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RADIOCARBON DATA OF FUNERARY DISCOVERIES FROM MIDDLE BRONZE AGE IN THE MUREȘ VALLEY. THE WIETENBERG CEMETERY FROM LIMBA-OARDA DE JOS (ALBA COUNTY, ROMANIA)

Abstract: The archaeological rescue excavations occasioned by the construction of the *Lot no. 1* of the *Highway no. 10*, Sebeș-Turda, highlighted an unexpected Bronze Age necropolis belonging to Wietenberg Culture. The Bronze Age necropolis was delimited between 6+600 and 6+650 kilometers, and located on the southwestern part of the *Site no. 6*, right above the early Vinča settlement defensive trenches (Fig. 1-2). With 74 excavated funerary complexes, the partially excavated Wietenberg cemetery is one of the largest in Transylvania. According to the radiocarbon data presented in this study, the necropolis was used in the Middle Bronze Age (1780-1690 cal. BC), associated with the Wietenberg culture (phase II), and is contemporary with the end of the cemetery from Sebeș-Între Răstoace located approximately 7.5 km South – South-West, on the Sebeș River terraces.

Keywords: *Bronze Age, Wietenberg culture, cremated bone samples, radiocarbon absolute data.*

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The archaeological site Limba-Oarda de Jos is a large Neolithic settlement in South-Western corner of Transylvanian Plateau (Scașelor Plateau). The site is located on the Mureș Valley, a major communication route in the prehistory of the Carpathian Basin that linked Transylvania to the Pannonian Plain. It is a *key-site* in understanding the complexity of prehistoric cultural processes - beginning with Early Neolithic and ending with the Iron Age - on this part of the Intra-Carpathian area¹. The site was occupied during the Early and Middle Neolithic (7-5 mil B.C.) and had a long series of successive habitations beginning in the early phases of Starčevo-Criș Cultural complex (IB-IIA, Precriș culture) and ending with the complex phenomenon of the Vinča Cultural complex (A2 – B1 phases).

During more than 10 months, between 2016 and 2017², the rescue

¹ CIUTĂ, CIUTĂ, 2015

² The *Site no. 6* of the *Lot no. 1* of the Sebeș-Turda Highway, was excavated as part of mitigation ahead of the construction of the infrastructure project, and was delimited by the way in which practically the footprint of the motorway crossed, from south to north, the archeological site, previously known and researched under the name: *The Assembly of archeological sites from Oarda de Jos-Limba* (CIUTĂ 2009, CIUTĂ 2009a, CIUTĂ et alii 2017). In reality, more than 70% of

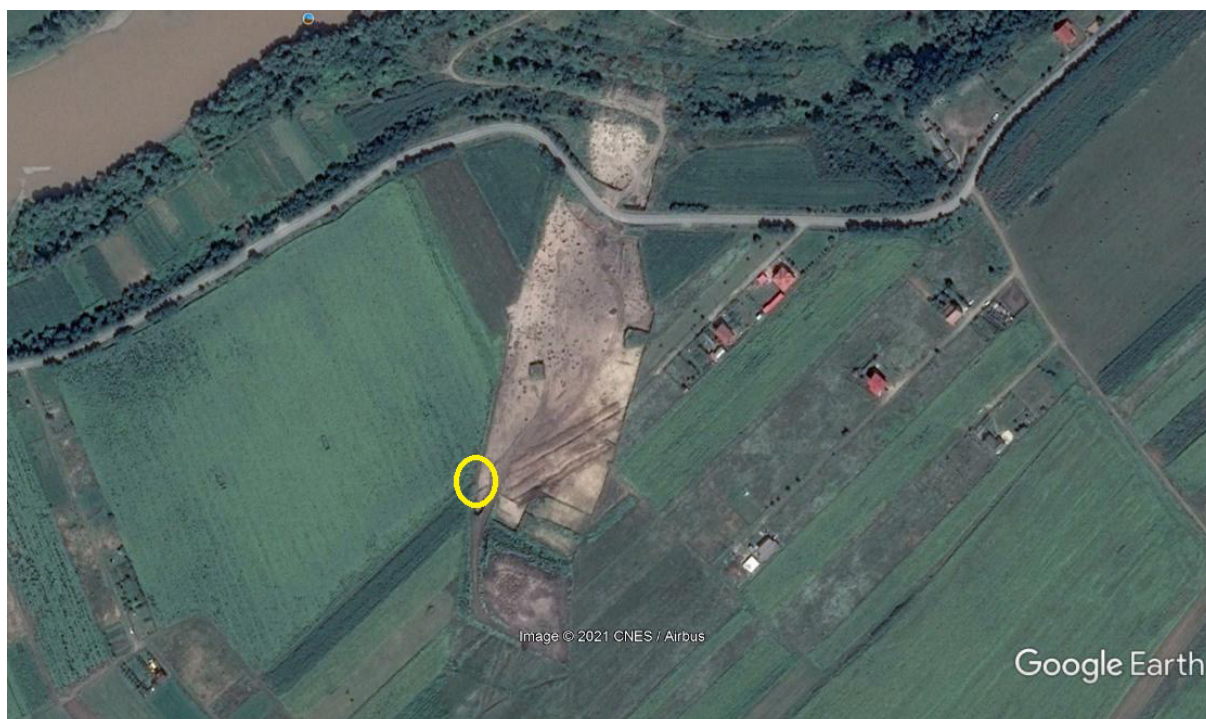


Fig. 1. The Site no. 6, at the end of the rescue excavations (August 2016). The yellow circle represents the estimated area of the Bronze Age cemetery (source: Google Earth, accessed at 24.02.2021).

research confirmed many cultural and chronological items later revealed by systematic excavations³, but also highlighted new unexpected results. On the south-western corner of the delimited area of the site (Fig. 1-2)⁴, through the placement of a technical road for the removal of the earth from the excavation of Neolithic settlements, field researchers discovered funeral urns that delimited the eastern boundary of a Bronze Age incineration cemetery. This unforeseen discovery required a revision of the entire site research strategy, namely the opening of a new separate sector, to delimitate and document the Bronze Age funeral deposits⁵. This situation was all the more necessary as the necropolis was located on top of two of the protecting ditches of the Vinča settlements (Fig. 2). The Bronze Age funerary area at Limba-Oarda de Jos is situated around 250 m south from the Mureș River on the interface of the first river terrace and the slopes of Secașelor Plateau at the foothills of the north edge of the Barbului Hill.

The necropolis is not covered by any depositional level of human habitation after the Bronze Age. It is capped by the soil deposit that was washed in by the rain from the hill slope. The outline of pits into which the urns at Limba-Oarda de Jos were deposited could not be identified because the soil used for their filling has the same texture

and colour (dark brown) as the one they were dug into⁶. The level of the urns, identified at 1,20-1,70 m. depth, is right over the archaeologically sterile soil which is yellow clayey sand (loess). One of the Vinča ditches (Cpx. 3), which is closest to the settlement, is covered by the southern area of the necropolis (Fig. 1-2).

The cemetery appears like as an agglomeration of ceramic urns, containing incinerated debris, which seem to have been placed in groups (Fig. 3). The funerary area, which includes 74 urns and one possible burning place composed of a rectangular structure of burnt clay, was caught on an area of 350 square meters, representing around half of the estimated total dimension (Fig. 1-2). No inhumation graves and no stone structures (cists) built inside, and outside grave pits were discovered. In the southern area, a rectangular burnt clay structure (1,40 x 60 cm.), like the open fireplaces, preserved in good conditions, can be interpreted as a special place for incineration (funeral bonfire?). Some scholars consider that the spatial organization of the graves inside the cemetery can be interpreted as potential delimitations of some specific groups⁷, that can represent families, clans, or other social, religious or gender segregation.

Overall, the spatial distribution of the investigated funerary urns delimited a semicircle area (Fig. 8). However, if the necropolis had a general round shape, we estimate that the excavated area is approximately half of the entire cemetery. A total of 74 funerary complexes were excavated⁸, and we estimate that the necropolis may have had more than

the archaeological site is located in the administrative territory of Oarda de Jos (now a district of Alba Iulia), but because in the literature the site became known as Limba (Ciugud commune), where they were made the first excavations in the middle of XX century, the responsible decided to keep its title sending to this locality. The cemetery which does the subject of the present paper, belong to Oarda de Jos, more precisely to Șesu Orzii sector (1106.2 - National Archaeological Register code - RAN).

³ CIUTĂ 2009, CIUTĂ 2009a, CIUTĂ *et alii* 2017; CIUTĂ *et alii* 2018.

⁴ In technical terms, is about: the Zone 3, Sector C, Research Unit (UC) 35.

⁵ The necropolis was excavated and documented during June and July 2016, the responsible of this sector being ph.d. C.I. Popa.

⁶ POPA 2019, 50 cf. BEREZKY 2016, 31, 64, MARC 2016, 66.

⁷ FĂNTĂNEANU *et alii* 2017, 158-159, Fig. 259. The authors distinguished a possible boat shape group.

⁸ All the contexts and materials documented "in situ", where conserved, collected and deposited at Ioan Raica Museum in Sebeș. The procedure of processing them is ongoing.

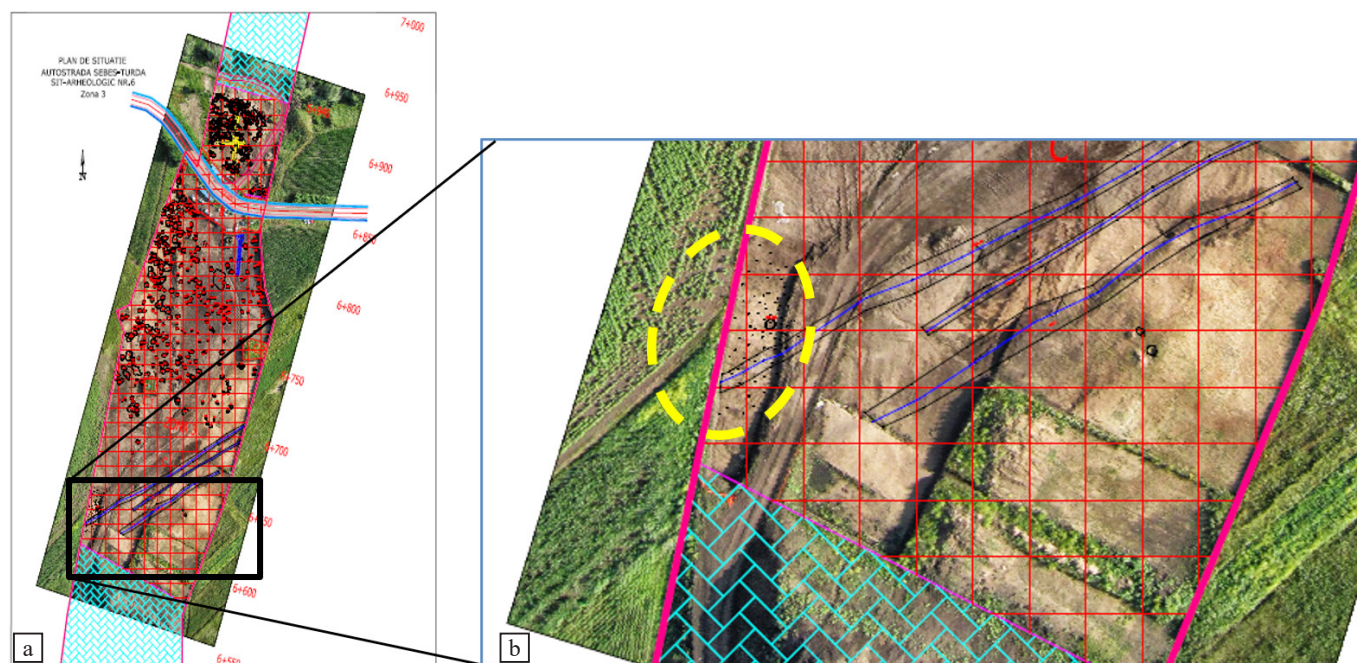


Fig. 2. Photogrammetric situation of the *Site no. 6* (a). The area of the Bronze Age cemetery and the Neolithic ditches (b)

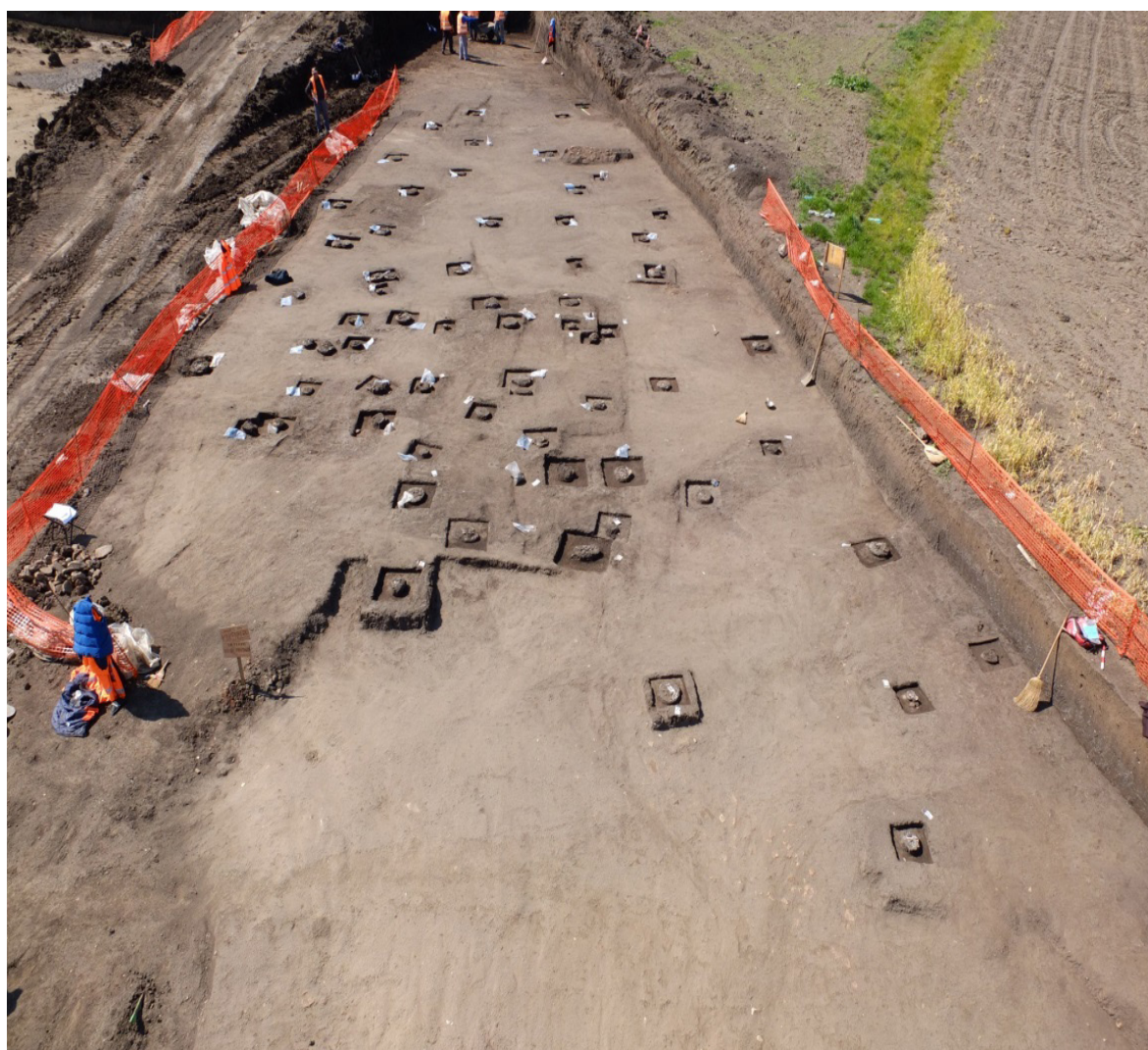


Fig. 3. The Wietenberg cemetery from Limba-Oarda de Jos (*Site no. 6*), during the excavations

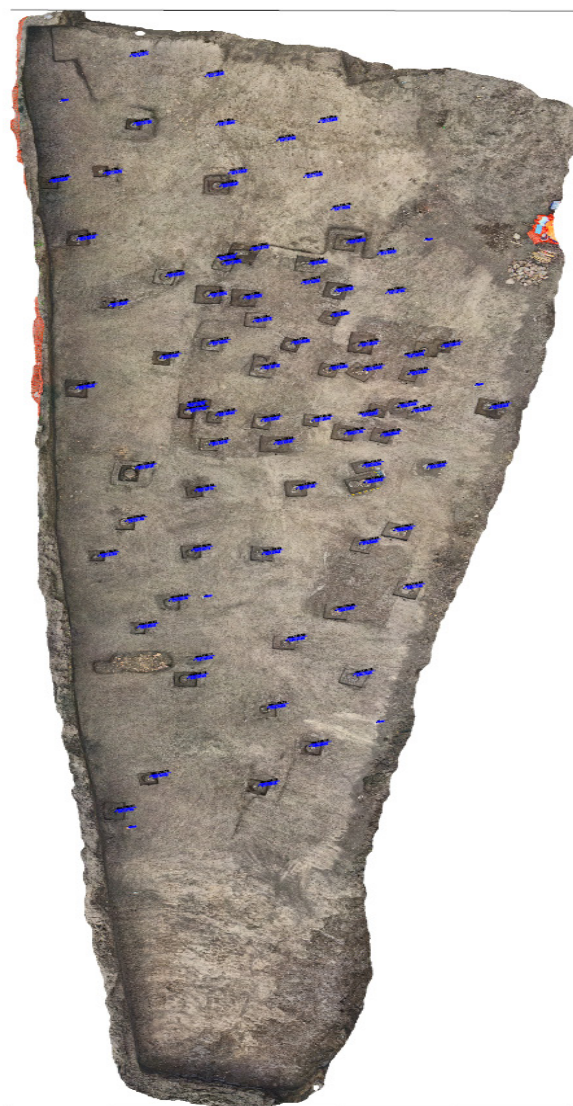


Fig. 4. Aerial photography and photogrammetrical superposition with the counting of the funerary complexes (UC. 35). The yellow rectangles delimit the area with the urns from which were taken the bone samples (Fig.5).



Fig. 5. The central area of the cemetery with the urns from which were taken the bone samples

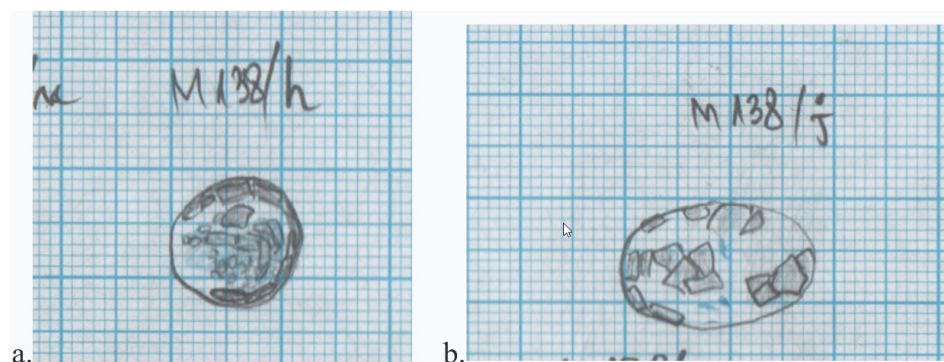


Fig. 6. Drawings⁹ of the with the urns from which were taken the bone samples



Fig.7. Funerary urns *in situ*: Cpx. 138/h (a) and Cpx. 138/i (b – in the center).

150 funerary urns. The necropolis is the largest Wietenberg cremation cemetery yet recorded in Transylvania. Graves with two funerary urns were also found. The distance between urns varies from 20 cm. to about 2,5 m. At the first sight the tombs do not appear to have been arranged in a certain order, but there are opinions that they could be organized in at least two possible groups¹⁰.

It is unclear where the people buried in the cemetery lived. There is no evidence of a contemporary settlement in the area delimited by the archeological site or around it. We do not exclude the possibility that the related Bronze Age settlement, which used the cemetery, may be located somewhere westward of the emplacement of the *Site no. 6*, on the long and flat terrace of the Mureș River, located between the Șesu Orzii and Balastieră sectors¹¹.

The ceramic vessels in which cremated remains were placed, usually of poor quality in terms of strength, as well as the vessels used to cover the urn opening (lids), served as containers and can be considered to be part of the grave structure. Both types of graves: with urn without lid and with urn and lid are present inside the necropolis.

The procedure of processing of the contents of the urns is ongoing.

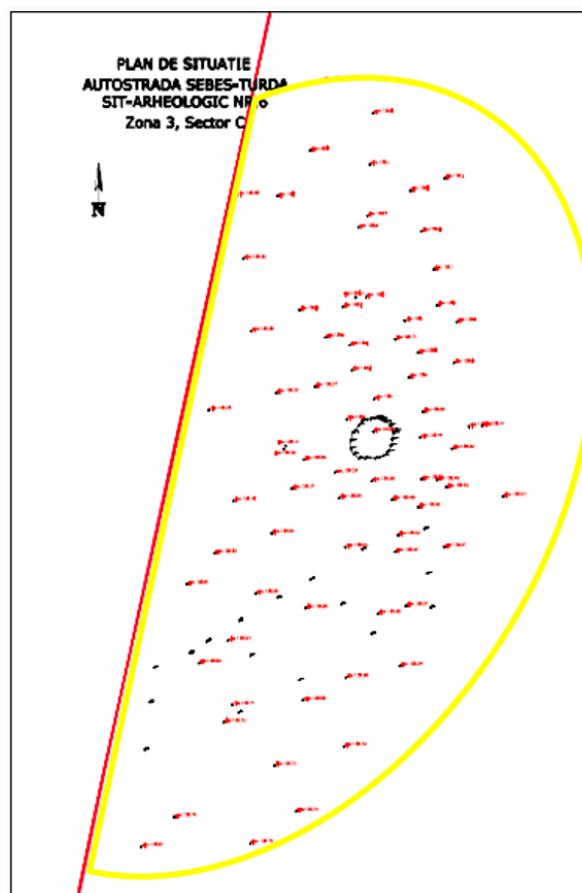


Fig. 8. The general shape of the researched area of the cemetery.

⁹ Drawings: C.I. Popa.

¹⁰ FĂNTĂNEANU *et alii* 2017.

¹¹ To the north, east and south, its presence is impossible because archaeological research has not found specific structures.



Fig. 9. The Wietenberg cemetery from Limba-Oarda de Jos-Şesul Orzii (Site no. 6), at the end of the excavations. View from North.

THE RADIOCARBON DATA

We conducted radiocarbon analysis of material from Limba-Oarda de Jos-Şesul Orzii in order to better understand its chronological position within the Bronze Age. The cremated bone samples were initially excavated and identified by the responsible of the research¹². Five samples of cremated human bones were collected directly from the urn and provided to Dr. Colin Quinn in July 2018. Each sample was given a radiocarbon sample number in

accordance with the protocols of the *Mortuary Archaeology of the Râmeţ Bronze Age Landscape* (MARBAL) Project. The full list of samples include:

PREPARING AND ANALYZING THE SAMPLE

In August 2019, a piece of calcined bone was selected from RC 18-026 and submitted to the University of Georgia AMS Lab (<https://cais.uga.edu/analytical-services/>). The sample was received by the laboratory on September 12, 2019. The sample was prepared in accordance with UGAMS lab protocols. Here is the sample preparation technique that was applied in order to extract bone bioapatite (bone carbonates), which is how cremated bones are dated:

“The bone was cleaned and washed, using ultrasonic bath. After cleaning, the dried bone was gently crushed to small fragments. The crushed bone was treated with diluted 1N acetic acid to remove surface absorbed and secondary carbonates. Periodic evacuation insured that evolved carbon dioxide was removed from the interior of the sample fragments, and that fresh acid was allowed to reach even the interior micro-surfaces. The chemically cleaned sample was then reacted under vacuum with 100% phosphoric acid to dissolve the bone mineral and release carbon dioxide from bioapatite. The resulting carbon dioxide was cryogenically purified from the other reaction products and catalytically converted to graphite using the method of Vogel et al. (1984) Nuclear Instruments and Methods in Physics Research B5,

Radiocarbon Sample #	Site	Context	Material
RC 18-026	Oarda de Jos/Limba	M.9 (Cx. 138 H)	Calcined bone
RC 18-027	Oarda de Jos/Limba	M.42	Calcined bone
RC 18-028	Oarda de Jos/Limba	M.10 (Cx. 138 I)	Calcined bone
RC 18-029	Oarda de Jos/Limba	M.76	Calcined bone
RC 18-030	Oarda de Jos/Limba	M.29	Calcined bone

¹² M-M. Ciută and R. Totoianu.

289-293" (Dr. Alexander Cherkinsky, *personal communication*, October 4, 2019).

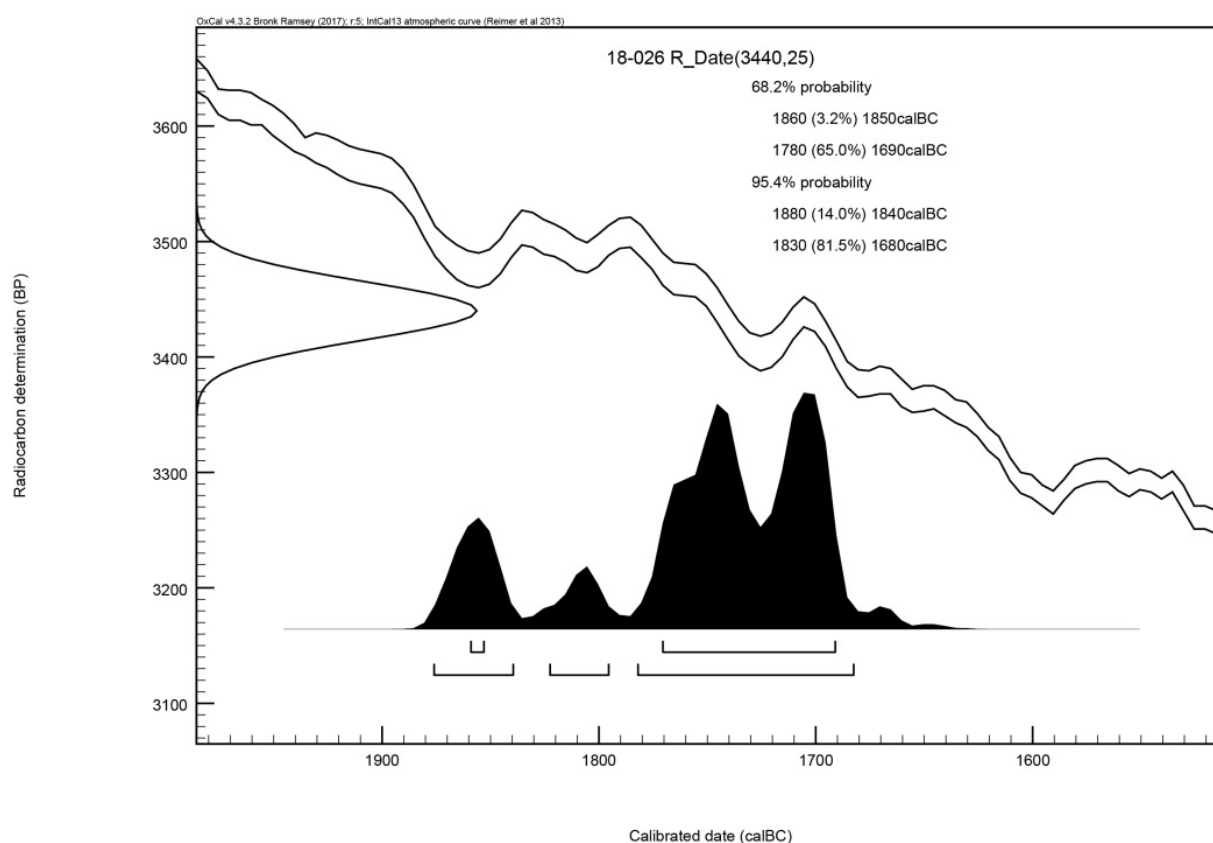
The ^{14}C radiocarbon analyses were conducted according to the following protocol: "Graphite $^{14}\text{C}/^{13}\text{C}$ ratios were measured using the CAIS 0.5 MeV accelerator mass spectrometer. The sample ratios were compared to the ratio measured from the Oxalic Acid I (NBS SRM 4990). The sample $^{13}\text{C}/^{12}\text{C}$ ratios were measured separately using a stable

isotope ratio mass spectrometer and expressed as $\delta^{13}\text{C}$ with respect to PDB, with an error of less than 0.1‰. The quoted uncalibrated dates have been given in radiocarbon years before 1950 (years BP), using the ^{14}C half-life of 5568 years. The error is quoted as one standard deviation and reflects both statistical and experimental errors. The date has been corrected for isotope fractionation." (Dr. Alexander Cherkinsky, *personal communication*, October 3, 2019).

UGAMS#	Sample ID	Material	$\delta^{13}\text{C}$, ‰	^{14}C age, years BP $\pm$	pMC $\pm$
44053	RC 18-026	burnt bone	-26.64	3440 $\pm$ 25	65.2 $\pm$ 0.19

AMS Results

The University of Georgia AMS Lab provided the following data:



The uncalibrated age of M.9 is 3440 ± 25 years BP. The date was then calibrated using OxCal v. 4.3. The burning of the bone probably occurred between 1880 and 1680 cal. BC (95% confidence – 2 sigma), but most likely between 1780-1690 cal. BC (65% confidence).

COMPARISON WITH SEBEȘ – ÎNTRĂ RĂSTOACE BRONZE AGE CEMETERY

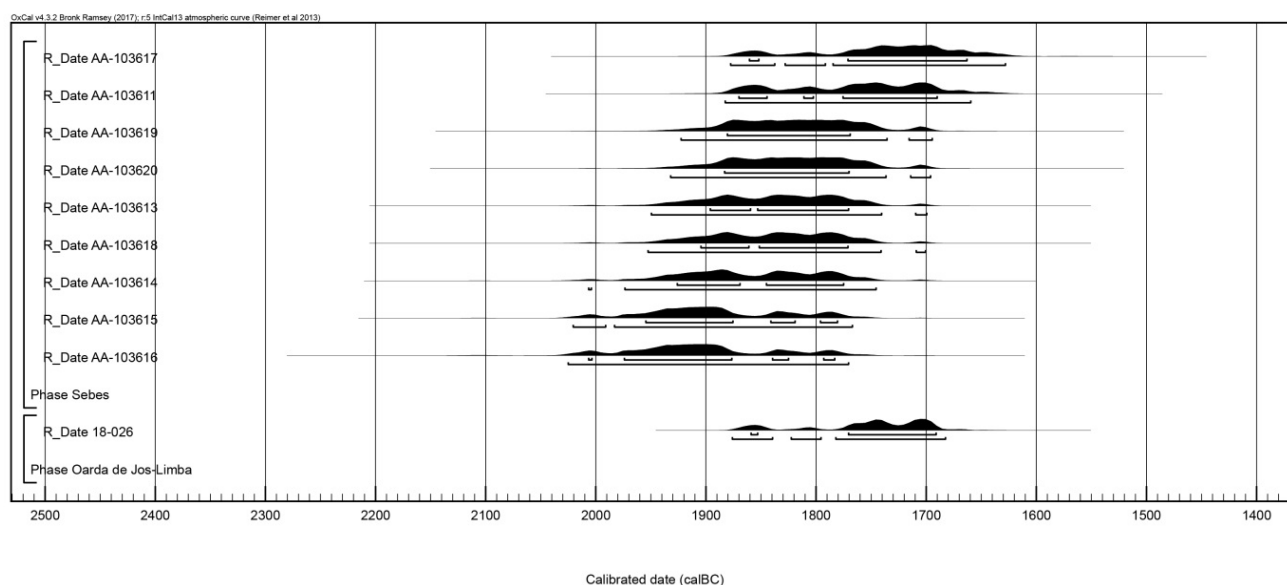
Based on similarities in material culture and mortuary treatment, we examined whether the cemetery at Limba-Oarda de Jos-Șeșul Orzii (*Site no. 6*) may be contemporaneous with the Wietenberg cemetery at Sebeș-

Între Răstoace that was previously dated¹³. To test this possibility, we constructed a Bayesian Model in OxCal v.4.3. The dates are consistent with at least some temporal overlap between the two cemeteries.

A phase model of the Sebeș-Între Răstoace cemetery suggests that the most probable span for the use of the cemetery was between 1880-1770 cal. BC.¹⁴ Two of the dates from cremated burials from the cemetery (AA-103611, AA-103617) are similar to the date from Oarda de Jos-Limba. With only one date so far from Oarda de Jos-Limba,

¹³ BĂLĂN *et alii* 2014; FĂNTĂNEANU *et alii* 2017.

¹⁴ BĂLĂN *et alii* 2018.



it is impossible to determine whether the use-life of the cemetery was the same as the use-life of Sebeș. The date we do have, however, is consistent with cremation burials being placed in both cemeteries around the same time. At the same time, we cannot rule out the possibility that the Sebeș cemetery predated the Oarda de Jos-Limba cemetery. In the future, additional dates could help clarify the duration of activity at Oarda de Jos-Limba and the relationship with other cemeteries in southwest Transylvania.

The Wietenberg funerary discoveries grew in number together with the evolution of the research of Middle Bronze Age in Transylvania, especially in the last decade, with the occasion of several archaeological rescue excavations. The list of the more than 50 funerary discoveries are grouped in cemeteries, is completed with the more recently researched cemeteries from Sebeș¹⁵, Luduș¹⁶, Florești¹⁷ and Limba-Oarda de Jos¹⁸. New radiocarbon dates and Bayesian models continue to expand our understanding of the chronology of the Wietenberg in Transylvania¹⁹.

The Bronze Age cemetery discovered at Limba-Oarda de Jos (*Site no. 6*), adds an important new point to the general picture of the Wietenberg necropolises in Transylvania²⁰, especially in the area of high concentration of this cultural phenomenon in the southwest corner of the Plateau. In particular, the discovery contributes to the knowledge of the specific forms of manifestation of the funerary universe of the Bronze Age, and of the absolute chronology of Wietenberg culture in the eastern frontier of the Carpathian Basin, confirming the data as it was reconsidered relatively recently²¹.

¹⁵ BĂLAN *et alii* 2014; FĂNTÂNEANU *et alii* 2017.

¹⁶ BERECKI 2016.

¹⁷ ROTEA *et alii* 2008.

¹⁸ CIUTĂ *et alii* 2016.

¹⁹ QUINN *et alii* 2020.

²⁰ BĂLAN *et alii* 2014, 29-33, Fig. 2.14.

²¹ GOGĂLTAN 2015, 53-95, MARC 2016, 61-67; POPA 2019.

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