from charring and no other prior processing (such as breaking or boiling). Another example is the cereal fragment (Poaceae) from the Bronze Age pot (Fig. 7/2) with a glassy appearance, indicative of processing or cooking. The experiments carried out during the PlantCult project supervised by Maria Valamoti<sup>26</sup>, suggested that this aspect indicates a water and heat treatment. The glassy features can be related to starch gelatinization. Most probably, both fragments mentioned above were ground grains, untreated before charring. A second cereal fragment (*Cerealia*) from the same bronze Age pot has also possible marks of processing (Fig. 7).

Macrobotanical remains of einkorn (*Triticum monococcum*) were found at other Neolithic sites from Transylvania and elsewhere, during the Vinča B2 phase at Liubcova (Caraș-Severin County)<sup>27</sup>, Miercurea Sibiului<sup>28</sup> (Sibiu County). Other discoveries come from Limba, Alba County (Vinča A3) in the shape of caryopses found in a ceramic pot<sup>29</sup>; at Parța (Timiș County) during the Vinča B2–B3 phase and last but not least, at Uivar (Timiș County), in a dwelling<sup>30</sup> of the C phase. Another discovery comes from the Bronze Age site at Cheile Turzii – *Peștera Ungurească* (Cluj County) from a Bodrogkeresztur cultural context. Caryopses of einkorn (*Triticum monococcum*) and cornelian cherry stone pips (*Cornus mas*) were also found but in small quantities<sup>31</sup>.

Other Bronze Age discoveries of einkorn were made at Carei – *Bobald* (Satu Mare County)<sup>32</sup>, specifically in an Otomani cultural layer; also, at the eponymous site of Otomani (Bihor County), during phase III<sup>33</sup>. Macrobotanical remains were identified at archaeological sites of the Coțofeni culture, also. Thus, at Șeușa – *Gorgan* (Alba County), a large amount of plant remains was discovered in a feature attributed to phase IIIb–IIIc. The 3.1 kg of plant material contained einkorn caryopses (over 20%)<sup>34</sup>. Also, at Cheile Turzii – *Peștera Ungurească*, in the Coțofeni layer, were identified three einkorn caryopses<sup>35</sup>. Another find came from Cluj-Napoca (Cluj County) where in a Wietenberg (phase III) feature, were also identified caryopses of einkorn (*Triticum monococcum*)<sup>36</sup>.

South of the Carpathian, one-grained einkorn was identified at Gumelnița – *Măgura Calomfirești*<sup>37</sup>, and at Lăceni – *Teleor 008* (Teleorman County)<sup>38</sup>, both within Eneolithic Gumelnița contexts. No macrobotanical remains of two-grained einkorn (*Triticum urartu*) were yet found in Romania, but there are some discoveries at Fivà, Italy for the Bronze Age period, with one-grained einkorn caryopses also found<sup>39</sup>.

Earlier finds of cornelian cherry (*Cornus mas*) than those of the Bronze Age site at Cheile Turzii – *Peștera Ungurească*, come from the Vinča culture: Limba<sup>40</sup>, Miercurea Sibiului<sup>41</sup> and Uivar<sup>42</sup>. Another Bronze Age discovery of Cornelian cherry (*Cornus mas*) was made at the Otomani site of Carei – *Bobald*<sup>43</sup>.

<sup>27</sup> Cârciumar 1996, p. 90.

<sup>28</sup> Ciută 2009, p. 81–82.

<sup>29</sup> Ciută et alii 2004.

<sup>30</sup> Fisher, Rosch 2004.

<sup>31</sup> Ciută 2009, p. 102.

<sup>32</sup> Cârciumar 1996, p. 68.

<sup>33</sup> Cârciumar 1983.

<sup>34</sup> Ciută et alii 2006, p. 352–354; Ciută 2009, p. 99–100.

<sup>35</sup> Ciută 2009, p. 101.

<sup>36</sup> Ciută 2009, p. 104.

<sup>37</sup> Lazăr et alii 2020, Tab. 6.

<sup>38</sup> Bogaard 2001.

<sup>39</sup> Jones, Rowley-Conwy 1984, p. 328, Kreuz-Boenke 2002.

<sup>40</sup> Zach-Obmann et alii 2004.

<sup>41</sup> Ciută 2009, p. 81–82.

<sup>42</sup> Fisher, Rosch 2004, p. 210–220.

<sup>43</sup> Ciută, Molnar 2017.

<sup>24</sup> Panțu 1906, p. 73.

<sup>25</sup> Săvulescu 1958, p. 317; Scarlat, Tohăneanu 2003, p. 84.

<sup>26</sup> Valamoti et alii 2017; 2019; 2021.



Barley (*Hordeum vulgare*) was identified at a series of Vinča sites in Romania such as Liubcova<sup>44</sup>, Cârcea (Dolj County)<sup>45</sup>, Parța<sup>46</sup> and Uivar<sup>47</sup> (Timiș County), and Limba<sup>48</sup>. The Eneolithic Bodroghkeresztur culture yielded one find of barley at Cheile Turzii – *Peștera Ungurească*<sup>49</sup>. During the Bronze Age, barley also appears at the Otomani sites of Carei – *Bobald*, Medieșul Aurit<sup>50</sup> and Otomani (here in smaller quantities)<sup>51</sup>.

## CONCLUSIONS

The macrobotanical remains identified at Șoimuș – *La Avicola* (Ferma 2), such as cornelian cherry (*Cornus mas*) and einkorn (*Triticum monococcum*) are in line with other Neolithic and Eneolithic discoveries in Romania. Even though the diversity of plant species and the quantities are small, the identifications of the one-grained and two-grained einkorn (*Triticum urartu*) are the first for the Vinča culture in Romania. The presence of fragmented remains with possible processing traces do suggest food preparation, even though it is possible that some of the traces were the result of charring. The discoveries of chaff in all vessels except for pot 142347 in Cpl. 345 and pot 14395 in Cpl. 462 is a clear sign of cereal processing such as winnowing and thrashing, and it is likely that these took place in the settlement area.

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## REFERENCES

- Andrițoiu 1992 – I. Andrițoiu, *Civilizația tracilor din sud – vestul Transilvaniei în Epoca Bronzului*, *SympThrac* 9, 1992, p. 19–26.
- Arranz-Otaegui et alii 2016 – A. Arranz-Otaegui, S. Colledge, L. Zapata, L. C. Teira-Mayolini, J. J. Ibáñez, *Regional diversity on the timing for the initial appearance of cereal cultivation and domestication in southwest Asia*, *PNAS* 113(49), 2016, p. 14001–14006, <https://doi.org/10.1073/1612797113>.
- Bard et alii 2000 – A. Badr, K. Müller, R. Schäfer-Pregl, H. El rabey, S. Effgen, H. H. Ibrahim, C. Pozzi, W. Rohde, F. Salamini, *On the Origin and Domestication of Barley* (*Hordeum vulgare*), *Molecular biology and evolution* 17(4), 2000, p. 499–510.
- Bogaard 2001 – A. Bogaard, *Charred plant remains from flotation in 2000*, in: D. W. Bailey, R. Andreescu, S. Mills (eds.), *Southern Romania Archaeological Project, Second Preliminary Report*, Cardiff University, 2001, p. 113–127.
- Brandolini et alii 2016 – A. Brandolini, A. Volante, M. Heun, *Geographic differentiation of domesticated einkorn wheat and possible Neolithic migration routes*, *Heredity* 117(3), 2016, p. 135–141.
- Cârciumaru 1983 – M. Cârciumaru, *Considerații paleoetnobotanice și contribuții la agricultura geto-dacilor*, Th-D 4, 1983, p. 126–134.
- Cârciumaru 1996 – M. Cârciumaru, *Paleoetnobotanica*, Iași, 1996.
- Ceapoiu et alii 1984 – N. Ceapoiu, Gh. Bîlteanu, Cr. Hera, N. N. Săulescu, F. Negulescu, A. Bărbulescu, *Grîul*, București, 1984.
- Ciută et alii 2006 – M. Ciută, A. Marc, B. Ciută, A. Gligor, *Raport privind cercetările arheologice sistematice efectuate în situl de la Șeușa-Gorgan*, CCA, campania 2005, Constanța, 2006, p. 352–354.
- Ciută 2009 – B. Ciută, *Cultivarea plantelor în pre- și protoistoria bazinului intracarpatic din România: analize statistice și spațiale efectuate asupra macroresturilor vegetale*, Alba Iulia, 2009.
- Ciută, Molnar 2017 – B. Ciută, Z. Molnar, *Contribuții la dieta comunităților Otomani. Analiza macroresturilor vegetale recuperate din situl de la Carei-Bobald*, *Sargetia* SN 8, 2017, p. 11–27.
- Dobrescu et alii 2016 – R. Dobrescu, C. E. Ștefan, C. Bonsall, *Observations sur l'Industrie en obsidienne découverte à Șoimuș – La Avicola* (Ferma 2), *MCA* 12, 2016, p. 45–56.
- Fairbairn et alii 2002 – A. Fairbairn, E. Asouti, J. Ner, D. Martinoli, *Macro-botanical evidence for plant use at Neolithic Çatalhöyük South-central Anatolia, Turkey*, *Vegetation History and Archaeobotany* 11(1–2), 2002, p. 41–54.
- Fisher, Rosch 2004 – E. Fisher, M. Rosch, 8. *Archäobotanische Untersuchungen*, in: W. Schier, F. Drașoveanu, *Vorbericht über die rumänisch-deutschen Prospektionen und Ausgrabungen in der befestigten Tellsiedlung von Uivar, jud. Timiș, Rumänien (1998-2002)*, *PZ* 79(2), 2004, p. 209–220.
- Gopher et alii 2021 – A. Gopher, S. Lev-Yadun, Sh. Abbo, *Breaking Ground. Plant Domestication in the Neolithic Levant: The “Core-Area One-Event” Model*, Emery and Claire Yass Publications in Archaeology, The Institute of Archaeology, Tel Aviv University, 2021.
- Hajnalová, Dreslerová 2010 – M. Hajnalová, D. Dreslerová, *Ethnobotany of einkorn and emmer in Romania and Slovakia: towards interpretation of archaeological evidence*, *PamArch* 101, 2010, p. 169–202.
- Haldorsen et alii 2011 – S. Haldorsen, H. Akan, B. Çelik, M. Heun, *The climate of the Younger Dryas as a boundary for Einkorn domestication*, *Vegetation History and Archaeobotany* 20, 2011, p. 305–318; DOI 10.1007/s00334-011-0291-5.
- Hidalgo, Brandolini 2014 – A. Hidalgo, A. Brandolini, *Nutritional properties of einkorn wheat* (*Triticum monococcum* L.), *Journal of the Science of Food and Agriculture* 94, 2014, p. 601–612.
- Hillman 2001 – G. Hillman, *Archaeology, Percival, and the problems of identifying wheat remains*, in: P. D. S. Caligari, P. E. Brandham (eds.), *Wheat taxonomy: the legacy of John Percival*, The Linnean special issue 3, Great Britain, 2001, p. 27–36.
- Hillman et alii 1996 – G. C. Hillman, S. Manson, D. de Moulins, M. Nesbitt, *Identification of archaeological remains of wheat: the 1992 London Workshop*, *Circaea* 12(2) (1996 for 1995), 1996, p. 195–209.
- Jacommet 2006 – S. Jacomet, *Identification of chaff remains from archaeological sites*, 2<sup>nd</sup> edition, IPNA, Basel, 2006.
- Jones, Rowley-Conwy 1984 – G. Jones, P. A. Rowley-Conwy, *Plant remains from the north Italian lake dwellings of Fiaavè (1.400–1.200 B.C.)*, in: R. Perini (ed.), *Scavi archeologici nella Zona Palafitticola di Fiaavè-Carera. Parte I: Campagne 1969-1976. Situazioni dei Depositi e dei resti strutturali*, vol. I, Trento, p. 323–355.
- Jones et alii 2000 – G. Jones, S. Valamoti, M. Charles, *Early crop diversity: a “new” glume wheat from northern Greece*, *Vegetation History and Archaeobotany* 9, 2000, p. 133–146.
- Kabukcu et alii 2021 – C. Kabukcu, E. Asouti, N. Pöllath, J. Peters, N. Karul, *Pathways to plant domestication in Southeast Anatolia based on new data from aceramic Neolithic Gusr Höyük*, *Sci Rep* 11, 2021, p. 2112; <https://doi.org/10.1038/s41598-021-81757-9>.

<sup>44</sup> Cârciumaru 1996, p. 90.

<sup>45</sup> Cârciumaru 1996, p. 70.

<sup>46</sup> Cârciumaru 1996, p. 97; Monah 1994, p. 81–85.

<sup>47</sup> Fisher, Rosch 2004, p. 210–220.

<sup>48</sup> Zach-Obmann et alii 2004.

<sup>49</sup> Ciută 2009, p. 102.

<sup>50</sup> Cârciumaru 1996, p. 68, 91.

<sup>51</sup> Cârciumaru 1996, p. 94.



- Kreutz, Boenke 2002 – A. Kreutz, N. Boenke, *The presence of two-grained einkorn at the time of Bandkeramik culture*, Vegetation History and Archaeobotany 11, 2002, p. 233–240.
- Lazăr et alii 2020 – C. Lazăr, V. Opreș, Th. Ignat, B. Manea, O. Frujină, C. Covătaru, A. Darie, A. Bălășescu, V. Radu, G. Vasile, M. Golea, M. Mărgărit, G. Popescu, M. Dimanche, D. Pîrvulescu, M. Streinu, B. Șandric, M. Tufaru, A. Iancu, G. Dinu, V. Parnic, C. Căpiță, Th. Zavalas, A. Dima, T. Sava, *Gumelnița: research results of the 2018 and 2019 fieldwork seasons*, RCAN 6, 2020, p. 15–100.
- López-Merino et alii 2015 – L. López-Merino, S. A. G. Leroy, S. Haldorsen, M. Heun, A. Reynolds, *Can Triticum urartu (Poaceae) be identified by pollen analysis? Implications for detecting the ancestor of the extinct two-grained einkorn-like wheat*, Botanical Journal of the Linnean Society 177, 2015, p. 278–289.
- de Moulins 1997 – D. de Moulins, *Agricultural Changes at Euphrates and Steppe Sites in the Mid-8<sup>th</sup> to the 6<sup>th</sup> millennium BC*, BARIntSer 683, Oxford, 1997.
- Monah 1994 – F. Monah, *Determinări arheobotanice pentru stațiunea neolitică de la Parșa (comuna Saș, jud. Timiș)*, ActaMN 31/I, 1994, p. 81–85.
- Nesbitt 2002 – M. Nesbitt, *When and where did domesticated cereals first occur in southwest Asia?*, in: R. T. J. Cappers, S. Bottema (eds.), *The Dawn of Farming in the Near East. Studies in Early Near East Production, Subsistence, and Environment* 6, 2002 (1999), Berlin, p. 113–132.
- Niță et alii 2015 – L. Niță, C.E. Ștefan, M. Dimache, T. Hilă, R. Petcu, *Considerații privind industria litică de la Șoimuș La Avicola (Ferma 2), jud. Hunedoara*, BMJT 7, 2015, p. 97–116.
- Panțu 1906 – Z.C. Panțu, *Plantele cunoscute de poporul român. Vocabular botanic cuprinzând numirile române, franceze, germane și științifice*, București, 1906.
- Pourkheirandish et alii 2018 – M. Pourkheirandish, F. Dai, S. Sakuma, H. Kanamori, A. Distelfeld, G. Willcox, T. Kawahara, T. Matsumoto, B. Kilian, T. Komatsuda, *On the origin of the Non-brittle Rachis Trait of Domesticated Einkorn Wheat*, Frontiers of Plant Science 8, 2018, DOI: 10.3389/fpls.2017.02031.
- Săvulescu 1958 – T. Săvulescu, *Flora Republicii Populare Române*, vol. VI, București, 1958.
- Scarlat, Tohăneanu 2003 – M. A. Scarlat, M. Tohăneanu, *Mic Tratat de Fitomedicină*, vol. II, Ploiești, 2003.
- Schoch et alii 1988 – W. Schoch, B. Pawlik, F. H. Schweingruber, *Botanische Makroreste*, Stuttgart, 1988.
- Ștefan 2016 – C. E. Ștefan, *Playing with clay: The anthropomorphic figurines from Șoimuș – La Avicola (Ferma 2), Hunedoara County, Dacia NS 60*, 2016, p. 31–66.
- Ștefan 2017 – C. E. Ștefan, *Miniature vessels from Șoimuș – La Avicola (Ferma 2), Hunedoara County. A case study*, Dacia NS 61, 2017, p. 7–69.
- Ștefan et alii 2013 – C. E. Ștefan, R. Petcu, R. Petcu, *Reprezentări antropomorfe din așezarea neolitică de la Șoimuș – La Avicola (Ferma 2), jud. Hunedoara*, SP 10, 2013, p. 49–66.
- Ștefan et alii 2015 – C. E. Ștefan, R. Petcu, R. Petcu, *Vase cu picioare de la Șoimuș – La Avicola (Ferma 2), jud. Hunedoara*, SCIVA 66(3–4), 2015, p. 183–209.
- Tanno, Willcox 2012 – K. Tanno, G. Willcox, *Distinguishing wild and domestic wheat and barley spikelets from early Holocene sites in the Near East*, Vegetation History and Archaeobotany 12, 2012, p. 107–115, DOI 10.1007/s00334-011-0316-0.
- Valamoti et alii 2017 – S. M. Valamoti, S. Jacomet, H. Stika, A. Heiss, *The PLANTCULT Project: Identifying the plant food cultures of ancient Europe*, Antiquity 91(358), 2017, DOI:10.15184/aqy.2017.130.
- Valamoti et alii 2019 – S. M. Valamoti, E. Marinova, A. G. Heiss, I. Hristova, C. Petridou, T. Popova, S. Michou, L. Papadopoulou, P. Chrysostomou, P. Darcque, D. Grammenos, S. Iliev, S. Kotsos, C. Koukouli-Chrysanthaki, K. Leshtakov, D. Malamidou, N. Merousis, V. Nikolov, K. Nikov, K. Panayotova, A. Papanthimou, H. Popov, L. Stefani, Z. Tsirtsoni, T. K. Ruseva, *Prehistoric cereal foods of southeastern Europe: An archaeobotanical exploration*, JAS 104, 2019, p. 97–113.
- Valamoti et alii 2021 – S. M. Valamoti, C. Petridou, M. Berihuete-Azorín, H.-P. Stika, L. Papadopoulou, I. Mimi, *Deciphering ancient 'recipes' from charred cereal fragments: An integrated methodological approach using experimental, ethnographic and archaeological evidence*, JAS 128, 2021, 105347, <https://doi.org/10.1016/j.jas.2021.105347>.
- Willcox 2002 – G. Willcox, *Geographical variation in major cereal components and evidence for independent domestication events in the Western Asia*, in: R. T. J. Cappers, S. Bottema (eds.), *The dawn of farming in the Near East*, Studies in Early Eastern Production, Subsistence and Environment 6, 2002 (1999), Berlin, 2002, p. 133–140.
- Willcox 2005 – G. Willcox, *The distribution, natural habitats and availability of wild cereals in relation to their domestication in the Near East: multiple events, multiple centres*, Vegetation History and Archaeobotany 14, 2005, p. 534–541, DOI 10.1007/s00334-005-0075-x.
- Zach-Obmann et alii 2004 – B. Zach-Obmann, M. Clută, E.B. Ciută, *Identificarea macroresturilor vegetale descoperite într-un sit aparținând perioadei neoliticului dezvoltat*, Apulum 41, 2004, p. 103–112.