

Personal adornments discovered in the Boian funerary contexts: necropolis of Sultana-Valea Orbului (Călărași County, Romania)

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Abstract: The necropolis of Sultana-Valea Orbului (Călărași County) has been investigated by Done Șerbănescu (starting with 1974). Over 250 inhumation graves which were attributed to the Boian culture have been discovered. For this study, we analyzed the archaeological assemblage preserved in the Museum of Gumelnița Civilization from Oltenița (Călărași County) belonging to seven graves. The personal adornments are mainly manufactured from *Spondylus* valve. The bracelets were made by an extremely unitary technological transformation scheme of raw material. On the external side, the median area of the valve was removed. The valve was also abraded on the internal side in order to remove the cardinal plateau. From a valve, a belt element was processed by the abrasion of the surface. A similar piece was made of clay. The most numerous beads of *Spondylus* valve have a bilobed/trilobed morphology with triangular section, convex extremities and convex-concave sides. The pieces are endowed with two/three perforations. The inventory is complemented by tubular beads and cylindrical beads. Ringlike elements were made from the bone, involving a very complex technological transformation scheme. Small cylindrical beads with a central perforation were made of malachite and green schist. Analyzed pieces showed different degrees of use-wear demonstrating that they were worn before the deposition in graves. The discoveries from the Sultana-Valea Orbului necropolis were compared with other Boian findings to determine if there is a typology of the funeral inventory specific to this culture.

Rezumat: Necropola de la Sultana-Valea Orbului (județul Călărași) a fost cercetată de Done Șerbănescu (începând cu 1974). Au fost descoperite peste 250 de morminte de înhumare atribuite culturii Boian. Pentru acest studiu, am analizat ansamblul arheologic conservat în Muzeul Civilizației Gumelnița din Oltenița (județul Călărași), provenind din șapte morminte. Podoabele au fost fabricate în principal din valva *Spondylus*. Brățările au fost realizate printr-o schemă de transformare tehnologică a materiei prime extrem de unitară. Pe partea externă, zona mediană a valvei a fost îndepărtată. Valva a fost, de asemenea, abrazată pe partea internă, pentru a îndepărta platoul cardinal. Dintr-o valvă, a fost prelucrat prin abraziune un element de centură. O piesă similară a fost realizată din lut. Cele mai numeroase mărgelile din valvă de *Spondylus* au o morfologie bilobată/trilobată, cu secțiune triunghiulară, extremități convexe și laturi convex-concave. Piese sunt prevăzute cu două/trei perforații. Inventarul este completat de mărgelile tubulare și mărgelile cilindrice. Piese inelare au fost realizate din os, implicând o schemă de transformare tehnologică foarte complexă. Mărgelile cilindrice, de mici dimensiuni, cu o perforație centrală au fost realizate din malachit și sist verde. Piese analizate prezintă diferite grade de uzură care demonstrează că au fost purtate înainte de depunerea în morminte. Descoperirile din necropola de la Sultana-Valea Orbului au fost comparate cu alte descoperiri Boian, pentru a determina dacă există o tipologie a inventarului funerar specific acestei culturi.

Keywords: Boian culture, necropolis, raw materials, technological analysis, use-wear marks.

Cuvinte cheie: cultura Boian, necropolă, materii prime, analiză tehnologică, stigmat de uzură.

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◆ Geographical and cultural framework

During the period of maximum extension, Boian culture was present in the Muntenia territory on the background of Dudești culture and with Linear-Pottery influences, as well as in southeastern Transylvania and Dobrogea, and south of the Danube, in northeastern Bulgaria (S. Pandrea 2000; N. Ursulescu *et alii* 2001). Four evolutionary phases of culture have been identified (Bolintineanu, Giulești, Vidra and Spanțov), from 5200 BC to 4500 BC (tab. 1). Within these phases, we are seeing a change in the types of settlements and dwellings: from flat settlements and hovels – in the first two stages, to tell settlements, sometimes with defense ditches – in the last two stages. Ceramics is characterized in the Bolintineanu phase of an angular strip decoration with triangular impressions or with excised motifs and inlaid with white; in the Giulești phase, it evolves to a ceramic with excised decor and inlaid with white and with crude painting after burning; while in the last two phases a ceramic with excised décor and graphite painting is encountered even if sporadically (N. Ursulescu *et alii* 2001; V. Opriș *et alii* 2017).

Site	Type	Radiocarbon data (cal BC)	References
Căscioarele-D'aia Parte	N	4722-4548	C. Lazăr <i>et alii</i> 2018
Căscioarele-Ostrovel	S	5210-4903	C. Lazăr <i>et alii</i> 2013
Ciulnița	S	4730-4540	S. Bréhard, A. Bălășescu 2012
Glina	N	4849-4685	C. Lazăr <i>et alii</i> 2013
Hârșova	S	4702-4547	S. Bréhard, A. Bălășescu 2012
Radovanu-La Muscalu	S	4800-4613	C. Lazăr <i>et alii</i> 2013
Sultana-Ghețarie	S	4956-4729	V. Opriș <i>et alii</i> 2017
Sultana-Ghețarie	S	4839-4654	V. Opriș <i>et alii</i> 2017
Sultana-Malu Roșu	N	5011-4799	C. Lazăr <i>et alii</i> 2012
Sultana-Malu Roșu	N	4943-4712	M. Hervella <i>et alii</i> 2015
Sultana-Valea Orbului	N	5303-5063	C. Lazăr <i>et alii</i> 2018
Sultana-Valea Orbului	N	4763-4536	C. Lazăr <i>et alii</i> 2018

N – necropolis, S – settlement

Tab. 1. AMS radiocarbon dates obtained for the Boian settlements and necropolises.
Date AMS obținute pentru așezări și necropole Boian.

Sultana-Valea Orbului site belongs administratively to the Sultana village (southern Romania, Călărași County), being located about 1.5 km northeast of the village edge on the right bank of Mostiștea lake. The necropolis was discovered by Done Șerbănescu and George Trohani in 1972, as a result of the surface research conducted for the development of the irrigation system in the area (D. Șerbănescu, G. Trohani 1978). Starting with 1974, archaeological investigations have been initiated under the direction of Done Șerbănescu and Mihai Sânpetru. Between 1974 and 2007, 13 archaeological excavation campaigns took place with several researchers joining the archaeological team.

A number of 253 inhumation graves which were attributed to Boian culture (D. Șerbănescu 2002; D. Șerbănescu, O. Androne 2003; M. Neagu 2003; D. Șerbănescu, A.D. Soficaru 2006; D. Șerbănescu *et alii* 2007, 2008) have been revealed. In terms of anthropological study, they have been determined by age and gender as follows: infans I: 32; infans II: 7; juveniles: 8; mature/adult men: 45, mature/adult women: 43; undetermined: 36.

Necropolis	Raw material	Species / petrography	Typology	No. of pieces	References
Andolina ¹	shell	<i>Spondylus</i>	bi/trilobed bead	23	E. Comşa 1961, 1973, 1974; S. Enea 2011; C. Lazăr, Th. Ignat 2012; M. Séfériadès 2013
			tubular bead	6	
		<i>Antalis</i>	tubular bead	28	
	stone	malachite	cylindrical bead	28	
Curătești	shell	marine bivalve?	bead?	?	M. Gătej, A.D. Soficaru 2006; D. Șerbănescu, S. Cristache 2011; R. Kogălniceanu 2012; C. Lazăr, Th. Ignat 2012
		gastropod	bead?	?	
	bone	diaphysis	ring	?	
	stone	marble	bead	?	
Glina	shell	<i>Antalis</i>	bead	?	E. Comşa 1974; C. Schuster <i>et alii</i> 2008; R. Kogălniceanu 2012; C. Lazăr, Th. Ignat 2012
Grădiștea Ulmilor-Boian A ²	shell	<i>Spondylus</i>	bead	2	E. Comşa 1974; S. Enea 2011; R. Kogălniceanu 2012; C. Lazăr, Th. Ignat 2012
			bracelet	1	
	bone	diaphysis	ring	1	
Popești-Vasilați	shell	<i>Spondylus</i>	bead	?	D. Șerbănescu 1999; M. Neagu 2003; C. Schuster <i>et alii</i> 2008; S. Enea 2011; R. Kogălniceanu 2012; C. Lazăr, Th. Ignat 2012
	bone	diaphysis	ring	1	
			bead	?	
	stone	malachite	bead	?	
Sultana-Malu Roșu	shell	<i>Spondylus</i>	bi/trilobed bead	32	C. Lazăr <i>et alii</i> 2018
			tubular bead	1	
Sultana-Valea Orbului	shell	<i>Spondylus</i>	bracelet	1	D. Șerbănescu 2002; D. Șerbănescu, O. Androne 2003; M. Neagu 2003; D. Șerbănescu, A.D. Soficaru 2006; D. Șerbănescu <i>et alii</i> 2007, 2008; S. Enea 2011; C. Lazăr, Th. Ignat 2012
			bilobed bead	?	
			various beads	?	
			belt element	?	
		<i>Glycymeris</i>	bracelet	?	
		<i>Antalis</i>	?	?	
	bone	diaphysis	ring	?	
			ringlike element	?	
			tubular bead	?	
			cylindrical bead	?	
	stone	malachite	cylindrical bead	?	
		green schist (?)	cylindrical bead	?	
		marble	pendant	1	
Valea Mare ³	shell	<i>Spondylus</i>	various bead	24	D. Șerbănescu 1985
			bi/trilobed bead	15	

Tab. 2. Synthesis of the published archaeological assemblages from the Boian necropolises.
Sinteza ansamblurilor arheologice publicate din necropolele Boian.

¹ The personal adornments are in the patrimony of the Călărași County Museum. We would like to thank for the access to archaeological material.

² See footnote above.

³ We have attributed these discoveries to the Boian culture based on the presence of *Spondylus* bi/trilobed beads. Previously, other studies had considered that these tombs belong to the Gumelnița culture (D. Șerbănescu 1985; R. Kogălniceanu 2012; C. Lazăr (ed.) 2012). The archaeological material is in the patrimony of the Gumelnița Civilization Museum from Oltenița and was analyzed following a collaborative project with this institution.

Some of these graves were double, but most of them contained one skeleton. The individuals were seated in crouched position, on the left side in most cases, oriented especially towards east and southeast (D. Şerbănescu 2002; D. Şerbănescu, O. Androne 2003; D. Şerbănescu, A.D. Soficaru 2006; D. Şerbănescu *et alii* 2007; 2008). Few skeletons were placed on their right side, with a western orientation. Of these, 81 graves had funeral inventories such as ornaments, pottery and lithic materials. The personal adornments were made of *Ostrea* sp. (bracelets), *Spondylus* sp. (bracelets, belt elements, various beads), *Antalis* sp. (tubular beads); minerals (malachite, marble, schist – pendants and cylindrical beads) and bone (rings, ringlike elements) (D. Şerbănescu 2002; D. Şerbănescu, O. Androne 2003; D. Şerbănescu, A.D. Soficaru 2006; D. Şerbănescu *et alii* 2007; 2008).

For this study, we analyzed the archaeological assemblage preserved in the Museum of Gumelniţa Civilization from Olteniţa (Călăraşi County) resulting from seven graves. We will then correlate the results with other Boian's funeral discoveries (fig. 1) and integrate all the data in order to trace the characteristic elements of this culture at the level of the funeral inventory.

◆ *Spondylus* valve

In the Boian necropolises, most of the ornaments were made of *Spondylus* valve (tab. 2). There is a wide range of adornments from small cylindrical beads, to belts elements and massive bracelets. A first typological category is represented by bilobed beads. Not less than 66 bilobate beads were uncovered in the tomb no. 172 of Sultana-Valea Orbului necropolis (fig. 2/A). They have a triangular section, convex extremities and convex-concave sides. The pieces are endowed with two perforations, asymmetrically disposed. For the processing of these pieces, in a first stage, a splinter with a rectangular morphology was extracted out of the valve. We cannot reconstruct the procedures which accompanied the debitage operation, due to the subsequent technological interventions. The bilobed shape was created by cutting (fig. 2/D), and the perforations by bifacial rotation (fig. 2/C). The entire surface was rigorously abraded (fig. 2/D). The deformation of the perforations, towards the inner wall, can demonstrate the attaching modality of the piece by sewing. We would like to underline the very advanced usage, which manifests by deforming the wall between the perforations, almost until fracture (fig. 2/E-F). In addition, a flat facet (fig. 2/G) develops parallel to the piece's axe, in the area between perforations which generated, in some cases, the evolution from a triangular section of the pieces, towards a trapezoidal section.

Such pieces are present at the Sultana-Malu Roşu – M69 (C. Lazăr *et alii* 2018), Andolina necropolis (fig. 3/A) (E. Comşa 1961, 1973) or Valea Mare necropolis (fig. 4/A). The same technological scheme was used (fig. 3/B, D; fig. 4/B-D). Identical was also the fastening system because the use-wear pattern evolves similarly, in the area between the perforations, sometimes leading to their fracture (fig. 3/E-J; fig. 4/E-G). In conclusion, it can be said that the pieces were worn before the grave deposition and even repaired, like in the case of a trilobed piece from the necropolis at Andolina it broke at the level of a perforation and a perforation was immediately performed under the fracture to continue its function as ornament (fig. 3/C).

Other typological categories are represented by the tubular beads (fig. 5/A). These items have reached us in their final stage of use, which has largely wiped the technological marks. So, in the case of these tubular *Spondylus* shell beads we cannot identify their method of debitage. The surface of the pieces is shaped by extremely fine abrasion (fig. 5/B). The perforation was carried out through rotation, from one extremity continued with the

intervention from the other extremity as well, in order to enlarge the perforation, which resulted in slightly flared walls on both extremities (fig. 5/C-D). Pieces have an advanced degree of use-wear, consisting of concave ends (fig. 5/E-F), corresponding to flattened facets (fig. 5/G), with macroscopic polish and a perforation within which the rotation marks are almost absent.

Tubular, fusiform and biconvex beads were inventoried for the Andolina necropolis (fig. 6/A), Grădiștea Ulmilor - Boian A necropolis (fig. 6/E, H) and Valea Mare necropolis (fig. 7/A). Neither in this case we could identify with certitude the debitage procedures. Technological data in the shaping operation (fig. 7/B-C) are identical to those of the previously described items. Specific marks of perforation procedure are absent (fig. 6/B, F; fig. 7/D). The morphology of the extremities presents, for most of the pieces, a concave edge (fig. 6/C; G-I; fig. 7/E-F). Moreover, for some of the pieces the concave extremity seems to correspond, in length, to a smooth and fine facet (fig. 6/D, J; fig. 7/G). We can suggest that this is the area affected by the wearing of the pieces.

Five belt elements were published for the necropolis of Sultana-Valea Orbului, one of which was made of clay (D. Șerbănescu *et alii* 2007) (fig. 8/A, F). The other four are from *Spondylus* valve; only one of these four pieces could be recovered within the analyzed collection. The object is, unfortunately, heavily degraded to the surface. In spite of that, we can see that a shaping procedure (fig. 8/B) has been applied on both sides, eliminating the cardinal plateau. The resulting morphology is slightly triangular with a convex-concave section. To the wider side, there are two heavily worn perforations, with the disappearance of the rotation marks and the outer wall fracture (fig. 8/C-D). Below, two other perforations were made by bifacial rotation. Technological scratches are visible, while the perforations begin to deform towards the outside wall, indicating that after the fracture of the first perforations, they came into use (fig. 8/E). We do not know, however, whether the perforations were made as a result of fracturing or were created from the first stage. The other perforations present on the surface of the piece do not show use-wear marks.

The Sultana-Valea Orbului necropolis represents a particular case due to the presence of bracelets made from both left and right valves. Thus, for the two bracelets made of right valve (fig. 9/A), the elimination of the median/convex area was apparently performed by percussion (fig. 9/B), identified through a few marks. On the internal side most of the cardinal plateau was removed, using the percussion overlapped by abrasion. Furthermore, the external side has been adjusted by abrasion (fig. 9/C). The surface of the items is extremely degraded so we could not identify possible micro-wear marks. On the internal wall, flattened areas (fig. 9/D) are present and these could be attributed to skin friction. The other bracelets have a thin morphology and were made from the left valve (fig. 9/E-F). A method of processing through abrasion (fig. 9/G) was applied to all specimens. On the external side, the median area of the valve was removed. One item still preserves small red spots, but much of the exterior layer was removed by the shaping procedure. The valves were also abraded on the internal side in order to remove the cardinal plateau (fig. 9/H). The scratches specific to the shaping procedure are difficult to identify due to the valve structure and various surface damage. Two of them have a perforation made by bifacial rotation (fig. 9/I) with visible rotation marks. Specimens with a better preserved surface have a fine area to touch, with a macroscopic polish on the internal side.

A *Spondylus* bracelet was discovered in the necropolis at Grădiștea Ulmilor - Boian A (fig. 10/A). It was made from the left valve. The surface of the piece is well preserved with an advanced degree of use-wear. On both sides, a debitage method by shaping was used (fig. 10/B). The cardinal plateau was removed (fig. 10/C). The surface of the piece is fine at touching with

macroscopic polish (fig. 10/D-E) on the inner hole and inferior side most likely result from skin/coat rubbing. It is obvious that the pieces were worn before becoming a funeral inventory.

◆ *Antalis* scaphopod

The author of the discoveries, namely Done Șerbănescu, among the few published information (D. Șerbănescu 2002) writes that adornments made of *Antalis* shells were also discovered in the necropolis. We have not identified such pieces in the Museum of Gumelnița Civilization within the preserved collection. Alternatively, we had the opportunity to study the pieces made of this raw material uncovered within the Boian necropolis of Andolina (fig. 11/A). Due to the anatomical limitations imposed by this scaphopoda's shell, only tubular beads were made out of *Antalis* shell. Entire shells collected from the beach have a conic form, quite powerfully curved. The unfractured extremities have a thin and sharp edge, which cannot be found at the samples identified in the necropolis. Also, they do not have a pronounced curved profile and the extremities are rounded, illustrating a segmentation procedure. The segmentation of the samples from the necropolis was made by bending or by sawing. The presence of extremities with a *bec de flûte* morphology (fig. 11/B) seems to show that segmentation has been achieved mainly by bending. In one case, we have identified the marks of a segmentation procedure by sawing (fig. 11/C). On some of the pieces, the ribs specific to this type of shell were flattened by surface abrasion (fig. 11/D). The usage evolution is characterized by the appearance of small concavities at the extremity level (fig. 11/F), corresponding to a friction facet, with macroscopically polish (fig. 11/G). Extremely interesting is the assemblage from Andolina because some beads are stuck together or they keep fragments from other pieces in their hole (fig. 11/E). This demonstrates that the *Antalis* tubular beads were clearly caught in mixed ornaments, one shell in the extension of the other.

◆ Bone

Pieces with a ringlike morphology made of bone are present in the necropolis of Sultana-Valea Orbului. They were made on flat blank, obtained from the diaphysis of a large sized mammal long bone, through a method of longitudinal debitage. We analyzed two pieces (fig. 12/A-B). In this case also, we do not know the methods of obtaining the blanks. The appendix was created by sawing (fig. 12/C) and the rod was regularized by longitudinal scraping (fig. 12/D). Perhaps the ring area was also extracted by sawing, after which the outline was regularized by scraping (at least in one case) (fig. 12/G). Entire surface of the items was shaped by abrasion, with visible marks (fig. 12/E-F). At one specimen, a powerful polish with finely oblique scratches develops within the perforation, due to use-wear. For the second item, the perforation inside was abraded (fig. 12/H) and the marks of use-wear did not eliminate the technological ones proving that it was not in use for a long period. We presume this object was utilized for clamping a coat.

The only analogies found north of the Danube for these types of pieces come from the Cernica necropolis. A series of data between 5355-5220 cal BC and 5070-4940 cal BC (S. Stratton *et alii* 2018) have been published for this. Based on these data, the authors agree that the cemetery began to be used in the late phase of Dudești culture and possibly continued into the early phase of the Boian culture. However, at the present stage of research, most of the adornments from this necropolis we have studied (M. Mărgărit, M.-C. Vintilă 2015) are considered typical for the Boian culture. Equally, we do not have much data on ornaments specific to the Dudești culture and it is not excluded that the artifacts have appeared since that time and have continued to be used throughout the Boian culture. In this necropolis also a series

of pieces with a ringlike morphology appear (fig. 13/A). We cannot reconstruct the procedures of obtaining the blank, because the entire surface was submitted to the shaping operation, generally by scraping (fig. 13/B), superposed by abrasion (fig. 13/C). The perforation presents a cylindrical morphology, resulted from the perforation by rotation, followed by a perforation enlargement by applying of scraping (fig. 13/D). The pieces' shape was also given by scraping, hardly identifiable, because it was superposed with a new shaping stage, by abrasion. This type of pieces presents a strong macroscopic polish, especially at the level of the appendix (fig. 13/E), resulted from manipulation which proves that the used area was mostly the inferior half.

In the Boian contexts rings made from large sized mammal bone diaphysis appear. This time we are dealing with a procedure of bone segmentation, in rings, obtaining thus blanks in volume. Bone rings are mentioned in the necropolis of Curătești (M. Gătej, A.D. Soficaru 2006; D. Șerbănescu, A.D. Soficaru 2006), Popești-Vasilați (M. Neagu 2003; C. Schuster *et alii* 2008) and Sultana-Valea Orbului (D. Șerbănescu *et alii* 2007; 2008). Even if no technological information is provided in the publication, we can suppose that the same technological transformational scheme has been used.

An exceptional piece with an advanced degree of use-wear comes from the necropolis of Grădiștea Ulmilor - Boian A (fig. 14/A). It preserves the anatomical volume, using the medullary canal which was enlarged by transversal scraping to the extremities, completed with a longitudinal scraping (fig. 14/E-F) at median level. Segmentation at both ends was achieved by sawing (fig. 14/B), hardly identifiable, because the segmentation edges were rigorously abraded (fig. 14/C). The piece was provided with two perforations, unfortunately fractured, made by unifacial rotation from the upper side (fig. 14/D). The surface of the piece has a very strong polish and it resulted from utilisation (probably an intense friction by hand).

◆ Stone

At Sultana-Valea Orbului necropolis, green beads were processed both from malachite and probably schist (fig. 15/A) among with several specimens from the *Spondylus* valve. These are cylindrical beads with a central perforation made by bifacial rotation (fig. 15/B-D). The entire surface was shaped by abrasion (fig. 15/E-J). Marble was used as raw material for processing a pendant from the Sultana-Valea Orbului necropolis (D. Șerbănescu *et alii* 2007; 2008).

We assume that the 28 cylindrical bead from a tomb discovered at Andolina were made of malachite (E. Comșa 1961), similar other specimens being mentioned at Popești-Vasilați (M. Neagu 2003; C. Schuster *et alii* 2008).

◆ Discussion

Coming exclusively from funerary contexts, these personal adornments reached the finishing stage of their processing. In the case of bone pieces or stone beads, they could be made by the community that used them or could be imported in finite form. Only in the case of the *Spondylus* valve or *Antalis* shell, we can assume we are dealing with imports. The variables which can be invoked are those of a direct import of raw material or of the already finished pieces and, at the same time, of a direct exchange or from group to group.

The funerary inventories in the Boian necropolis prove to be quite unitary in composition, the same typological categories being present. Equally, the technological schemes seem to be quite unitary. From the quantitative point of view, the most common are the ornaments made of *Spondylus*. For the bracelets discovered in the necropolis of Sultana-

Valea Orbului, both right and left valves were used to obtain bracelets. In the case of the right valve (this being thicker), the hole was achieved by percussion followed by surface abrasion, while in the case of the left valve, a method of processing through abrasion was applied. The left valve was used for belt elements (due to its round shape) and the same procedure of abrasion transformation was applied at the technological level. Volume modification was performed through perforations, some with heavy use-wear marks.

For making beads of various morphologies, it seems the right valve has been used (A. Tsuneki 1989). And the latter were carefully preserved and repaired in the case of fracture, as we were able to observe in the necropolis of Andolina. Among these adornments, the most important are especially those with bilobed/trilobed morphology which seem to be specific to the Hamangia and Boian cultures then disappearing during the Gumelnița culture. Also in this case, regardless the necropolis from which they came, the same modification procedures were used, consisting of cutting by sawing for a bi/trilobate shape, the realization of the bilateral perforations and the abrasion of the surface. The funeral inventory is completed by tubular, biconvex and cylindrical beads, morphological difference being created by the abrasion procedure. All items have a central perforation made by bifacial rotation.

Tubular beads were processed from *Antalis* shells, the only typological category that can be obtained from this type of shell. Two typological category were made of bone: rings and pieces with a ringlike morphology involving different technological schemes. In the first case, a segmentation debitage method was applied, which allowed to get a blank in volume; in the latter case, a longitudinal debitage was applied, after which a flat blank was obtained what then knew a elaborate transformation technological scheme. The lithic materials were turned into cylindrical beads, similar to those of the *Spondylus* valve.

Following our analysis, it is clear that all pieces have an advanced degree of use-wear which proves that they have been worn before being deposited in the graves and shows how the pieces were fastened. Thus, for tubular beads, the morphology of the extremities is generally strongly rounded, with the appearance of a small concave facet. Moreover, it seems to correspond, in length, to a flattened and fine surface. We may assume that this is the area affected by the utilization of the pieces. The use-wear of the *Antalis* tubular beads is characterized, like the morphologically similar pieces made of *Spondylus*, by the appearance of small concavities at the extremity level. For the bilobed/trilobed beads, perforations are deformed towards the inner wall. Between perforations a usage facet exists, developed parallel to the piece's axe. The use-wear on belt element is characterized by a strong deformation of the two perforations symmetrically placed, until their fracture. The existence of use-wear marks on the specimens identified in prehistoric graves was also recorded in other studies (e.g. C. Beldiman *et alii* 2008; A. Polloni 2008; S. Bonnardin 2009; M. Mărgărit, C.-M. Vintilă 2015; C. Lazăr *et alii* 2018 etc.) and it seems to be a common practice.

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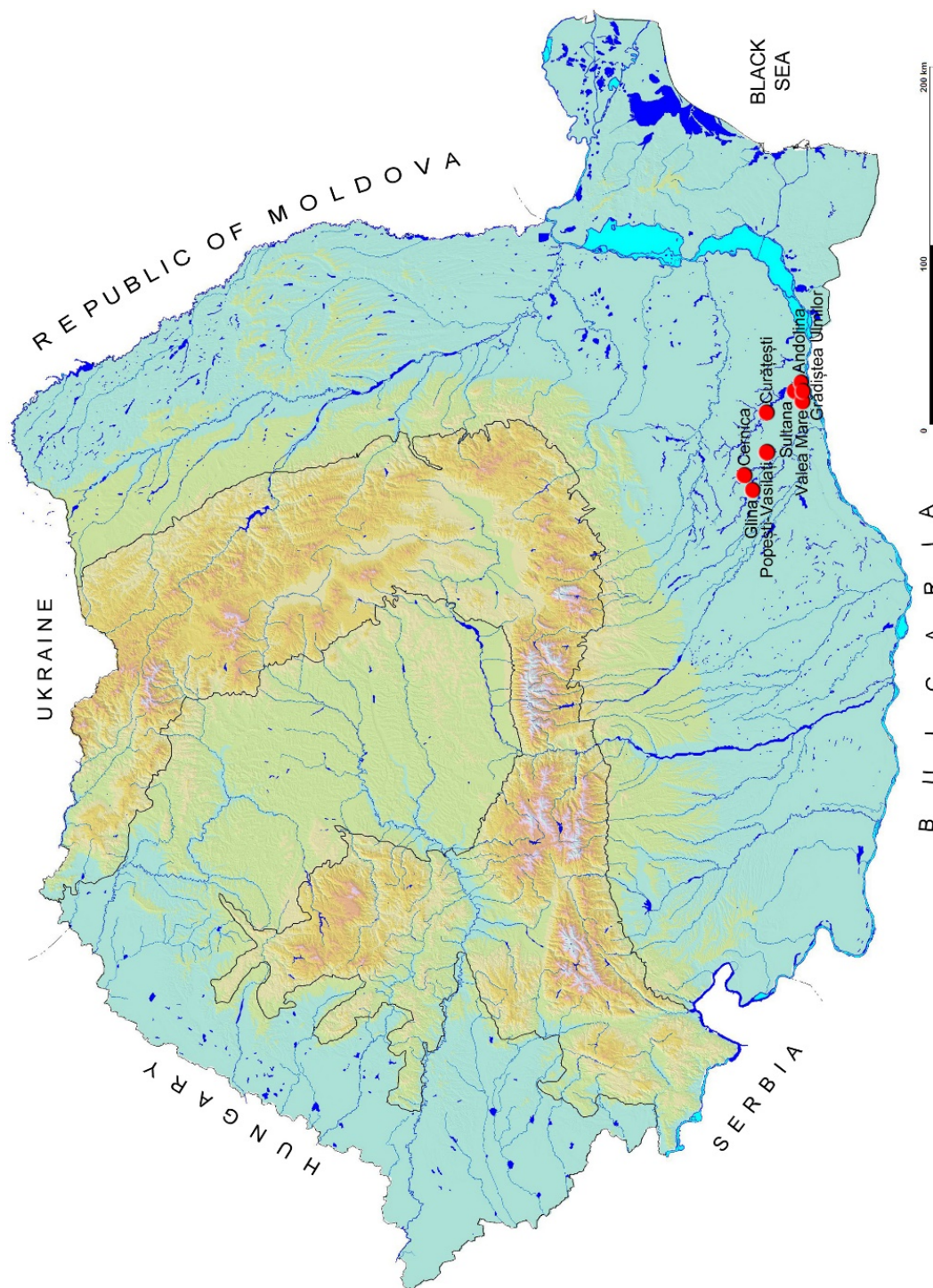


Fig. 1. Necropolises analyzed in this study.
Necropolele analizate în acest studiu.

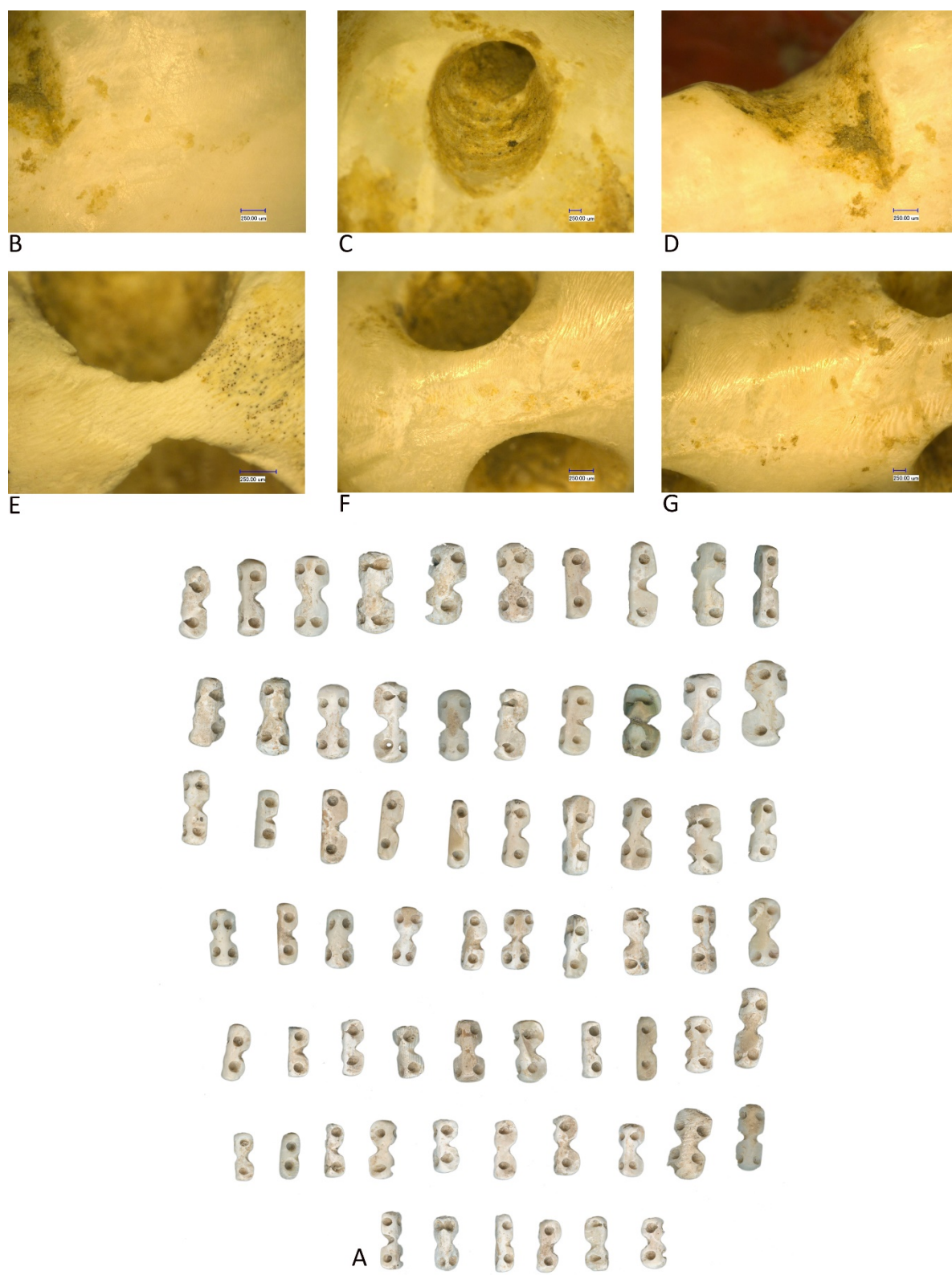


Fig. 2. A. Bilobed beads made of *Spondylus* valve (Sultana-Valea Orbului necropolis) (scale = 1 cm); B. abrasion marks (100x); C. perforation detail (50x); D. sawing marks (100x); E.-F. deformation of perforation (150x, 100x); G. flattened surface (50x).

A. Mărgelile bilobate confecționate din valvă de *Spondylus* (necropola de la Sultana-Valea Orbului) (scara = 1 cm); B. stigmatism de abraziune (100x); C. detaliu perforație (50x); D. stigmatism de sciage (100x); E.-F. deformare perforație (150x, 100x); G. suprafață aplatizată (50x).

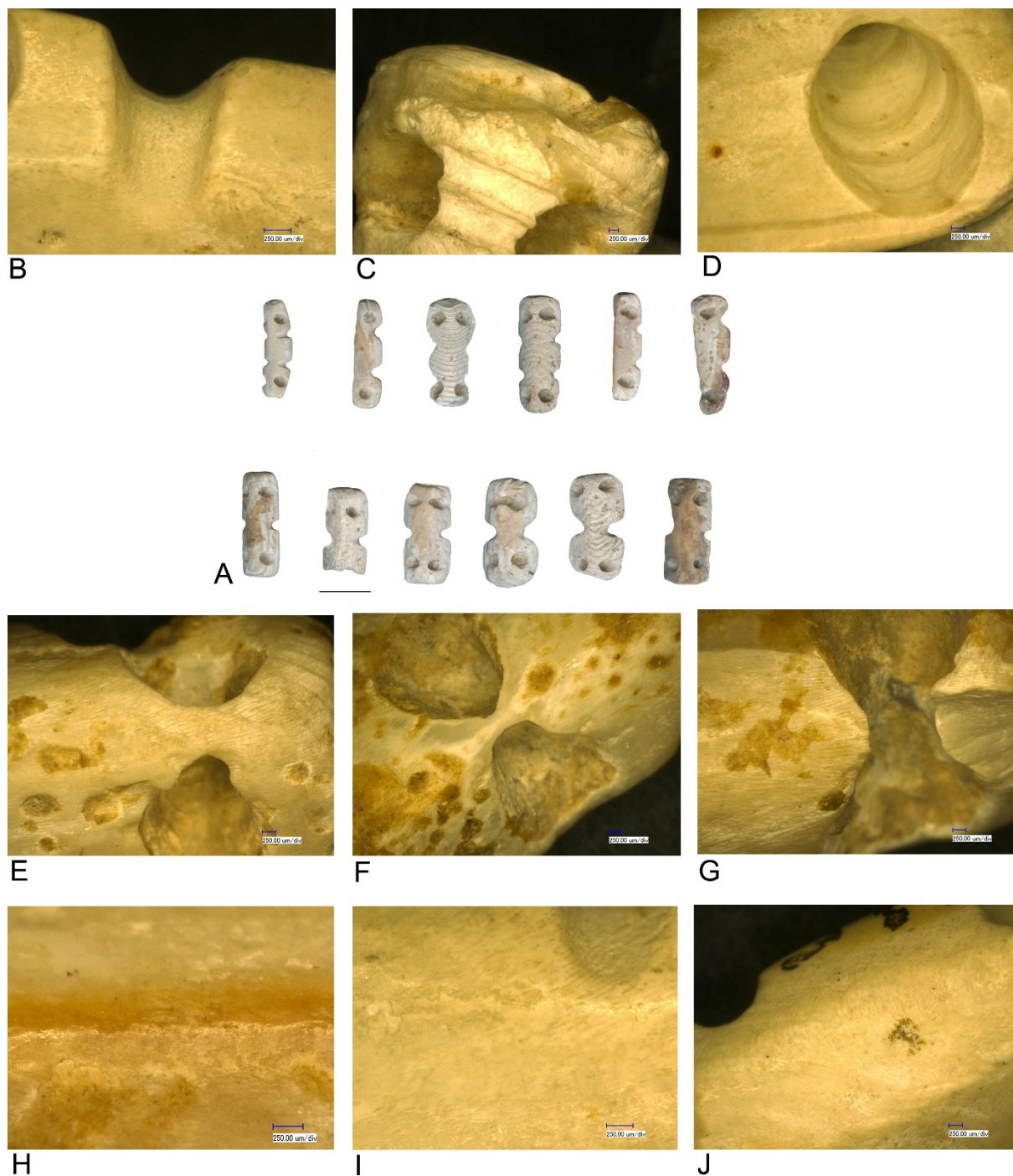


Fig. 3. A. Bilobed and trilobed beads made of *Spondylus* valve (Andolina necropolis) (scale = 1 cm); B. cutting marks followed by abrasion (100x); C. repaired piece (35x); D. perforation detail (50x); E-G. deformation of perforation (50x); H-J. flattened surface (100x, 100x, 50x).
A. Mărgele bilobate și trilobate confecționate din valvă de *Spondylus* (necropola de la Andolina) (scara = 1 cm); B. stigmate de tăiere, urmate de abraziune (100x); C. piesă reparată (35x); D. detaliu perforație (50x); E-G. deformarea perforației (50x); H-J. suprafață aplatizată (100x, 50x, 100x).

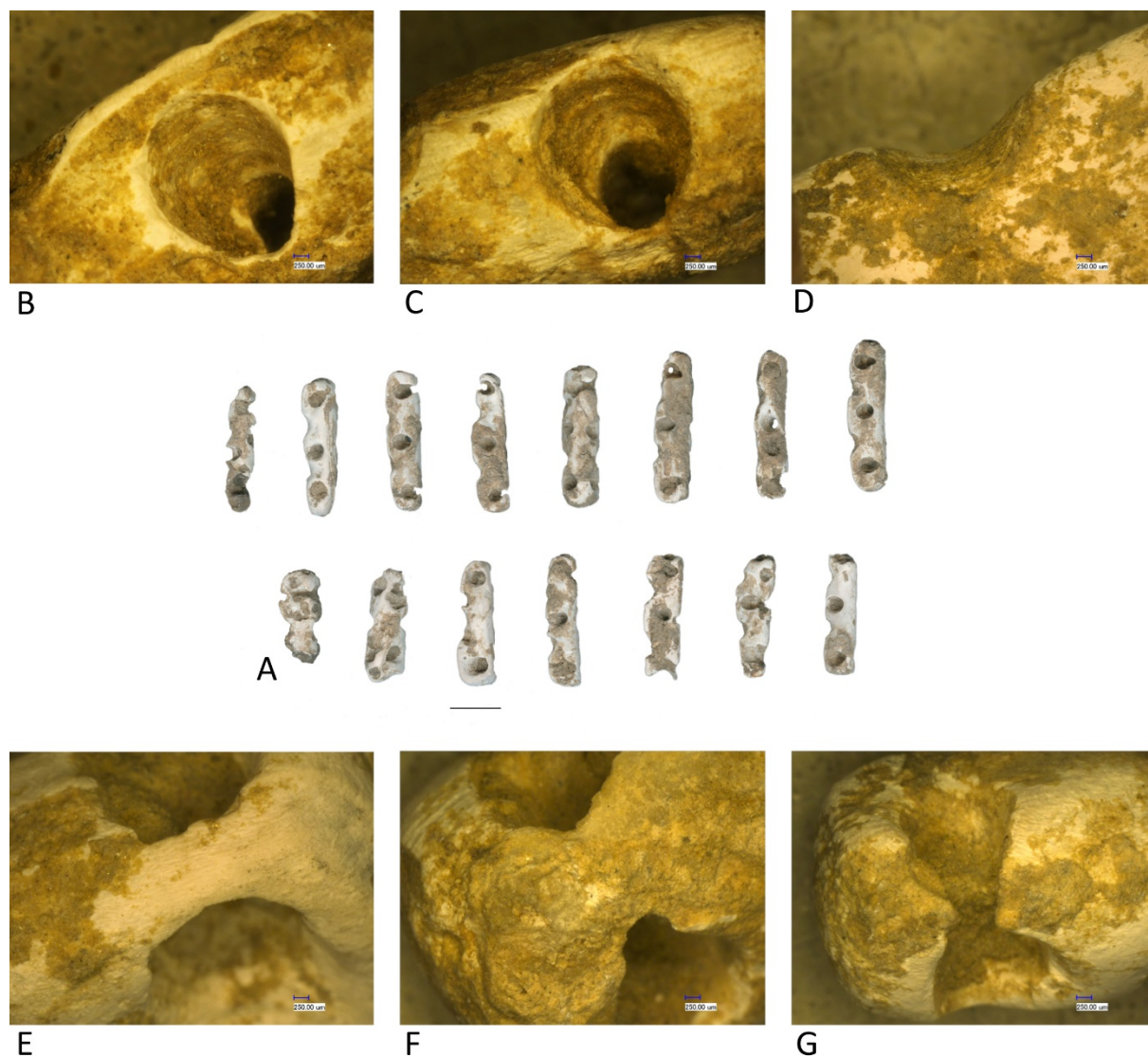


Fig. 4. A. Bilobed and trilobed beads made of *Spondylus* valve (Valea Mare necropolis) (scale = 1 cm); B-C. perforation details (50x); D. cutting marks followed by abrasion (50x); E-G. deformation of perforation (50x).

A. Mărgelile bilobate și trilobate confecționate din valvă de *Spondylus* (necropola de la Valea Mare) (scara = 1 cm); B-C. detalii perforație (50x); D. stigmat de tăiere, urmate de abraziune (50x); E-G. deformare perforație (50x).

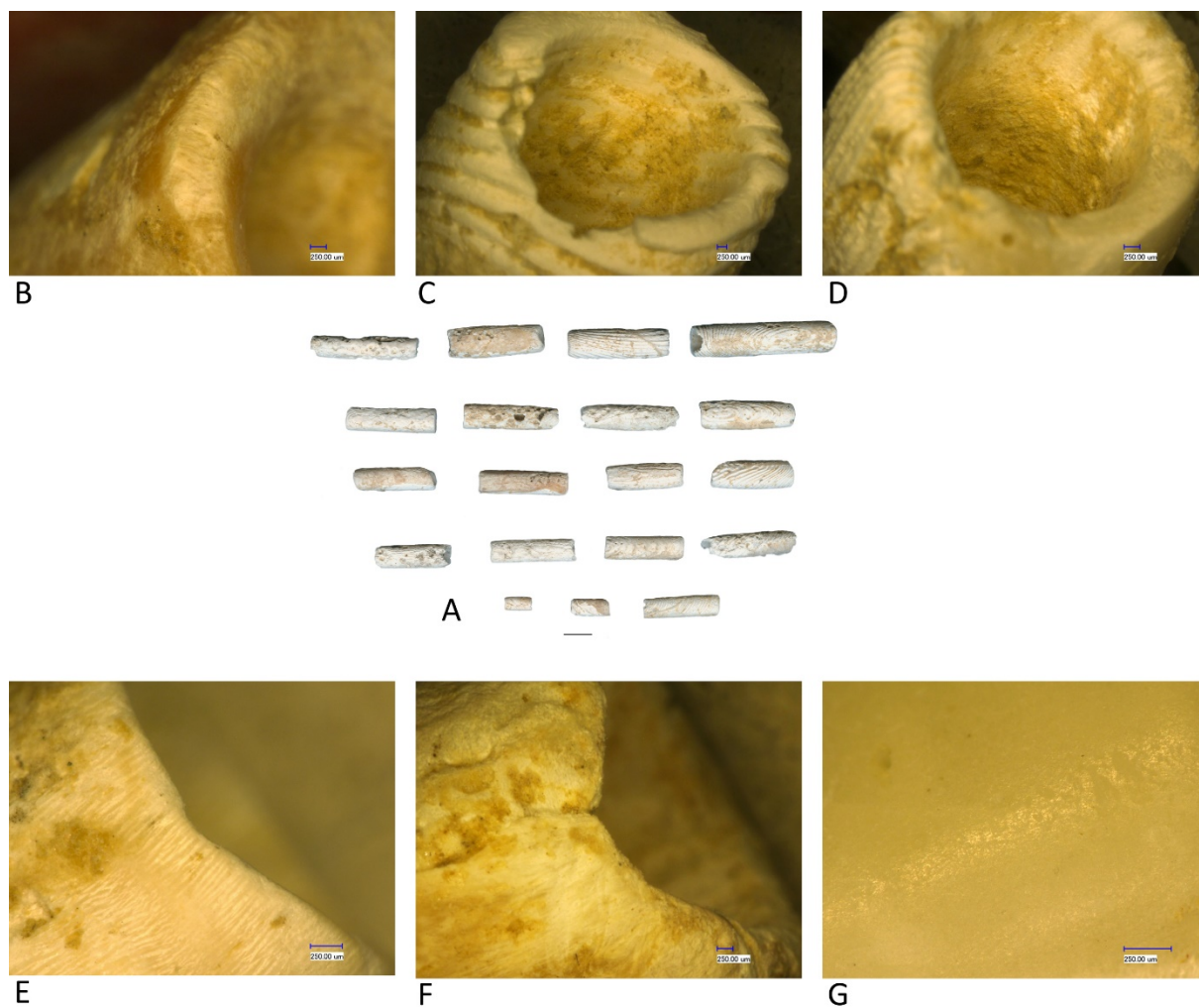


Fig. 5. A. Tubular beads made of *Spondylus* valve (Sultana-Valea Orbului necropolis) (scale = 1 cm); B. abrasion marks (50x); C-D. perforation details (30x, 50x); E-F. concave edge (100x, 50x); G. flattened facet (150x).

A. Mărgelile tubulare confecționate din valvă de *Spondylus* (necropola de la Sultana-Valea Orbului) (scara = 1 cm); B. stigmat de abraziune (50x); C-D. detalii perforație (30x, 50x); E-F. extremitate concavă (100x, 50x); G. suprafață aplatizată (150x).

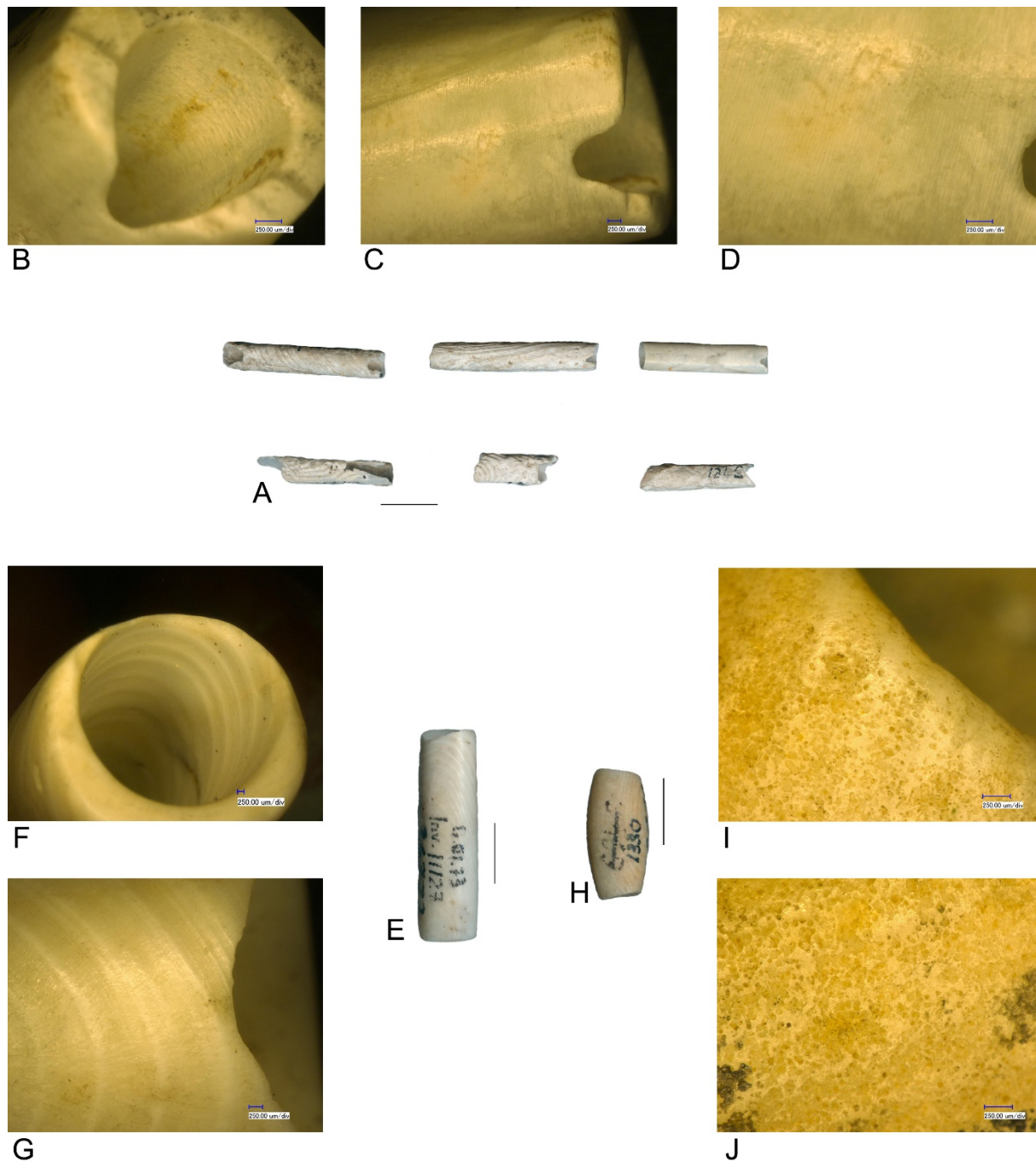


Fig. 6. A. Tubular bead made of *Spondylus* valve (Andolina necropolis) (scale = 1 cm); B, F. perforation details (100x, 20x); C, G, I. concave edge (50x, 50x, 100x); D, J. flattened facet (100x); E. tubular bead (Grădiștea Ulmilor - Boian A necropolis) (scale = 1 cm); H. biconvex bead (Grădiștea Ulmilor - Boian A necropolis) (scale = 1 cm).

A. Mărgel tubulare confecționate din valvă de *Spondylus* (necropola de la Andolina) (scara = 1 cm); B, F. detalii perforație (100x, 20x); C, G, I. extremitate concavă (50x, 50x, 100x); D, J. suprafață aplatizată (100x); E. mărgea tubulară (necropola de la Grădiștea Ulmilor - Boian A) (scara = 1 cm); H. mărgea biconvexă (necropola de la Grădiștea Ulmilor - Boian A) (scara = 1 cm).

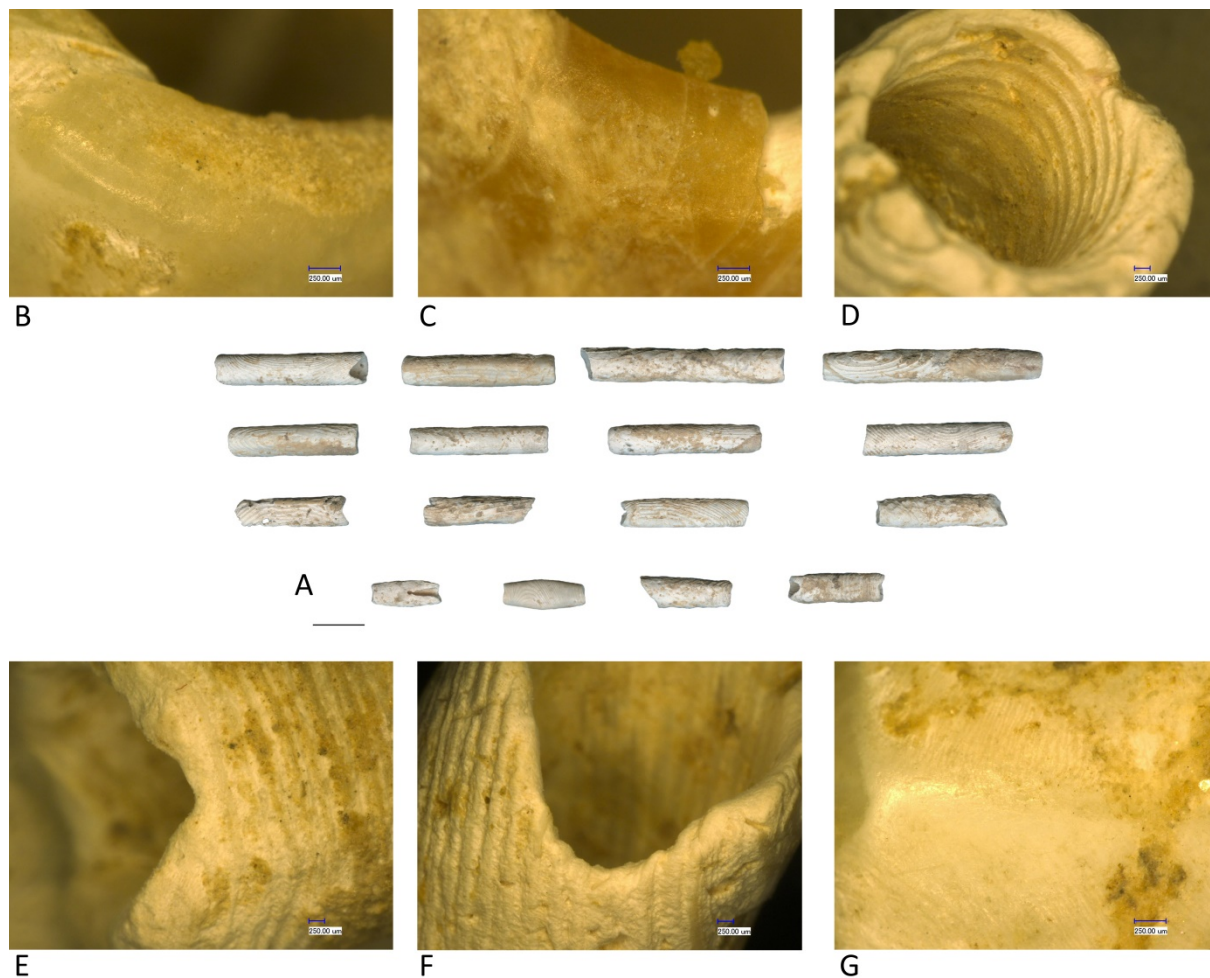


Fig. 7. A. Tubular and fusiform beads made of *Spondylus* valve (Valea Mare necropolis) (scale = 1 cm); B-C. abrasion marks (100x); D. perforation detail (50x); E-F. concave edge (50x); G. flattened facet (100x).
A. Mărgel tubulare și fusiforme confecționate din valvă de *Spondylus* (necropola de la Valea Mare) (scara = 1 cm); B-C. stigmat de abraziune (100x); D. detaliu perforație (50x); E-F. extremitate concavă (50x); G. suprafață aplatizată (100x).

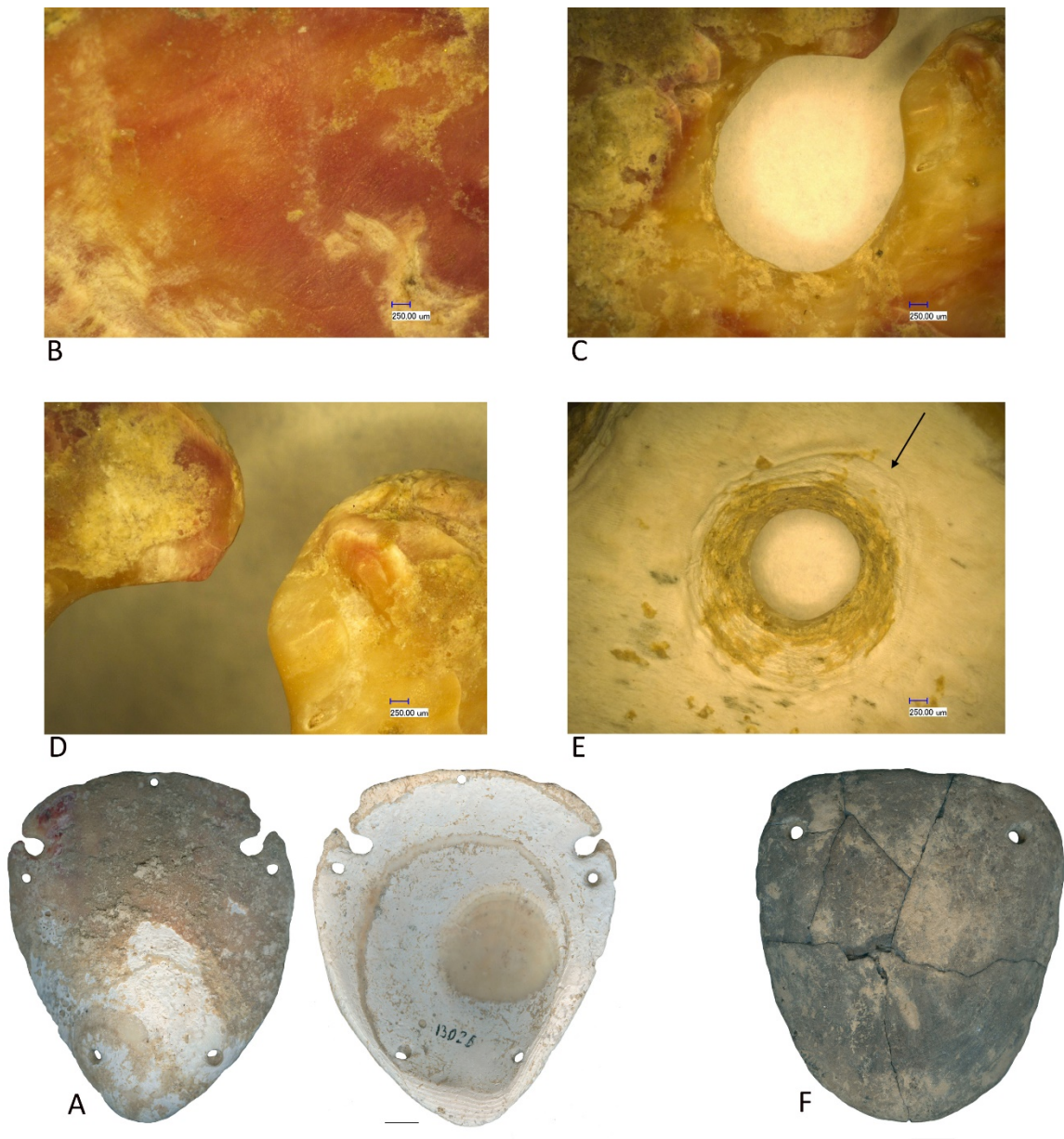


Fig. 8. A. Belt element made of *Spondylus* valve (Sultana-Valea Orbului necropolis) (scale = 1 cm); B. abrasion marks (50x); C.-D. fracture of perforation (50x); E. perforation detail (50x); F. belt element made of clay (Sultana-Valea Orbului necropolis) (scale = 1 cm)

A. Element de centură confecționat din valvă de *Spondylus* (necropola de la Sultana-Valea Orbului) (scara=1 cm); B. stigmat de abraziune (50x); C.-D. perforație fracturată (50x); E. detaliu perforație (50x); F. element de centură confecționat din lut (necropola de la Sultana-Valea Orbului) (scara = 1 cm).

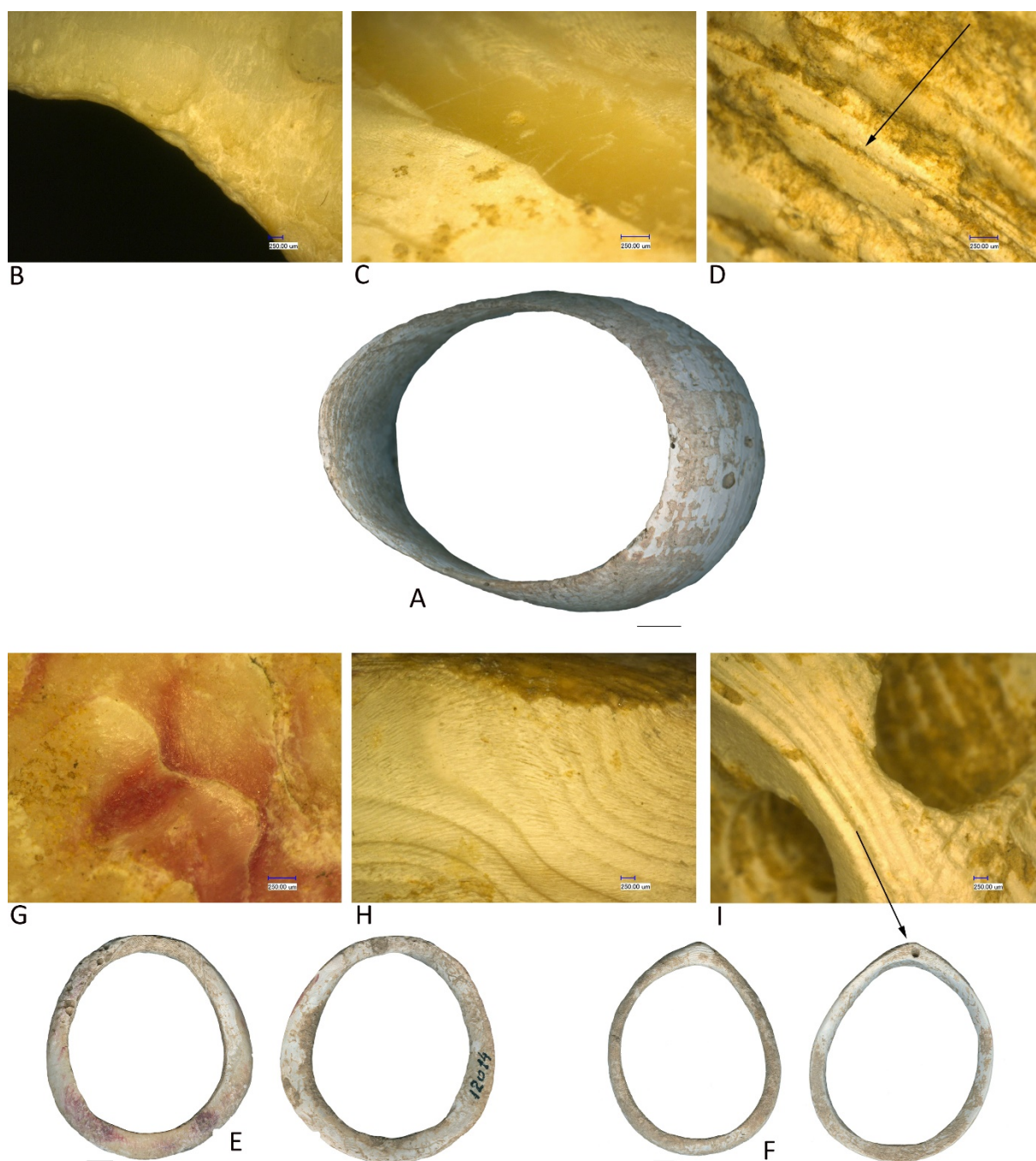


Fig. 9. A, E-F. bracelets made of *Spondylus* valve (Sultana-Valea Orbului necropolis) (scale = 1 cm); B. percussion marks (50x); C, G. abrasion marks (100x); D, H. flattened surface (100x, 50x); I. perforation detail (50x).

A, E-F. brățări confecționate din valvă de *Spondylus* (necropola de la Sultana-Valea Orbului) (scara = 1 cm); B. stigmat de percuție (50x); C, G. stigmat de abraziune (100x); D, H. suprafață aplatizată (100x, 50x); I. detaliu perforație (50x).

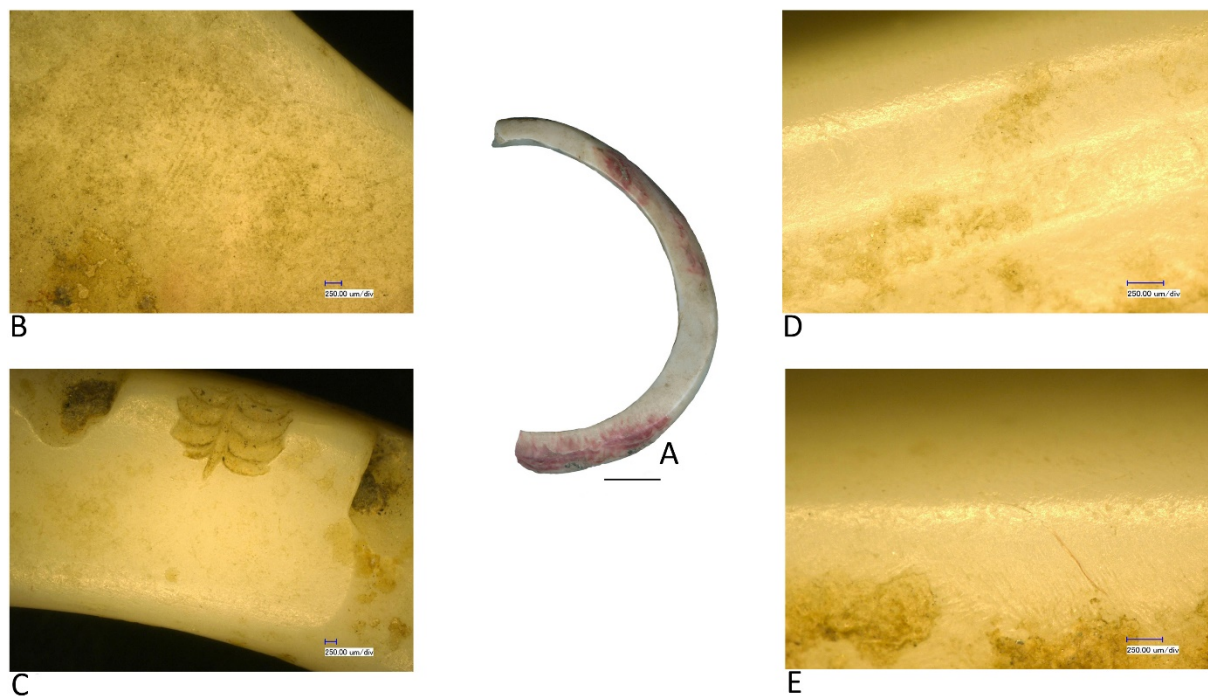


Fig. 10. A. bracelet made of *Spondylus* valve (Grădiștea Ulmilor - Boian A necropolis) (scale = 1 cm); B-C. abrasion surface (50x, 35x); D-E. use-wear surface (100x).

A. brățară confecționată din valvă de *Spondylus* (necropola de la Grădiștea Ulmilor - Boian A) (scara = 1 cm); B-C. abraziunea suprafeței (50x, 35x); D-E. uzură în suprafață (100x).

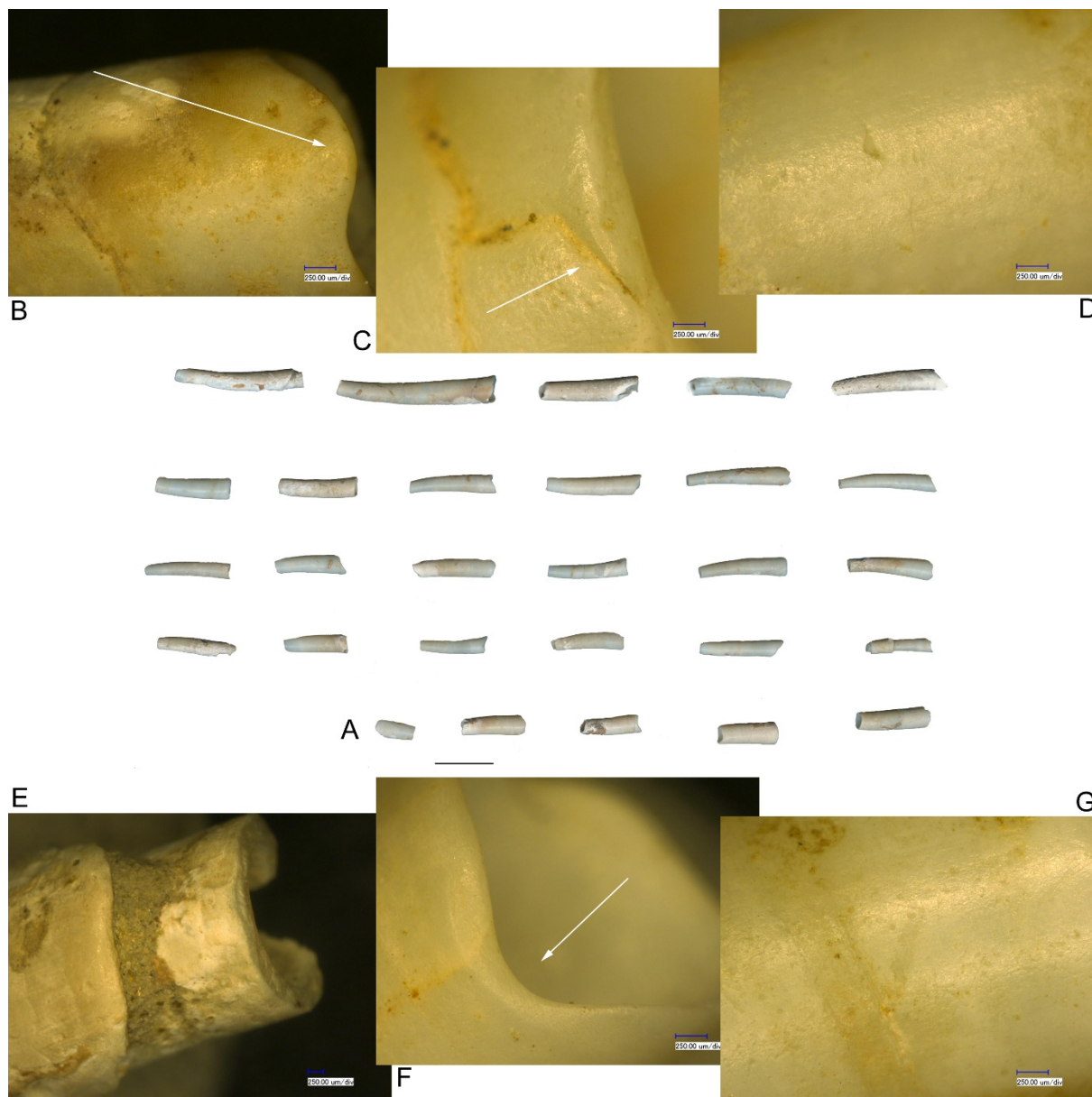


Fig. 11. A. Tubular beads of *Antalis* shell (Andolina necropolis) (scale = 1 cm); B. *bec de flûte* fracture (100x); C. detail of the sawing technique (100x); D. abraded surface (100x); E. a shell caught in another (50x); F. concave edge (100x); G. flattened facet (100x)
A. Mărgelile tubulare confecționate din cochilie de *Antalis* (necropola de la Andolina) (scara = 1 cm);
B. fractură în *bec de flûte* (100x); C. detalii ale segmentării prin *sciage* (100x); D. suprafață abrazată (100x);
E. cochilii prinse (50x); F. extremitate concavă (100x); G. fațetă aplatizată (100x).

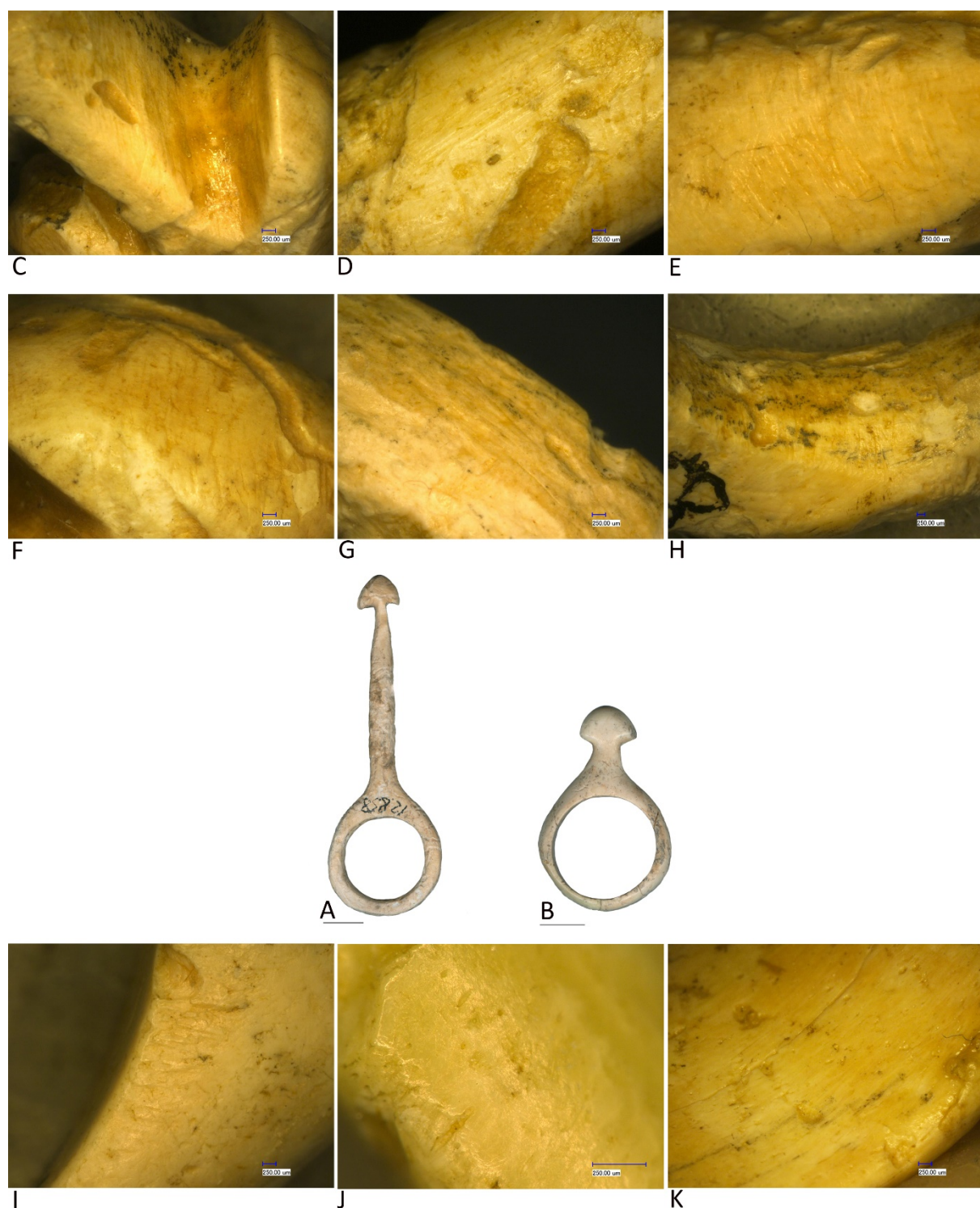


Fig. 12. A., B. pieces with a ringlike morphology (Sultana-Valea Orbului necropolis) (scale = 1 cm); C. sawing marks (50x); D, G. scraping marks (50x); E-F, H-I. abrasion marks (50x, 30x); J.-K. use-wear marks (200x, 50x).
A., B. piese cu morfologie inelară (necropola de la Sultana-Valea Orbului) (scara = 1 cm); C. stigmatе de *sciage* (50x); D, G. stigmatе de *raclage* (50x); E.-F, H.-I. stigmatе de abraziune (50x, 30x); J.-K. stigmatе de uzură (200x, 50x).

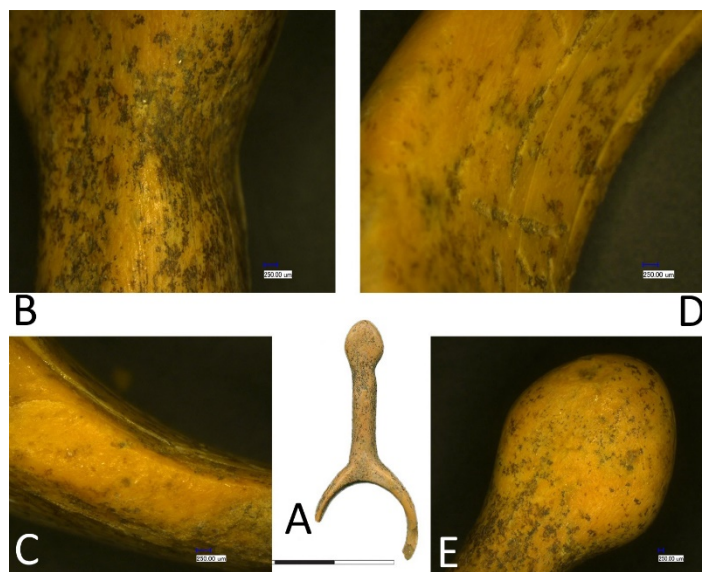


Fig. 13. A. piece with a ringlike morphology (Cernica necropolis) (scale = 1 cm); B, D. scraping marks (50x); C, E. abrasion marks (50x, 20x).

A. piesă cu morfologie inelară (necropola de la Cernica) (scara = 1 cm); B, D. stigmatе de *raclage* (50x); C, E. stigmatе de abraziune (50x, 20x).

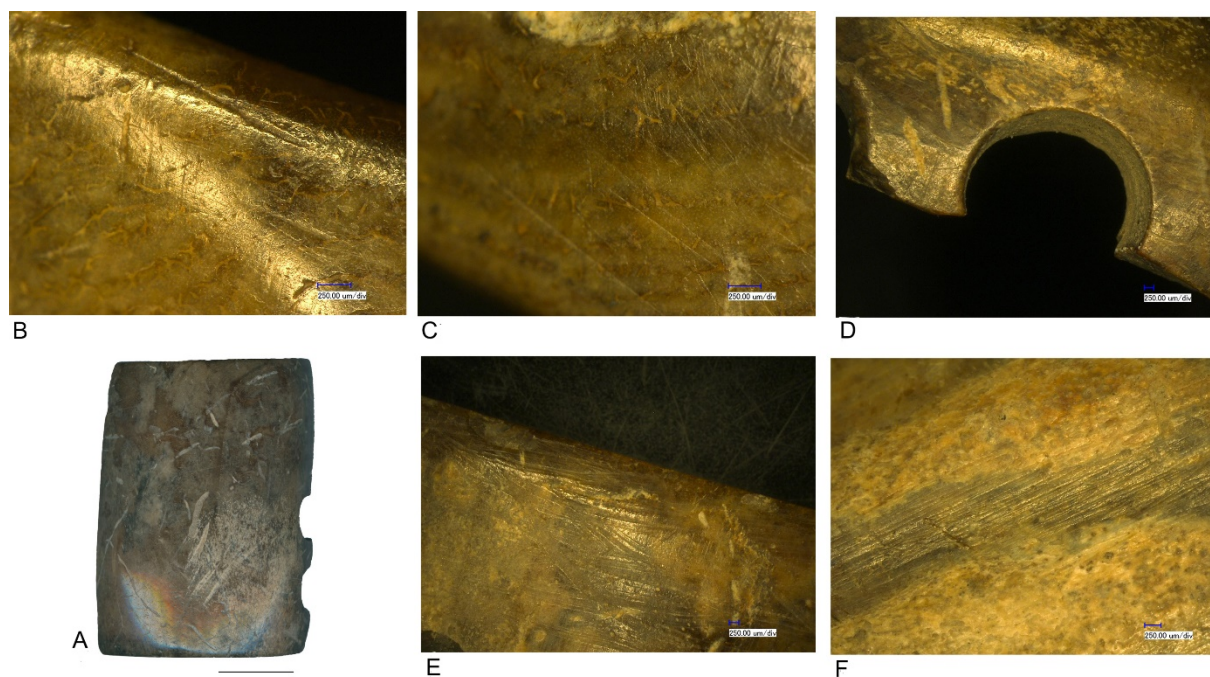


Fig. 14. A. Ring made from bone (Grădiștea Ulmilor - Boian A necropolis) (scale = 1 cm); B. sawing marks (100x); C. abrasion marks (100x); D. perforation detail (30x); E-F. scraping marks (30x, 50x).

A. Inel confecționat din os (necropola de la Grădiștea Ulmilor - Boian A) (scara = 1 cm); B. stigmatе de *sciage* (100x); C. stigmatе de abraziune (100x); D. detaliu perforație (30x); E-F. stigmatе de *raclage* (30x, 50x).

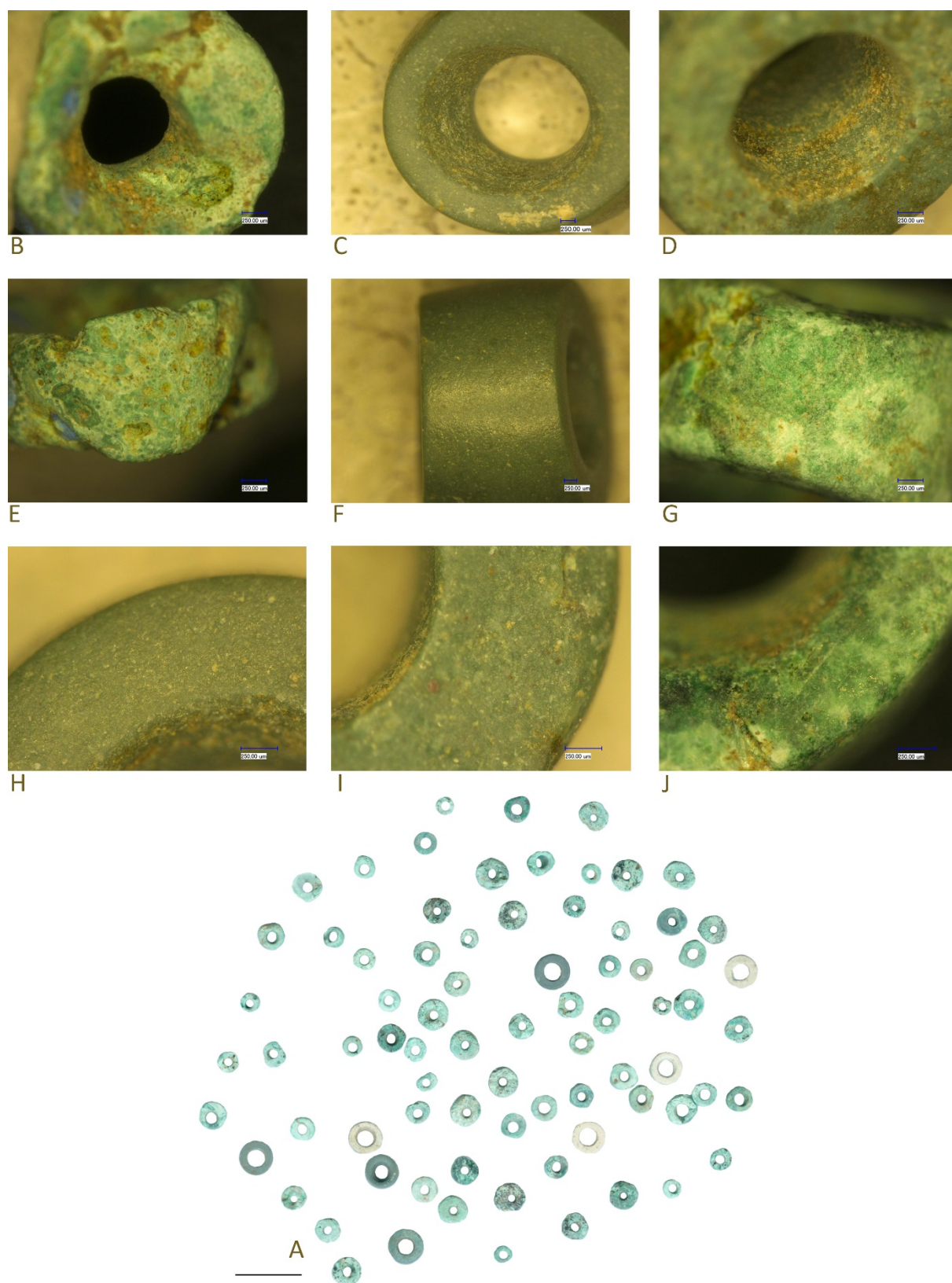


Fig. 15. A. Cylindrical beads made of malachite, schist and *Spondylus* valve (Sultana-Valea Orbului necropolis) (scale = 1 cm); B.-D. perforation details (100x, 50x, 100x); E.-G. abrasion of the debitage edges (100x, 50x, 100x); H.-J. abrasion of the surface (150x).

A. Mărgelile cilindrice confecționate din malachit, șist și valvă de *Spondylus* (necropola de la Sultana-Valea Orbului) (scara = 1 cm); B.-D. detalii ale perforației (100x, 50x, 100x); E.-G. abraziunea laturilor de debitaj (100x, 50x, 100x); H.-J. abraziunea suprafeței (150x).