



## Article

# Grotta del Santuario della Madonna at Praia a Mare (Cosenza, Italy): ritual pits and combustion structures. Spatial organization, fauna and lithic industries of the Mesolithic levels (2008-2011 excavations)

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## Key words

- Grotta del Santuario della Madonna at Praia a Mare
- Calabria
- Heart
- Pit ritual
- Animal remains
- lithic industry

## Parole chiave

- Grotta del Santuario della Madonna a Praia a Mare
- Calabria
- Focolare
- Fossa rituale
- Resti animali
- Industria litica

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## Summary

This paper presents the results of the study of the Mesolithic structures recovered during the 2008-2011 field seasons. These include a combustion structure and several small post-holes in SU 582, a pit (SU 638) and a hearth (SUs 641-652) with adjacent charcoal-rich area (SU 657). The structures differ in morphology and content, although all of them yielded animal bone remains, malacofauna and tortoise shells. However, the quantity of bone remains and the ratio among species as well as the fragmentation of the specimens are considerably variable. Such variables characterize the structures evidencing their different functions. Considering as a whole the remains it contained (including a wolf hemi-mandible and posterior distal limb of a badger), the pit SU 638 has been interpreted as a "ritual pit" or, in any case, a pit used in propitiatory rituals. Among the lithic industry any selection of particular tools occurs in the structures. The lithic assemblage, is referable to the Undifferentiated Epipalaeolithic an Early Holocene facies spread in South-Central Italy, Sicily and Sardinia-Corsica, between the 10th and the 8th millennium cal. BC.

## Riassunto

Si presentano i dati relativi allo studio delle strutture mesolitiche rinvenute nelle campagne di scavo 2008-2011. Si tratta di una struttura di combustione e di una serie di piccole buche di palo in SU 582, di una fossa (SU 638) e di un focolare (SU 641-652) con annessa un'area carboniosa (SU 657). Le strutture sono diverse per morfologia e per contenuto, anche se in tutte sono stati rinvenuti resti ossei animali, malacofauna e gusci di tartarughe. La quantità dei resti ossei e i rapporti tra le specie variano sensibilmente, così come la frammentazione dei resti. Queste variabili caratterizzano le strutture mettendo in evidenza le loro differenti finalità. La fossa SU 638, per l'insieme dei reperti in essa contenuti (tra i quali un'emimandibola di lupo e una zampa posteriore di tasso), viene interpretata come una "fossa rituale" o comunque adibita a riti propiziatori. Lo studio dell'industria litica non rivela selezioni di particolari strumenti litici nelle strutture. L'insieme litico è riferibile all'Epipaleolitico indifferenziato, una facies diffusa nel Centro-Sud Italia, Sicilia e Sardegna-Corsica, tra il X e l'VIII millennio cal. BC.

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## Introduction

This article presents the results of the most recent investigations carried out by the Soprintendenza al Museo Nazionale Preistorico Etnografico L. Pigorini in the Mesolithic levels of Grotta del Santuario della Madonna at Praia a Mare (Cosenza, Italy). The history of the researches, the stratigraphy of the cave and the results of AMS 14C dating are reported in Tagliacozzo *et al.* (this volume). The most recent levels of the Mesolithic occupation appear to be partially disturbed by the installation of Middle Neolithic structures. The presence of Neolithic pits and post holes appears less evident starting from SU 548 and disappears in the underlying SU 582 (see stratigraphic section in Fig. 3, Tagliacozzo *et al.* 2016 this volume).

The most significant Mesolithic palaeosurfaces and structures discovered during the excavations, as well as the preliminary considerations regarding the faunal remains and the associated lithic industries, will be described in detail (Tabs 1-3). SU 582 is characterized by the presence of a complex combustion structure and by a series of small sized post holes. The combustion structures continue in the underlying levels (SUs 614, 628). One pit (SU 638/637, ca. 7200 cal BC) is deeply depressed; it has an oval shape in the upper part becoming more round in the lower portion, and contained faunal remains (red deer, roe deer, wild boar, a complete distal limb of a badger and a wolf hemi-mandible). Another hearth consists of a central circular part (SU 641), made of two superimposed levels of stones with abundant charcoal and burned bones. Around the hearth there is a well-defined charcoal-rich area (SU 657, ca 7900-8400 cal BC), a real shell midden, rich in malacofauna remains (terrestrial and marine) as well as fragments of tortoise carapace, plastron and bones, some of them still in anatomical connection.

## Method

The taxonomic and skeletal identifications made in this study are based on the reference collections of the Laboratorio di Bioarcheologia of the Museo Nazionale Preistorico-Etnografico "L. Pigorini" (Rome, Italy). Microscopic analyses of the bone surfaces were carried out using a Nikon 1000 stereomicroscope with a 20x-220x magnification range.

In order to identify the nature of the surface alterations on the bones, and to distinguish human traces from those produced by animals, trampling abrasion, etc., reference was made to the well-established taphonomic literature (Binford 1981; Brain 1981; Potts and Shipman 1981; Shipman 1981; Shipman and Rose 1984; Blumenshine & Selvaggio 1988; Capaldo & Blumenshine 1994; Lyman 1994; Blumenshine 1995; Fisher 1995). The degree of combustion was evaluated employing the methodology developed by Stiner *et al.* (1995). The study of the bone industry has followed Legrand & Sidéra (2007).

Sex and age at death were determined in order to reconstruct exploitation strategies of the different species (Aitken 1974; Mariezkurrena 1983). Measurements were taken following von den Driesch (1976). In order to evaluate species abundance, the following indexes were used: number of identified specimens (NISP) (Grayson 1984), minimum number of elements (MNE) (Binford 1981; Klein & Cruz-Urbe 1984; Stiner 1994), and the estimate of the minimum number of individuals (MNI) (Bökönyi 1970).

The study of the lithic production was carried out following the stratigraphic sequence. All the artifacts have been studied and classified in order to reconstruct the core reduction sequences, the raw material procurement strategy and the typological features.

## Results

### *Palaeosurface SU 582*

SU 582, excavated 9 m<sup>2</sup> - depth 6/9 cm, represents the most recent preserved palaeosurface related to the Mesolithic frequentation (Fig. 1). It is characterized by archaeological material in horizontal deposition (limpets, top snails, lithic industry, and bones) and by the presence of a complex combustion structure (SUs 602-615), a more simple hearth (SU 604) and some post holes (SUs 592-594-596-598). Such post holes are of small size (diameter variable between 6 and 9 cm) and seem to follow a regular outline. One of them (SU 594) was coated with red-orange clay. The hearth of the complex combustion structure is a shallow pit (SU 602; L 20 cm, W 20 cm, D 10 cm ca.), filled by two different levels: a lower one made of stones and charcoal-rich soil (SU 612) and an upper one with more charcoal-rich and cineritic sediment (SU 603). In continuity with the hearth there is a cooking surface, slightly depressed (SU 615; L 50 cm, W 30 cm), made of medium-small stones with traces of exposure to fire and residues of ash and charcoal. Close to the hearth, spots of sediment very rich in charcoal have also been discovered (SUs 617 and 619), representing residues of the cooking activity.

SU 612 8782 ± 45 BP (uncalibrated 14C date); 8200-7600 BC (Calibrated using the OxCal model).

### *Lithic assemblage*

The lithic assemblage from SU 582 and related structures (ca. 900 artifacts.) includes mainly unmodified knapping debris (ca. 47% of the total assemblage) and asymmetric squat flakes (ca. 37%) made from pebbles (radiolarite, flint and siliceous limestone) that were collected locally on the shore and in riverbeds. Regardless of the raw material, the shape and the size of the blanks is not standardized. Blades and bladelets are very few (less than 2%). Five cores for flake production (Fig. 2, n. 1), almost all made on little pebbles, are also present.

Sixty five retouched tools (ca. 7% of the total assemblage) are present, most of them are common tools such as denticulates and scrapers made on broad flakes (Fig. 2, n. 11-18), sometimes with inverse retouch (Fig. 2, n. 13, 16). Borers (Fig. 2, n.11), truncations and splintered pieces also occur. Specialized tools consist of hyper-micro- (up to 15 mm) and micro- (16-25 mm) short end-scrapers (some of them sub-circular) (Fig. 2, n. 2-5) and hyper-micro- and micro-backed-tools (Fig. 2, n. 6-10), among which a double backed point (a non-canonical Sauveterre point) occurs (Fig. 2, 7). The lack of blade cores and other technological elements related to a specific technological lamellar scheme might suggest that these micro-backed tools were brought to the site as finished products.

The presence of microlithic backed tools is reasonably related to hunting, while it is likely that scrapers, denticulates and borers were used to perform other domestic activities. Some unretouched flakes show clear micro-removals along one edge suggesting the use of these crude blanks.

### *Fauna*

The hearth area and the charcoal-rich ones immediately adjacent to it, yielded 114 faunal remains; 71 (62% ca.) of them were unidentifiable: mainly small flakes that were burnt or showed traces of exposure to fire (Tabs 1-3). Mammals are represented by 17 remains of wild ungulates: wild boar and red deer are more frequent than roe deer, while carnivores are absent. Wild boar remains may be referred to 3 individuals: 2 juveniles (for the presence, among the others, of a fragment of lower deciduous canine and a newly erupted lower P3) and an adult. Those of red and roe deer may be referred to a single adult individual each. The presence of an upper M2 of roe deer allowed to assess an age of 3 - 5 years. Ungulates are represented by very rare cranial elements and loose teeth, rare long bone

diaphyses, and more frequent distal limb bones. Several specimens show butchery marks, especially fracturing; some percussion cones are also present suggesting that bone fracturing occurred close to the hearth. Rare bird remains are also present; 2 fragments of a right

ulna shaft and a right distal humerus have been attributed to a medium sized Columbiformes, *Columba livia/oenas*. Two other remains belong to Passeriformes of different size: a left radius shaft of a large Corvidae, common raven (*Corvus cf. corax*), and a right humerus

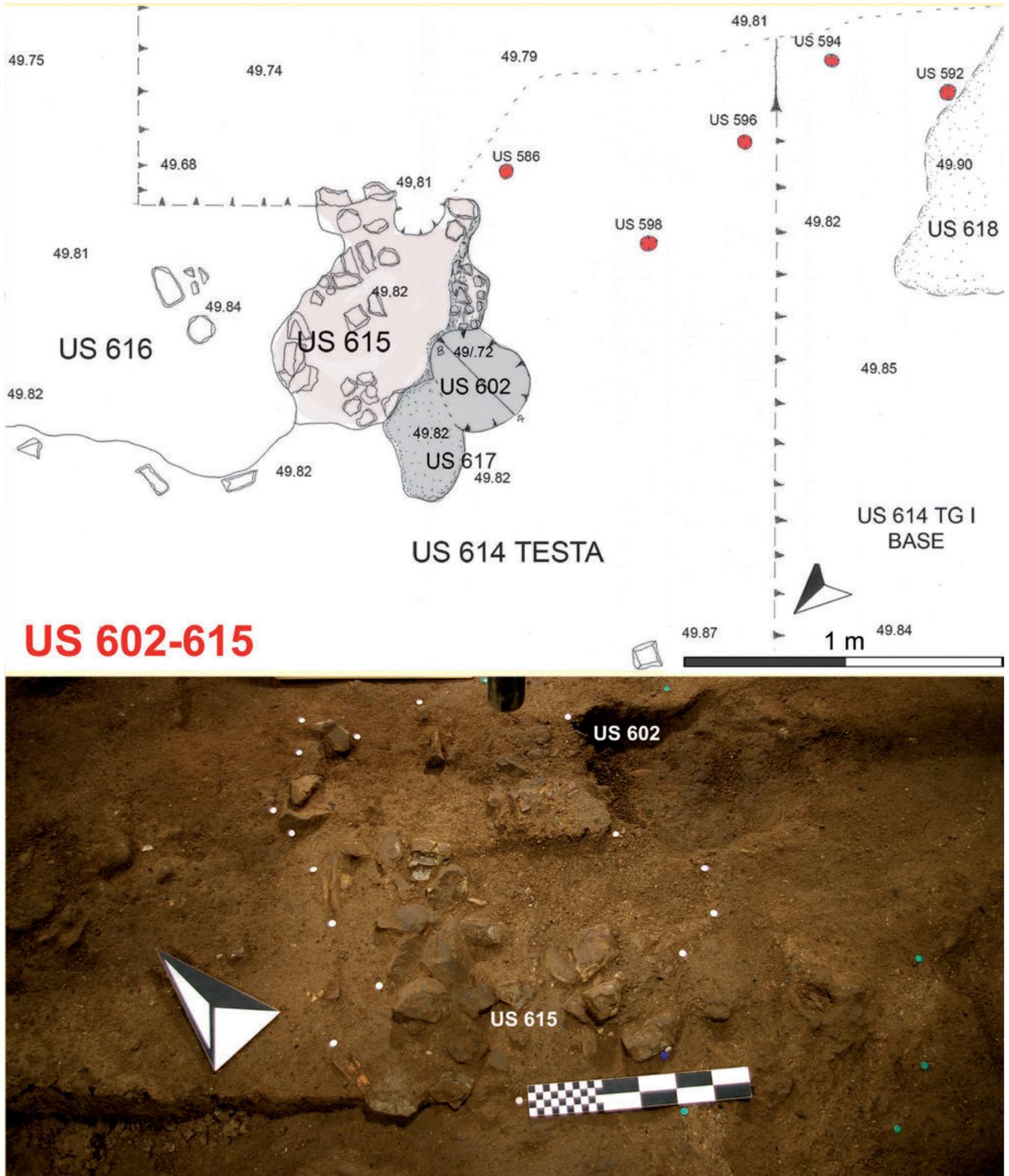
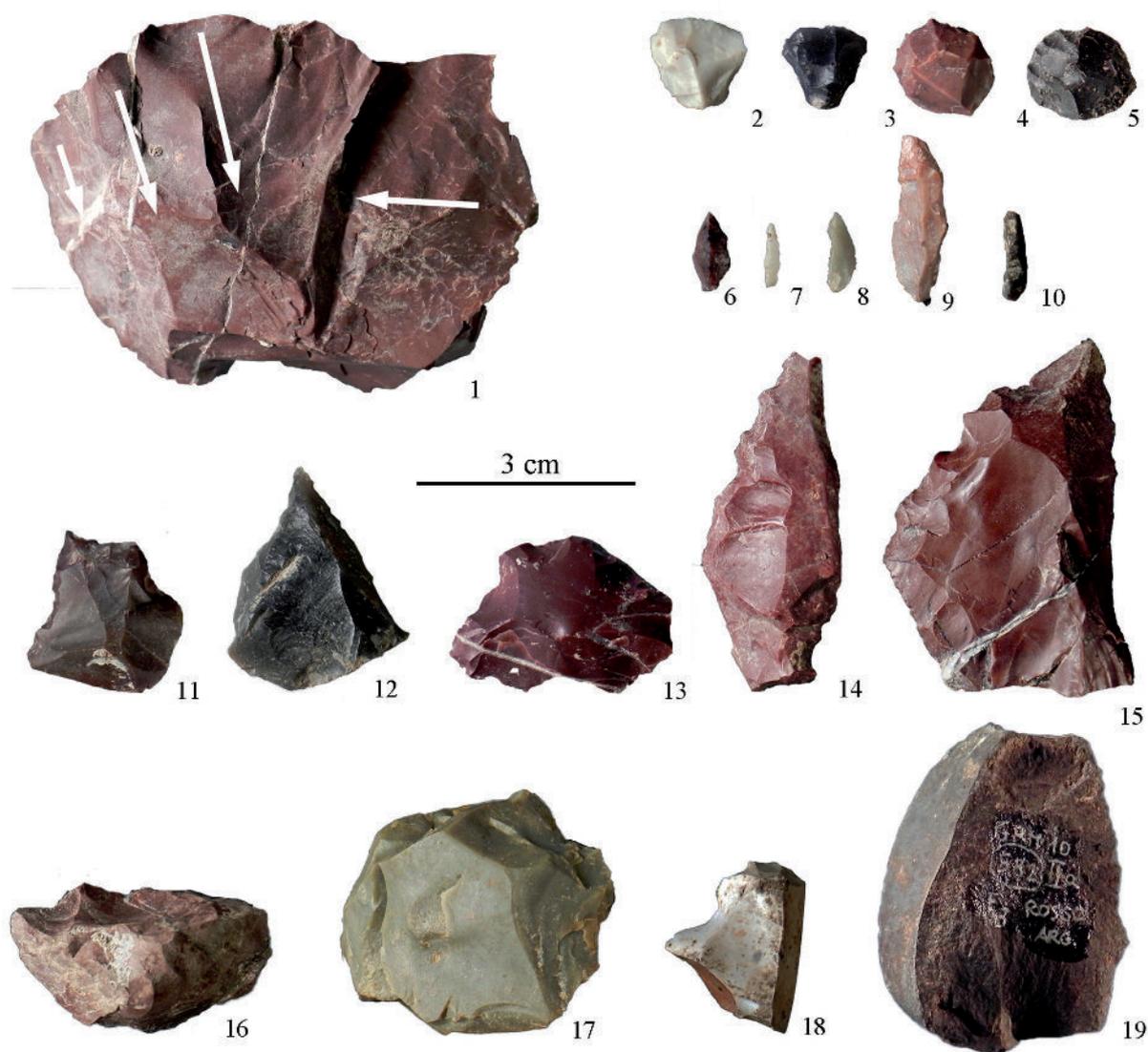


Fig. 1 - Grotta del Santuario della Madonna – Palaeosurface SU 582 : combustion structure (SUs 602-615), level rich in ash and charcoal with post holes (SUs 592-594-596-598). / Livello US 582 : struttura di combustione (USs 602-615), livello ricco di cenere e carbone (US 617) e buche di palo (USs 592-594-596-598).



**Fig. 2** - Grotta del Santuario della Madonna – Lithic artifacts from palaeosurface SU 582 and related structures. 1, core; 2-5, micro short end-scrapers; 6, partial backed point; 7-9, total backed points (n. 7 double backed); 10, backed bladelet; 11, borer; 12, notch; 13-16, denticulated scrapers (n. 13 and 16 with inverse retouch); 17-18, denticulated end-scrapers; 19, unretouched flake. / Industria litica dalla paleosuperficie US 582 e relative strutture. 1, nucleo a schegge; 2-5, grattatoi corti microlitici; 6, punta a dorso parziale; 7-9, punte a dorso totale (n. 7 a dorso bilaterale); 10, lamella a dorso; 11, becco; 12, incavo; 13-16, raschiatoi denticolati (nn. 13 e 16 a ritocco inverso); 17-18, grattatoi denticolati; 19, scheggia non ritoccata.

of a small sized Passeriformes of the Hirundinidae family, crag martin (cf. *Ptyonoprogne rupestris*). The dove ulna displays scrape marks on the dorsal face (Fig. 3), some of them are long and longitudinal, others are short and oblique to the *Papillae remigales*. Only the diaphyseal portion of the radius of the common raven is preserved with fractured and burned ends; combustion affects all the fracture edges for a few millimeters; some feeble superficial striae referable to a lithic tool have also been identified. The traces on the two bird diaphyses may indicate the exploitation of the bone as raw material rather than butchery/consumption. The scrape marks on the ulna may have a double interpretation and be related also to the procurement of feathers. Fish remains are rare and the malacofauna is

scarce with few limpets and some land gastropods. On the edges of some limpets traces of old removals have been detected, probably related to their gathering.

#### Hard animal tissue artifacts

An anterior portion of the diaphysis of a red deer tibia displays fracture edges that cannot be just related to simple fragmentation produced during butchery. The specimen shows a species of tang ending with a rectilinear base, while the opposite end affects the whole width of the tibia. On the edge of such end and on one of the lateral edges, that was intentionally thinned, use wear traces have also been detected, traces of cutting of soft material remains (study in progress).

**Tab. 1** - Grotta del Santuario della Madonna - Number of animal remains from the different SUs. / Numero di resti animali provenienti dalle diverse USs.

TAXA	US 617	US 612	US	US 637	US	US	US 643	US 652	US 657	Total Remains		
	/619	/602	615	NISP	641	642	NISP	NISP	NISP	NISP	%	
<b>Mammals</b>												
Wolf ( <i>Canis lupus</i> )				1							1	0,1
Badger ( <i>Meles meles</i> )				21					1		22	1,2
Carnivore				2	1	1					4	0,2
Wild boar ( <i>Sus scrofa</i> )	4	1	2	18	4	5			13		47	2,5
Red deer ( <i>Cervus elaphus</i> )	1	1	4	7	1	5	1		17		37	2,0
Roe deer ( <i>Capreolus capreolus</i> )	1	1	1	3		4			2		12	0,6
Cervid	1										1	0,1
<b>Total NISP</b>	<b>7</b>	<b>3</b>	<b>7</b>	<b>52</b>	<b>6</b>	<b>15</b>	<b>1</b>		<b>33</b>		<b>124</b>	<b>6,5</b>
<b>Micromammals</b>	3			30	17	21	12	3	25		111	5,9
<b>Total Mammals</b>	<b>10</b>	<b>3</b>	<b>7</b>	<b>82</b>	<b>23</b>	<b>36</b>	<b>13</b>	<b>3</b>	<b>58</b>		<b>235</b>	<b>12,4</b>
<b>Testudines</b>												
Pond tortoise ( <i>Emys cf. orbicularis</i> )				8	10	10	2		96		126	6,6
Hermann's tortoise ( <i>Testudo hermanni</i> )				5	6	6			27		44	2,3
Testudines	2			10	10	4	3		61		90	4,7
<b>Total Testudines</b>	<b>2</b>			<b>23</b>	<b>26</b>	<b>20</b>	<b>5</b>		<b>184</b>		<b>260</b>	<b>13,7</b>
<b>Others</b>												
<b>Vertebrate</b>												
Aves	3	1		3					1		8	0,4
Anphibia/Reptilia				1							1	0,1
Pisces				5	4				2		11	0,6
<b>Invertebrate</b>												
Echinoidea (sea-urchin)				2							2	0,1
<b>Total others</b>	<b>3</b>	<b>1</b>		<b>11</b>	<b>4</b>				<b>3</b>		<b>22</b>	<b>1,2</b>
<b>Mollusca</b>												
<i>Columbella rustica</i>	3					2					5	0,3
<i>Monodonta</i> sp.				19	1	6	1		19		46	2,4
<i>Patella</i> sp.	10			77	14	106	6		151		364	19,2
<i>Glycymeris</i> sp.									1		1	0,1
Terrestrial Gastropoda	5			79	64	53	10		277		488	25,8
<b>Total Mollusca</b>	<b>18</b>			<b>175</b>	<b>79</b>	<b>167</b>	<b>17</b>		<b>448</b>		<b>904</b>	<b>47,7</b>
<b>Total Identified</b>	<b>33</b>	<b>4</b>	<b>7</b>	<b>291</b>	<b>132</b>	<b>223</b>	<b>35</b>	<b>3</b>	<b>693</b>		<b>1421</b>	<b>75,0</b>
<b>Unidentified</b>												
Large mammal - cranial				2			2		1		5	0,3
Large mammal - axial				2					3		5	0,3
Large mammal - appendicular		1		3	1	3			7		15	0,8
Medium mammal - cranial				1	1				2		4	0,2
Medium mammal - axial		1		25		2			15		43	2,3
Medium mammal - appendicular				24	5	3	1		13		46	2,4
Unidentifiable	45	24		82	16	61	24		104		356	18,8
<b>Total Unidentified</b>	<b>45</b>	<b>26</b>		<b>139</b>	<b>23</b>	<b>69</b>	<b>27</b>		<b>145</b>		<b>474</b>	<b>25,0</b>
<b>Total Remains</b>	<b>78</b>	<b>30</b>	<b>7</b>	<b>430</b>	<b>155</b>	<b>292</b>	<b>62</b>	<b>3</b>	<b>838</b>		<b>1895</b>	<b>100,0</b>

**Tab. 2** - Grotta del Santuario della Madonna - Number of animal remains (Identified and Unidentified) and minimum number of individuals grouped by structure. / Numero di resti animali (determinati e indeterminati) e numero minimo di individui raggruppati per struttura.

TAXA	STRUCTURES IN US 582		US 637		USS 641-652		US 657	
	NISP	%	NISP	%	NISP	%	NISP	%
<b>Mammals</b>								
Wolf ( <i>Canis lupus</i> )			1	0,23				
Badger ( <i>Meles meles</i> )			21	4,88			1	0,12
Carnivore			2	0,47	2	0,39		
Wild boar ( <i>Sus scrofa</i> )	7	6,14	18	4,19	9	1,76	13	1,55
Red deer ( <i>Cervus elaphus</i> )	6	5,26	7	1,63	7	1,37	17	2,03
Roe deer ( <i>Capreolus capreolus</i> )	3	2,63	3	0,70	4	0,78	2	0,24
Cervid	1	0,88						
<b>Total NISP</b>	<b>17</b>	<b>14,91</b>	<b>52</b>	<b>12,09</b>	<b>22</b>	<b>4,30</b>	<b>33</b>	<b>3,94</b>
<b>Micromammals</b>	3	2,63	30	6,98	53	10,35	25	2,98
<b>Total Mammals</b>	<b>20</b>	<b>17,54</b>	<b>82</b>	<b>19,07</b>	<b>75</b>	<b>14,65</b>	<b>58</b>	<b>6,92</b>
<b>Testudines</b>								
Pond tortoise ( <i>Emys cf. orbicularis</i> )			8	1,86	22	4,30	96	11,46
Hermann's tortoise ( <i>Testudo hermanni</i> )			5	1,16	12	2,34	27	3,22
Testudines	2	1,75	10	2,33	17	3,32	61	7,28
<b>Total Testudines</b>	<b>2</b>	<b>1,75</b>	<b>23</b>	<b>5,35</b>	<b>51</b>	<b>9,96</b>	<b>184</b>	<b>21,96</b>
<b>Others</b>								
<b>Vertebrate</b>								
Aves	4	3,51	3	0,70			1	0,12
Anphibia/Reptilia			1	0,23				
Pisces			5	1,16	4	0,78	2	0,24
<b>Invertebrate</b>								
Echinoidea (sea-urchin)			2	0,47				
<b>Total Others</b>	<b>3</b>	<b>2,63</b>	<b>11</b>	<b>2,56</b>	<b>4</b>	<b>0,78</b>	<b>3</b>	<b>0,36</b>
<b>Mollusca</b>								
<i>Columbella rustica</i>	3	2,63			2	0,39		
<i>Monodonta</i> sp.			19	4,42	8	1,56	19	2,27
<i>Patella</i> sp.	10	8,77	77	17,91	126	24,61	151	18,02
<i>Glycymeris</i> sp.							1	0,12
Terrestrial Gastropoda	5	4,39	79	18,37	127	24,80	277	33,05
<b>Total Mollusca</b>	<b>18</b>	<b>15,79</b>	<b>175</b>	<b>40,70</b>	<b>263</b>	<b>51,37</b>	<b>448</b>	<b>53,46</b>
<b>Total Identified</b>	<b>43</b>	<b>37,72</b>	<b>291</b>	<b>67,67</b>	<b>393</b>	<b>76,76</b>	<b>693</b>	<b>82,70</b>
<b>Unidentified</b>								
Large mammal - cranial			2	0,47	2	0,39	1	0,12
Large mammal - axial			2	0,47			3	0,36
Large mammal - appendicular	1	0,88	3	0,70	4	0,78	7	0,84
Medium mammal - cranial			1	0,23	1	0,20	2	0,24
Medium mammal - axial	1	0,88	25	5,81	2	0,39	15	1,79
Medium mammal - appendicular			24	5,58	9	1,76	13	1,55
Unidentifiable	69	60,53	82	19,07	101	19,73	104	12,41
<b>Total Unidentified</b>	<b>71</b>	<b>62,28</b>	<b>139</b>	<b>32,33</b>	<b>119</b>	<b>23,24</b>	<b>145</b>	<b>17,30</b>
<b>Total Remains</b>	<b>114</b>	<b>100,00</b>	<b>430</b>	<b>100,00</b>	<b>512</b>	<b>100,00</b>	<b>838</b>	<b>100,00</b>

**Tab. 3** - Grotta del Santuario della Madonna - Number of identified animal remains and minimum number of individuals grouped by structure. / Numero di resti animali determinati e numero minimo di individui raggruppati per struttura.

TAXA	STRUCTURES IN US 582			US 637			USS 641-652			US 657		
	NISP	%	MNI	NISP	%	MNI	NISP	%	MNI	NISP	%	MNI
Wolf ( <i>Canis lupus</i> )				1	0,40	1						
Badger ( <i>Meles meles</i> )				21	8,40	1				1	0,15	1
Carnivore				2	0,80		2	0,60	1			
Wild boar ( <i>Sus scrofa</i> )	7	18,92	3	18	7,20	2	9	2,68	2	13	1,95	2
Red deer ( <i>Cervus elaphus</i> )	6	16,22	1	7	2,80	1	7	2,08	2	17	2,56	1
Roe deer ( <i>Capreolus capreolus</i> )	3	8,11	1	3	1,20	1	4	1,19	1	2	0,30	1
Cervid	1	2,70										
<b>Total Mammals</b>	<b>17</b>	<b>45,95</b>	<b>5</b>	<b>52</b>	<b>20,80</b>	<b>6</b>	<b>22</b>	<b>6,55</b>	<b>6</b>	<b>33</b>	<b>4,96</b>	<b>5</b>
Pond tortoise ( <i>Emys cf. orbicularis</i> )				8	3,20	2	22	6,55	4	96	14,44	7
Hermann's tortoise ( <i>Testudo hermanni</i> )				5	2,00	1	12	3,57	4	27	4,06	3
Testudines	2	5,41	1	10	4,00		17	5,06		61	9,17	
<b>Total Testudines</b>	<b>2</b>	<b>5,41</b>	<b>1</b>	<b>23</b>	<b>9,20</b>	<b>3</b>	<b>51</b>	<b>15,18</b>	<b>8</b>	<b>184</b>	<b>27,67</b>	<b>10</b>
<i>Columbella rustica</i>	3	8,11	3				2	0,60	2			
<i>Monodonta</i> sp.				19	7,60	12	8	2,38	8	19	2,86	10
<i>Patella</i> sp.	10	27,03	6	77	30,80	55	126	37,50	70	151	22,71	90
<i>Glycymeris</i> sp.										1	0,15	1
Terrestrial Gastropoda	5	13,51	2	79	31,60	7	127	37,80	15	277	41,65	27
<b>Total Mollusca</b>	<b>18</b>	<b>48,65</b>	<b>8,00</b>	<b>175</b>	<b>70,00</b>	<b>74</b>	<b>263</b>	<b>78,27</b>	<b>95</b>	<b>448</b>	<b>67,37</b>	<b>128</b>
<b>Totale Remains</b>	<b>37</b>	<b>100</b>	<b>14</b>	<b>250</b>	<b>100,00</b>		<b>336</b>	<b>100,00</b>		<b>665</b>	<b>100,00</b>	

A rib fragment belonging to a medium sized animal shows a pointed and rounded end.

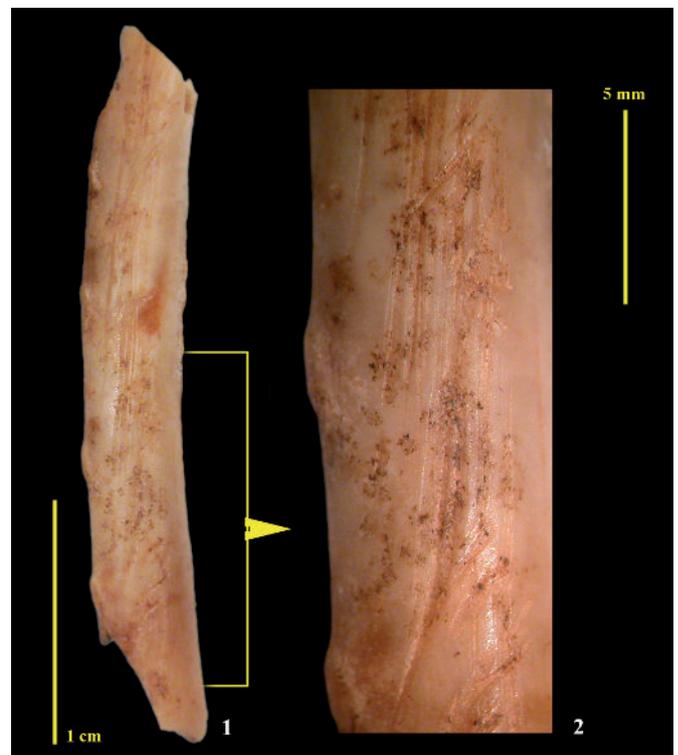
Three pierced shells of rustic dove snails (*Columbella rustica*) have been recovered. One of them, particularly well preserved, allows to observe the working traces produced for making the hole, initially by pressure followed by widening, and to detect use wear traces on part of the edge (Fig. 4, 5, a, b). The other two rustic dove shells appear fragile, whitish and with pulverulent surface; such deterioration may have been due to exposition to a heat source. The holes were found on the largest coil and have a quadrangular shape.

Such artifacts are often considered as ornaments, for jewels or for decorating clothes, but it is also possible that they had a more utilitarian purpose, for example as buttons.

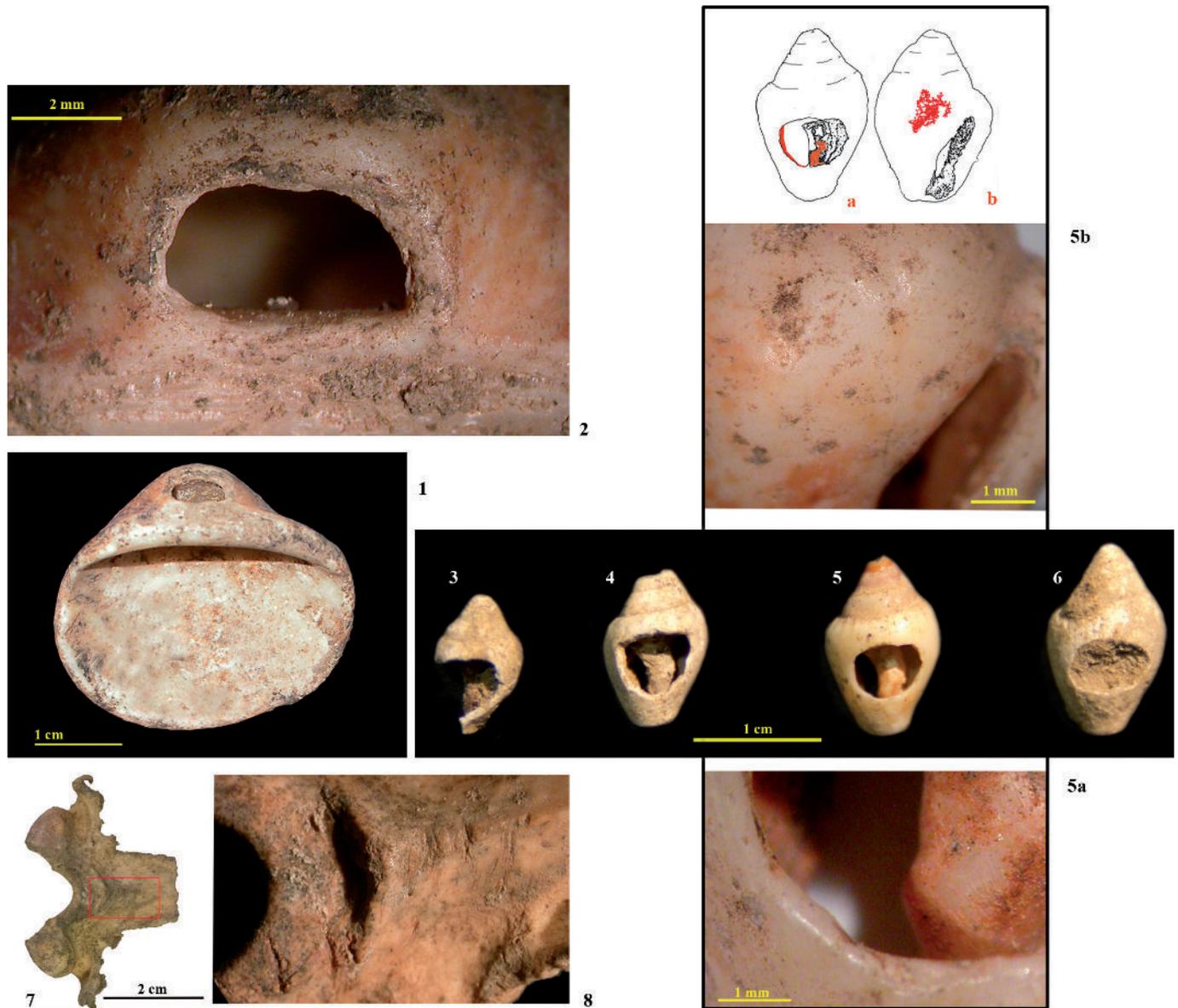
#### Pit SU 638

Particularly distinctive is the pit (SU 638; L 58 cm; W 56 cm, D 7/9 cm) excavated in the palaeosurface SU 628, this unit has been investigated for 3,5 m<sup>2</sup>ca. (depth 4/6 cm) (Fig. 5). Such pit has initially an oval shape that becomes more round towards its base. The filling (SU 637R) is made of silty sediment with abundant medium-small stones and contains abundant faunal remains and lithic industry. The excavation was carried out by artificial cuts and particularly significant is the content of cut III/IV, corresponding to the first depositional level, where there seems to be a selection of faunal elements. In fact, in addition to remains of red deer and wild boar, there are a wolf mandible, a complete distal posterior limb of a badger, and several shells of limpets and top snails (Tabs 1-3).

SU 637 TGI: 8135 ± 45 BP (uncalibrated 14C date); 7200-7040 and 7310-7210 BC (Calibrated using the OxCal model).



**Fig. 3** - Grotta del Santuario della Madonna – 1, dove ulna with scrape marks on the dorsal face; 2, detail of the striae. / 1, ulna di colomba con tracce da raschiamento sulla faccia dorsale; 2, dettaglio delle striae.



**Fig. 4** - Grotta del Santuario della Madonna – 1, Pierced *Glycimeris* sp. shell; 2, detail of the hole; 3-6, pierced shells of rustic dove snails; 5 a-b, detail of use-wear traces on shell n. 5, a (red) localization of use-wear traces on the hole and detail, b (red) rounding and polishing due to use on the back of the shell and detail; 7, fragment of badger skull with cut marks; 8, detail of cut marks. / 1, *Glycimeris* sp. forata; 2, dettaglio del foro; 3-6, conchiglie forate di columbella; 5 a - b, dettaglio delle tracce di usura sulla conchiglia n. 5, a (rosso) localizzazione delle tracce d'usura nel foro e ingrandimento al microscopio, b (rosso) localizzazione delle tracce di arrotondamenti dovute all'uso nella parte posteriore della conchiglia e ingrandimento al microscopio; 7, frammento di cranio di tasso con tracce di macellazione; 8, dettaglio dei tagli di macellazione.

#### Lithic assemblage from pit SU 638

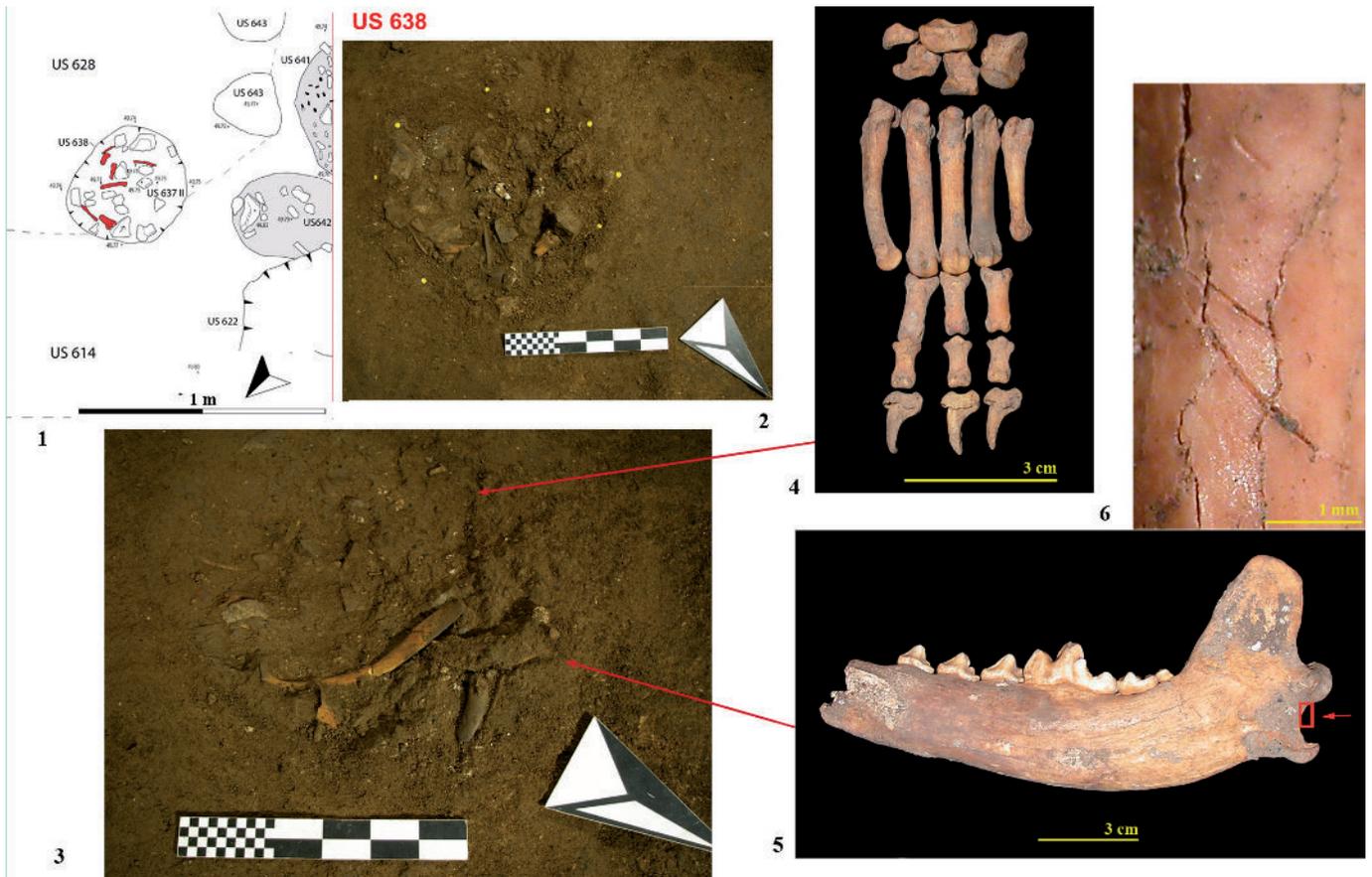
The filling (SU 637) of the pit SU 638 yielded scanty lithic material (41 items) for the most part consisting of some unretouched coarse flakes and debris. Among the formal tools there are a multiple burin on flake, a truncation on irregular blade, four scrapers and a notch, all made on broad and asymmetric flakes. Two residual cores (flint) and a flake core made on a little radiolarite pebble are also present.

The raw material and the techno-typological features of the lithic assemblage from pit SU 638 are comparable with those of SU 582 and do not show any peculiar feature that would suggest a selection in the lithic material deposition.

#### Fauna

Over 430 specimens have been collected (Tabs. 1-3). Twenty-eight remains belong to ungulates, mainly wild boar (NISP 18); red deer is scarcer (NISP 7) and roe deer is rare (NISP 3). There are remains of an adult wild boar (fused distal metatarsal), of a young-adult one with an age of 12-18 months (maxilla with M1, unfused vertebral discs, and unfused acetabulum) as well as of a single adult individual each for red and roe deer.

The wild boar is represented by two remains of maxilla and mandible, 8 fragments of ribs and vertebrae, 2 pelvis portions, two fragments of ulna, one of fibula and 4 belonging to distal limb bones.



**Fig. 5** - Grotta del Santuario della Madonna – 1-3, pit SU 638; 4, left posterior distal limb of badger; 5, right hemi-mandible of an adult-senile wolf; 6, detail of the cuts on the hemi-mandible, referable to its disarticulation from the cranium. / 1-3, fossa US 638; 4, zampa posteriore sinistra di tasso; 5, emimandibola destra di lupo adulto senile; 6 dettaglio dei tagli sull'emimandibola riferibili a disarticolazione dal cranio.

The elements are referable to both the right and left side of the animal and among the wild boar sized unidentifiable remains there are frequent fragments of long bone diaphyses and of trunk elements. Red deer is present with rare remains of maxilla with peeling traces, fragments of distal limb bones and some ribs, one of them complete. Roe deer is documented only by a distal metacarpal, a pelvis and an antler fragment.

Many specimens display localized burning traces. Butchering marks are represented by artificial cuts and impacts, several fragments display the distinctive traces of green bone fracture, and peeling traces, while gnaw marks have been detected on the roe deer pelvis.

Furthermore, in pit SU 638 there are also the remains of two carnivores: the wolf, with a complete right mandible, and the badger, with a whole left posterior distal limb. Two other remains of indeterminate medium-small sized carnivore, a caudal vertebra and a fragment of third phalanx, have been recovered close to the edge of the pit.

Birds are represented by 3 undetermined fragments. An ulna diaphysis of a large sized bird shows a longitudinal stone tool cut mark, a clear distal fracture and a triangular pointed end. Such features may be interpreted as related to the procurement of raw material rather than to simple butchery.

Furthermore, in pit SU 638 there are large portions of carapace and plastron of both pond and terrestrial tortoises, referable to at least 3 individuals.

Shells of limpets are abundant (MNI 55), while top snails (MNI 12) and terrestrial gastropods (MNI 7) are more rare. A *Monodonta* specimen presents dark marks located on one half of the shell; unfortunately the fragment is fractured just in the part with the traces.

On one side of the fracture some longitudinal lines are preserved; these intersect each other forming a grid; on the other side only few oblique lines are preserved (Fig. 6). Specific analyses are in progress in order to define the nature of the traces identified on this specimen.

Some limpet shells display lateral removals on the edge produced during the gathering activity. The presence of three shells showing clear-cut fracture edges and rectilinear outline should also be emphasized; such modifications could have been produced by the use of these shells as side or end scrapers; future researches will help to clarify this aspect.

It is also worth mentioning the presence of fish and sea urchin remains.

#### Wolf

The right hemi-mandible belonged to an adult-senile wolf (*Canis lupus*), probably a male individual considering the large size (Fig. 5, nn. 5-6). The surfaces of the specimen are covered by concretion and show longitudinal cracking suggesting a long exposure to weathering agents before burial. The element is almost complete and preserves the whole ascending ramus while in the mandibular branch only the anterior symphysis is missing, damaged in ancient times. The P2-M3 dental series is preserved, but the distal portion of the last tooth is broken. The P1 is absent, but its alveolus is completely preserved, while the alveolus of the canine is incomplete and filled with sediments and concretions. Therefore, it is not possible to exclude that the symphysis was intentionally fractured in the past just to extract the canine, that is actually absent. The element, considering the general dimensions, shows a body of the mandible that is particularly robust and massive, especially for its thickness.

Some measurements of the specimen are reported (in mm). Between parentheses the numbering system used by von den Driech (1976).

Height of the mandible behind M1 (19): h 30.22 - Thickness of the mandible behind M1: 15.30;

M1: L 28.71 - B 10.9;

Length of the premolar row P1-P4, measured along the alveoli (11): L 49.43;

Length of the molar row M1-M3, measured along the alveoli (10): L 44.30;

Length of the cheek- tooth row P1-M3, measured along the alveoli (8): L 92.80;

Height of the vertical ramus (18): 65.8;

Length from the condyle process to the aboral border of the canine alveolus (4) 148.52;

Length from the indentation between the condyle process and the angular process to the aboral border of the canine alveolus (5): 132.26.

From a comparison of this mandible with others referable to the Evolved and Final Epigravettian of South-Central Italy, the specimen resulted to be similar in size to one from the "Terre Brune" of Grotta Romanelli (Lecce) and smaller than the two from Palidoro (Rome). The length of the lower M1 falls within the average range of modern boreal wolf. The most evident traces of human handling are those referred to the fracturing for the extraction of the canine and to the stone tool cut marks located on the lateral face below the condyle, referable to the disarticulation of the mandible from the cranium. A light burning trace affects the anterior portion of the mandible, from the alveolus of the canine to M1 on both faces.

*Badger*

The left posterior distal limb of the badger (*Meles meles*) includes 21 remains of metatarsals, phalanges, and sesamoids and was recovered in anatomical connection (Fig. 5, n. 4). It is almost complete, cut at the level of the distal tibia, and preserves the two rows of the tarsals and the metatarsals, while some phalanges are absent. There are no evident traces of human modifications with the exception of a light combustion and slight wear affecting the proximal metatarsals. The completeness of the limb end and the way it

was recovered suggest the intentional deposition of the paw still with part of the soft tissues and the pelt. The badger is a plantigrade, and the limbs are long, large and with long and robust claws used for digging and defense. The anterior portion is covered by a blackish fur, while the plantar side is hairless and shows a large central pad, corresponding to the metatarsals, and five smaller ones of the digits. The paw recovered had a size of about 6 -7 cm. It probably represented an ornament or an amulet rather than the residue of a pelt since sometimes the paws remain attached to it. This hypothesis is supported both by the combustion traces localized on the proximal metatarsals and by the wear detected on the same elements. Such modification may indicate the will to clean and preserve the object (combustion) and its persistent manipulation (wear) that affected mainly the part of the bones that were not covered anymore by the skin, once the paw was severed from the rest of the limb.

*Hard animal tissue artifacts*

A medium ungulate shaft fragment displays at one end micro-retouches produced by use and a series of notches in the medullary portion related to bone tool manufacturing (Fig. 7). It presents use wear traces both at its end and on one edge. A roe deer antler tine portion shows some rounding traces at the end, but it is not sure if these are related to actual use by humans or to natural causes.

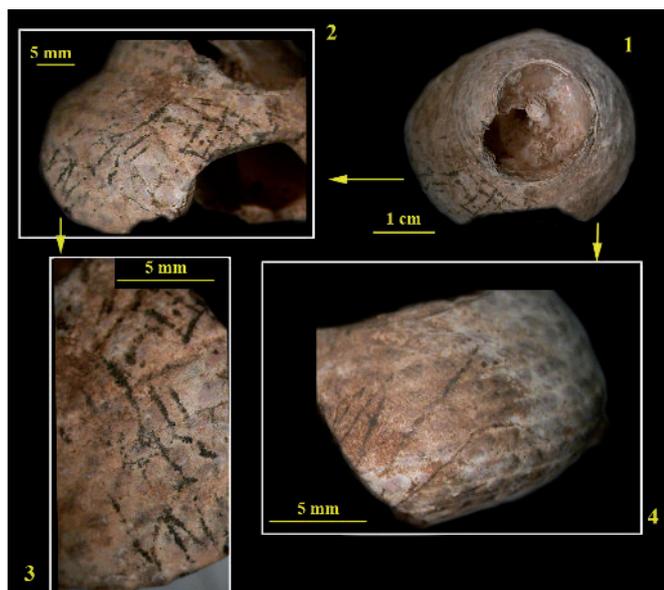


Fig. 6 - Grotta del Santuario della Madonna – 1, fragment of *Monodonta* shell with dark marks; 2-4, details of the dark marks. / 1, frammento di *Monodonta* sp. con linee di colore scuro; 2-4, dettaglio delle linee.

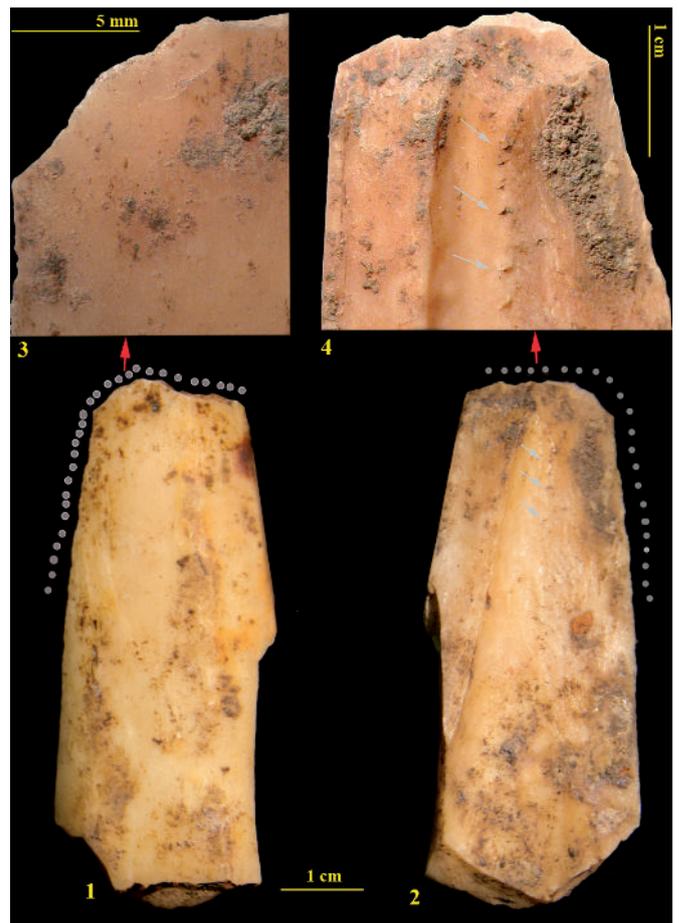
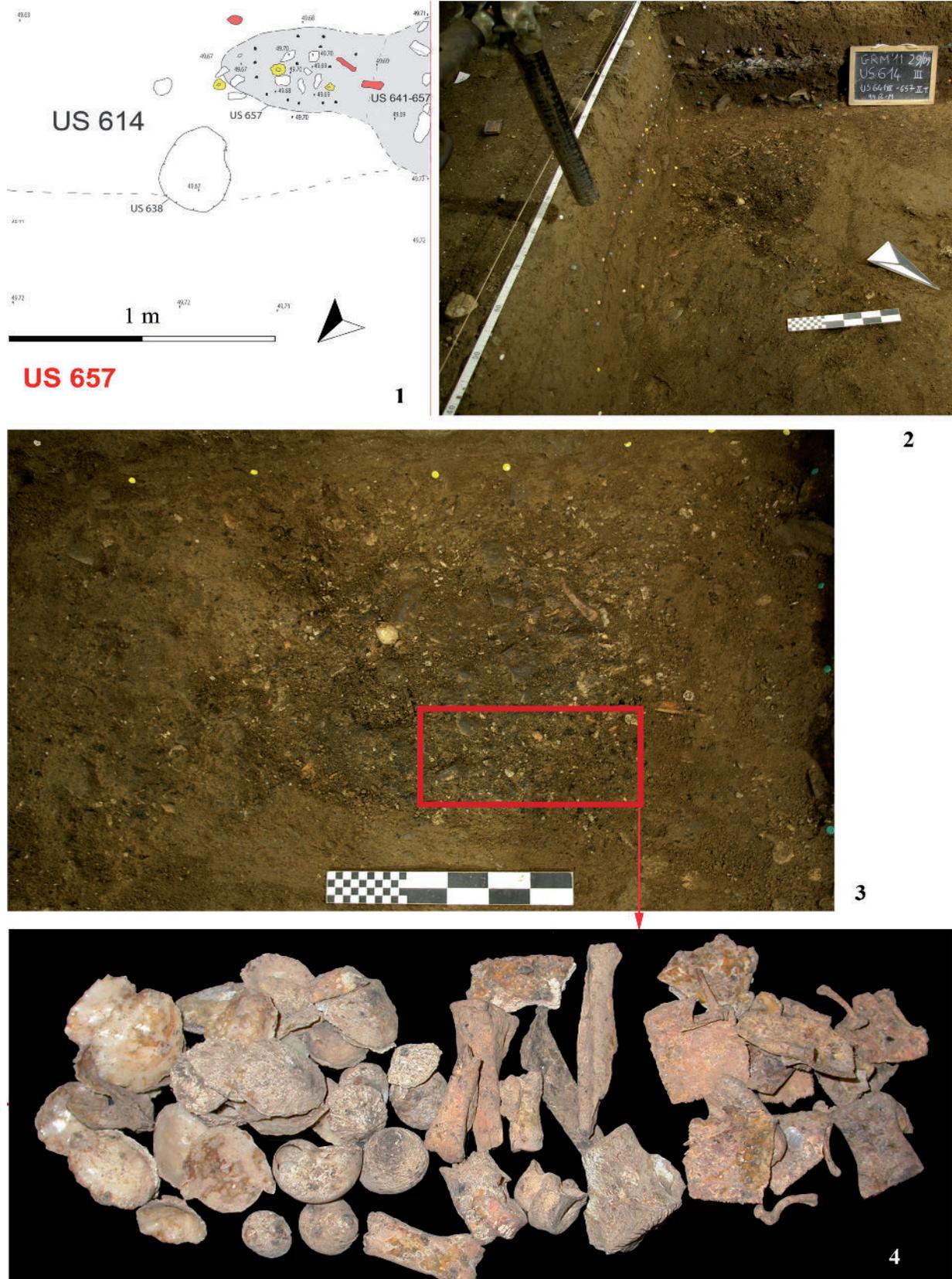


Fig. 7 - Grotta del Santuario della Madonna – 1-2, shaft fragment with micro-retouches at one end and a series of notches on the medullary face. Use wear traces are present both at its end and on one edge; 3, detail of use-wear traces; 4, detail of notches. / 1-2, frammento di diafisi con microritocchi su un'estremità e una serie di tacche nella porzione midollare, presenta tracce di uso su un'estremità e su uno dei margini; 3, dettaglio delle tracce d'uso 4, dettaglio delle tacche.



**Fig. 8** - Grotta del Santuario della Madonna – 1-3, Shell midden SU 657; 4, high concentration of terrestrial gastropod fragments and limpet shells, abundant remains of tortoises, rare remains of ungulates. The bones from the area marked with red rectangle. / 1-3, Chiocciolaio US 657; 4, alta concentrazione di gasteropodi terrestri e patelle, abbondanti resti di tartaruga, rari resti di ungulati. Resti ossei provenienti dall'area del rettangolo rosso.

For the uniqueness of the species identified and of the anatomical elements (in particular the association between the wolf hemi-mandible and the badger paw that is unknown in other Mesolithic structures) the remains recovered at the base of the pit may represent an intentional deposition for a specific purpose and not just discarded food debris.

#### Structure SUs 641-642-657

In the occupation level SU 614, excavated 9 m<sup>2</sup> ca - depth 15-18 cm (IV cuts), there is a wide combustion area (SUs 641-642-657), identified on the basis of the characteristics of the sediment and the concentration of materials. The hearth is represented by SU 641 made of two layers of medium-small stones, containing granular sediment, produced by exposure to fire, as well as numerous small charcoal fragments and burnt bones. Adjacent to the hearth there is an area (SU 642) of brown-reddish granular clay, with small and medium stones, rich in charcoal, fauna (in particular large portions of tortoise carapace and plastron, some of them in anatomical connection, and limpets), and lithic industry. Unfortunately both the hearth and its adjacent area continue under the trench wall, outside the excavated area, and therefore it was not possible to investigate them completely. SU 643 and SU 652 are sub-units that have been associated to SUs 641-642 (L 200 cm, W 57 cm, D 6/8 cm). In the portion of the deposit that was possible to observe, there is an area around the hearth (SU 657, L 68 cm, W 40 cm, D 6/8 cm), made of clayey-carbonaceous sediment, that is rich in charcoal, and has a concentration of food debris in particular malacofauna (terrestrial and marine) as well as large portions of tortoise carapace and plastron, with rare mammal bones and some burned stones in the center.

SU 657 TGI-II 9076 ± 45 BP (uncalibrated 14C date); 8350-8220 BC (Calibrated using the OxCal model). SU 657 TGIII 8878 ± 45 (uncalibrated 14C date); 8230-7910 BC (Calibrated using the OxCal model)

#### Lithic assemblage from structure SU 641-642-657

A total of forty lithic items comes from this combustion area. Debris and unretouched flakes are prevalent, only seven formal tools (a burin, 3 denticulates, 2 splintered pieces and an undeterminable retouched fragment) and one residual core were found. In this structure the lithic assemblage shows the same techno-typological features of the other SUs and there is no peculiarity which may suggest a specific selection of the artifacts.

#### Fauna

The different stratigraphic units forming the combustion structure have been analyzed separately (Tabs 1-4), but, considering both the proximity of the different areas and the low number of specimens in

each unit, they have been combined in order to allow general considerations. The three different areas that form the combustion structure seem to be characterized by the presence of different animal species.

SU 641: 155 faunal remains have been recovered: almost exclusively tortoises, both pond and terrestrial ones, with localized combustion traces. The remains are referred to only 3 individuals: one terrestrial and two pond tortoises. There are numerous fragments of terrestrial gastropods, that are difficult to correlate to a precise MNI because of the high fragmentation, and rare limpet shells corresponding to about ten individuals. Wild boar (NISP 4) and red deer (NISP 1) remains are extremely rare and distal limb elements are almost exclusively present, although among the unidentifiable remains there are rare fragments of long bone diaphyses. Fishes are represented by 4 elements.

SU 642: 292 faunal remains have been recovered: abundant remains of malacofauna (NISP 167), mainly limpets (NISP 106), less frequent top snails (NISP 6) and terrestrial gastropods (NISP 53). There are rare remains of red and roe deer, wild boar and tortoise; an element belonging to a small indeterminate carnivore is also present.

The two SUs 643 and 652 are characterized by the presence of rare faunal remains (Tab. 1).

On the whole the hearth yielded 512 faunal remains, over half of them are mollusks (Tab. 2), the remains of ungulates are rare (20 specimens) representing 2 wild boars (a juvenile and an adult male), 2 adult red deer and one adult roe deer. Carnivores are represented by a caudal vertebra and a fragment of 3<sup>rd</sup> phalanx. The unidentifiable specimens include small undeterminable flakes, some of them burnt. The tortoises are represented by 8 individuals (4 pond and 4 terrestrial tortoises); mollusks include at least 95 individuals: limpets are very abundant with 70 individuals, while top snails and terrestrial gastropods are less frequent. The two rustic dove snail shells are pierced.

SU 657: there is a high concentration of terrestrial gastropod fragments (NISP 277), so much fragmented that the estimate of the minimum number of individuals is 27; numerous limpet shells, corresponding to 151 fragments for a total of 90 individuals, and more rare top snails, with 19 fragments belonging to 10 individuals, were also recovered. Abundant remains of tortoises (NISP 181), frequently with clear cooking traces, have been identified. The pond tortoise prevails with 96 fragments corresponding to 7 individuals, many of them in large portions with the limb long bones still articulated; the terrestrial tortoise is more rare with 27 fragments and 3 individuals.

There are rare remains of ungulates (NISP 33). This is the only structure where the red deer remains (NISP 17) identified are prevalent over wild boar ones (NISP 13), however, if we consider the individuals, wild boar is represented by two animals (a juvenile and an adult) while red and roe deer only by a single adult each. Wild boar is represented only by distal limb bones (especially metapodials and phalanges). Among the red deer specimens distal limb bones are prevalent as well, but also the other limb elements are present. Roe

**Tab. 4** - Grotta del Santuario della Madonna - Number of animal remains and minimum number of individuals grouped by classes and structure. / Numero di resti animali e numero minimo di individui raggruppati in classi e per struttura.

TAXA	US 582		US 637		USS 641-652		US 657	
	NISP	MNI	NISP	MNI	NISP	MNI	NISP	MNI
<b>Total Mammals</b>	17	5	52	6	22	6	33	5
<b>Total Testudines</b>	2	1	23	3	51	8	184	10
<b>Total Mollusca</b>	18	8	175	74	263	95	448	128
<b>Total Remains</b>	37	14	250	83	336	109	665	143
<b>TAXA %</b>	%	%	%	%	%	%	%	%
<b>Total Mammals</b>	45,9	35,7	20,8	7,2	6,5	5,5	5,0	3,5
<b>Total Testudines</b>	5,4	7,1	9,2	3,6	15,2	7,3	27,7	7,0
<b>Total Mollusca</b>	48,6	57,1	70,0	89,2	78,3	87,2	67,4	89,5

deer is present with a metatarsal portion and a phalanx fragment. Some elements with butchering marks (striae and impact), mainly red deer specimens, rare percussion cones and frequent fragments with localized combustion traces have also been identified.

Furthermore, there is a fragment of badger skull with cut marks (Fig. 4, n. 7-8).

Among the unidentifiable mammal bones those of medium sized animals are prevalent, while fragments belonging to larger sized mammals are more rare. Small indeterminable flakes are frequent, most of them burnt. Fish and bird remains are extremely rare.

#### Hard animal tissue artifacts

There are a distal end of a very thin awl on an indeterminate long bone shaft and another awl made on a metatarsal shaft of roe deer with only the point modified. There are also two pierced shells: one of rustic dove snail (SU 642) and one of *Glycymeris* (SU 657, Fig. 4, n. 1-2).

On the whole the combustion structure appears as a true and typical Mesolithic shell midden, a place with accumulation, around a hearth, of food debris mainly related to gathering (terrestrial and marine mollusks, tortoises) rather than hunting activities (not whole animals were consumed, but among the ungulate remains metatarsals and phalanges are prevalent: portions with low content of edible parts). Unfortunately only a small portion of the area could be investigated, therefore it is not possible to establish for sure if the remains represent the residues of several occupations by a small group of people or of a single "banquet". However, considering the number of tortoises recovered, at least 17, within an area that represents only a small portion of the shell midden, it is more likely that this is the resulting from several repeated occupations of the same place.

## Discussion

The faunal remains from the different structures include a total of 1894 specimens; for about 73% of them it was possible to define genus and species. This very high number of identified specimens is due to the abundance of mollusks, some of them extremely fragmented (Tab. 1).

The structures are characterized by the presence of a different quantity of faunal remains varying from 114 (6%) in SUs 582 to 838 (44% ca.) in SU 657 (Tabs. 1-4, Fig. 9) Furthermore, among the structures it is possible to detect differences in the animal species composition as well as in their quantitative ratios.

Medium-large sized mammals are represented by 124 specimens; there are rare remains of carnivores (wolf and badger) and more frequent wild ungulates among which wild boar is prevalent with 47 remains, followed by red deer with 37 and, less abundant, roe deer with 12 specimens. The MNI estimate confirms the data obtained from the number of remains: wild boar is always prevalent with at least 9 individuals followed by red and roe deer with, respectively, 5 and 4 individuals (Tab. 1). The age estimate was based mainly on the degree of epiphysis fusion in long bones, because teeth were very rare. Wild boars are represented mainly by young/young-adult individuals (MNI 5), among which a 12-18 months old one, documented by a maxilla, provides also an indication of the season of capture: between the end of the spring and the beginning of autumn. Adults, with an age over 3-4 years, are less represented (MNI 4); among them at least one male individual was identified, besides a fragment of lower canine, also on the basis of the large size of some distal metapodials. Red deer remains belong mainly to adults, as indicated by the degree of fusion of metapodials and phalanges. However, there is at least one young-adult individual, less than 3 years old, as indicated by a fragment of proximal femur that is just fusing. Roe deer is represented only by adult animals; among them there is one 3-5 years old individual identified from a not very worn

upper left M1 (SU 615).

The carnivores, represented by wolf and badger, are present with rare remains referable to adult animals. The association between the wolf mandible and the complete badger paw in structure 637/638 represents an *unicum* in the scenario of the Italian Mesolithic. Furthermore, in this pit the remains have been found arranged in a coherent and not chaotic way as it would be in a simple dump of food residues; this is supported also by the position of the metapodials and the ribs of the ungulates. It is therefore possible to hypothesize an intentional deposition of selected remains of carnivores and ungulates that were considered of particular interest.

The badger is present also in the shell midden (SU 657), with a posterior portion of the skull with stone tool cut marks referable to butchery. Other incomplete fragments, from SUs 641-642, are referred to a medium sized indeterminate carnivore (Tabs 1-3).

The indeterminate remains that allowed at least an attribution to animal size and anatomical portion are 118 and are mainly referable to medium sized mammals (wild boar and red deer). The unidentifiable items are 474 and include mainly long bone shaft fragments, some of which are burnt.

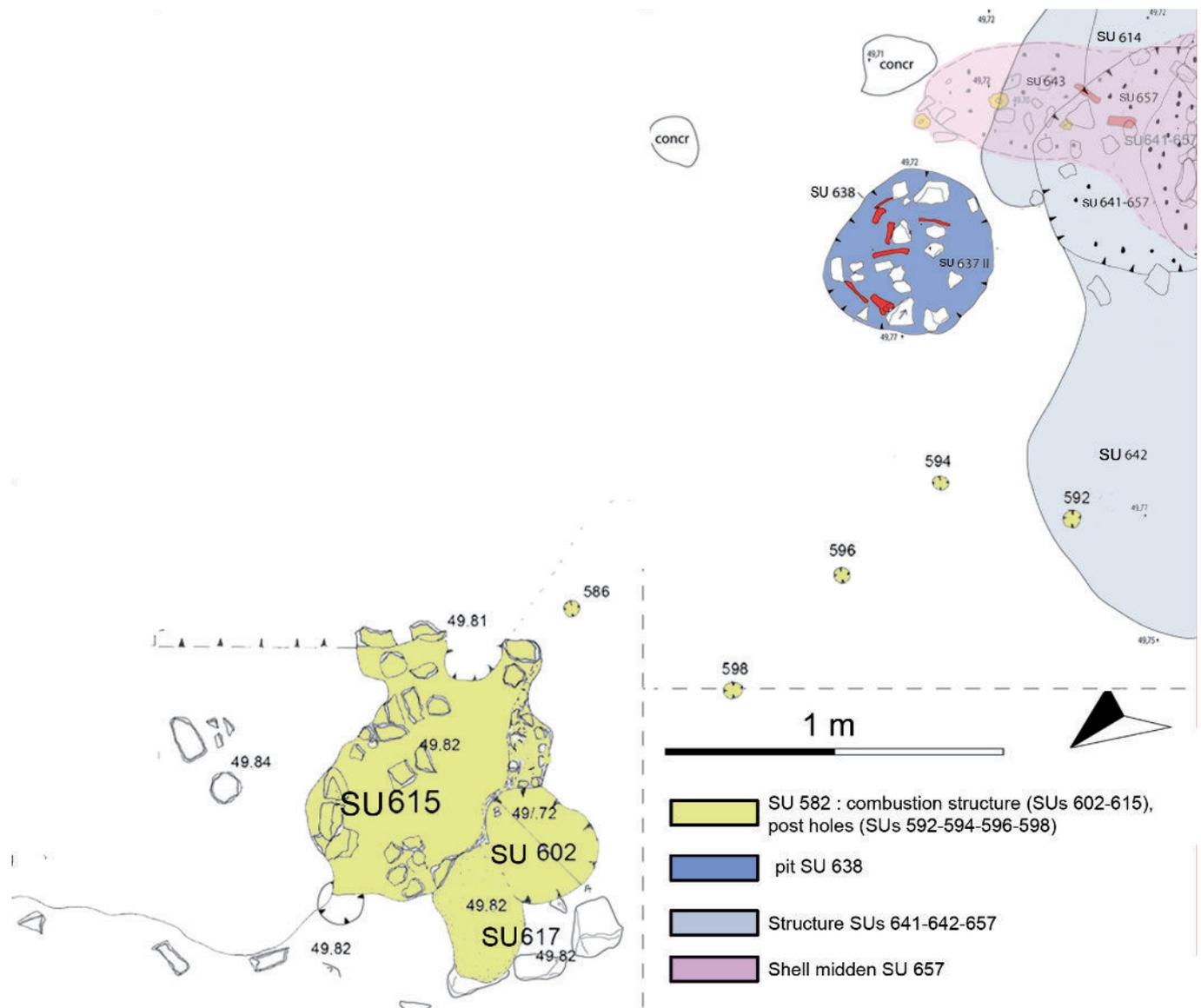
Although the investigated structures yielded relatively few mammal remains, the species identified and their ratios reflect more or less the faunal data from the Mesolithic levels of the excavations by L. Cardini (Cardini 1972, Fiore *et al.* 2004). In fact there are the three most hunted ungulate species (wild boar, red deer, roe deer). However, it is noteworthy - in the faunal association from the structures - the complete absence of bovids (aurochs, ibex and chamois) that are instead present, although with rare specimens, in the area excavated by Cardini. Finally it is possible to note also a decrease in the number of carnivore species in these contexts; in fact both wild cat and other mustelids are absent.

The presence of abundant micromammals, still under investigation, may evidence the existence of raptor roosts along the walls of the cave. However, no raptor remains have been identified in the fauna from the structures. Nevertheless, the presence of raptorial birds is intensely documented in the Mesolithic layers of the excavations by Cardini. In fact the remains of at least 6 species of diurnal raptors (Accipitriformes and Falconiformes) have been identified; some of these, such as the Northern goshawk (*Accipiter gentilis*) and the Common buzzard (*Buteo buteo*) frequent rock walls, cliffs and cavities (Gala *et al.* in this volume).

Rare bird remains have been recognized; these include a medium sized Columbiformes, *Columba livia/oenas* that, even now, is present in the cave with numerous individuals; the common raven (*Corvus cf. corax*) a largest Corvidae (between 55 and 70 cm long and with a wingspan that may almost reach 1.30 m) living in coastal areas with cliffs where it nests; a small sized Passeriformes of the Hirundinidae family, the crag martin (*Ptyonoprogne rupestris*), that builds its nest in rocky cliffs, in caves or under an overhanging rock. These remains, being of birds frequenting caves or cliffs, may therefore belong to birds that died of natural causes. However, both the dove ulna and the raven radius display anthropic traces that, rather than being produced during butchery or for meat consumption, may instead be interpreted as evidence for the exploitation of the bone as raw material or be related to the procurement of feathers.

The Testudinata are present with two species *Emys cf. E. orbicularis* (aquatic) and *Testudo hermanni* (terrestrial). For the presence in Sicily of the species *Emys trinacris* (Fritz *et al.* 2005), as regards the specific attribution of *E. orbicularis*, we preferred to use the name *E. cf. E. orbicularis*, although it is unlikely that in the sample analyzed there are remains belonging to the endemic Sicilian species (Pino Uria, Tagliacozzo 2008). A total of 260 remains has been identified; these include mainly fragments of carapace and plastron, but also limb long bones. Large portions of plastron with combustion traces have been recovered.

Notwithstanding the proximity to the coast, fish remains are rare and very rare are the amphibian specimens.



**Fig. 9** - Grotta del Santuario della Madonna – Plan of the structures identified on the investigated area. Stratigraphic relationships are not respected (from the bottom SU 657, SUs 641-642-657, SU 637/638, SU 582 level with SUs 602-615 and post holes). / Planimetria delle strutture identificate sull'area indagata. I rapporti stratigrafici non sono rispettati (dal basso US 657, USs 641-642-657, US 637, livello US 582 con USs 602-615 e buche di palo).

Complete or fragmented mollusk shells represent 47% (NISP 904) of the faunal assemblage; such specimens are still being analyzed, but preliminary results will be synthesized here. Terrestrial gastropods are the most abundant mollusks (in particular *Helix* sp.); complete shells are very rare, while fragments, even very small ones, are numerous; this makes the estimate of the MNI very difficult (NISP 488 MNI 40/50?).

Among the marine Gastropods, there are many complete or large portions of shells of *Patella* sp. (NISP 364 - MNI 221?). These are referable mainly to *P. caerulea* and *P. aspera* and their dimensions are medium-small. Many shells display an edge with old fractures probably produced when a tool was used as a lever for removing the shell from the rocks during gathering. Other rare specimens show also rounded and possibly worn edges and it is not possible to exclude that some of them may have been used as tools. The shells of top snail *Phorcus turbinatus* (*Osilinus turbinatus* = *Monodonta turbinata*) are less frequent. Specimens with a broken top have been recovered; such fractures are old and probably were produced to extract the mollusk. Rustic dove snail (*Columbella rustica*) shells

are rare, often pierced and used as ornament. Finally there are also some remains of echinoderms: spines of sea urchins.

The different structures reveal peculiarities on the basis of the quantity of remains, the species identified and the ratios among them (Tabs. 2, 3). Mollusks are always prevalent with the exception of the "structures in SU 582" where mammals are slightly more abundant. Mollusks are prevalent in pit SU 637, followed by mammals and rare tortoise fragments. The area of the hearths 642 - 652 and of the shell midden SU 657 are characterized by abundant mollusks and a good percentage of tortoises, while mammals are less represented. Considering the different distribution of the mammal species, carnivores were recovered in the ritual pit US 637/638 and in the shell midden 657 with particularly significant remains of wolf and badger, while in structure 641-652 there are a caudal vertebra and a fragment of 3<sup>rd</sup> phalanx of an indeterminate carnivore. The three ungulates are instead present in all the structures, with wild boar always prevalent with the exception of the shell midden where red deer is just a little bit more abundant.

Neither the number of remains nor the number of individuals are

representative of the importance of the different animals in the diet. In fact, although there are almost 300 mollusks compared to 22 tortoise individuals and 18 ungulates, these latter provide a quantity of meat and food noticeably higher than tortoises and mollusks, without taking into account the other products (hides, tendons, bones) that may be obtained from them. The accumulations of mollusks and tortoises, especially those around the shell midden, seem to represent, in any case, different and repeated short occupations during which most of the food was the resulting from gathering rather than hunting.

## Conclusions

The study of the palaeosurfaces of the Mesolithic frequentation at Grotta del Santuario della Madonna at Praia a Mare evidenced the presence of several combustion structures (simple *cuvettes*, organized hearths with deposition of stones, cooking surfaces). The different structures seem to have played a different role considering the differences in spatial organization as well as and in the quantity of animal remains recovered and the ratios among species. In contrast, it was not possible to detect peculiar features in the structure and composition of the scarce lithic industry associated with them.

The structures in SU 582 (USs 602-603-612 and 615) represent a cooking area with stones reddened by fire, repeatedly used, and probably often cleaned. This hearth area displays higher frequency of mammal bones, although extremely fragmented and of small size, and rare malacofauna. The hearths 641-642 and 657, that show significant presence of tortoises and malacofauna with scarce mammal remains, may represent for the different position and faunal composition, a set of different episodes. But, more probably, they may reflect a real and typical Mesolithic shell midden, produced by several occupations repeated in the same place and with accumulation of food refuses resulting from gathering activities.

Particularly interesting is the pit SU 637/638 that, for the presence of selected bone remains in the basal fill, may indicate a propitiatory or ritual use, before it was filled with other material and food debris.

Overall the investigated area represents a zone of repeated and short frequentations, as suggested by the relatively low number of bone and lithic remains. The presence of distal limb elements suggests that the complete ungulate carcasses were brought back to the cave and the presence of rare percussion cones shows that butchery, disarticulation and marrow extraction activities that occurred close to the cooking areas were reduced. The almost complete absence of cranial remains and loose teeth may indicate that most of the ungulate butchery activities occurred either in another area of the cave or outside it.

Bone tools are rare, often just diaphyseal fragments barely modified and showing clear modifications only on the functional portion. It is not possible to exclude that some limpets had been used as scrapers because some shells display rounded edges that cannot be explained just as modifications produced during shell gathering or related to post depositional phenomena that were not detected on other specimens. Ornaments obtained from shells of *Columbella* and *Glycimeris* are also numerous.

The lithic assemblages from the Mesolithic structures of Grotta della Madonna (see also Tagliacozzo *et al.* this volume) do not show any peculiar feature that would suggest a selection in the deposition of the lithic material. On the whole, they may be referred to the Mesolithic *facies* known as Undifferentiated Epipaleolithic (Martini 1993) documented in some sites of Central and Southern Italy, Sicily and Corsica-Sardinia, between the last quarter of the 10<sup>th</sup> and the last quarter of the 7<sup>th</sup> millennium cal. BC (Lo Vetro & Martini 2016). This *facies* has been interpreted as the likely outcome of techno-typological trends that were already in progress at the end of the final Epigravettian in South-Central Italy. Its lithic production is characterized by: a) an expedient technology, based on local raw material exploitation

using hard direct percussion; b) a high frequency of common tools (mainly notches, denticulates and scrapers), made on unstandardized flakes, roughly retouched; c) a very low amount of microliths (backed tools and geometrics).

In general, as far as the subsistence activity is concerned, the wide range of animal species exploited (ungulates, birds, terrestrial and pond tortoises, fish, marine and land mollusks) documents an excellent knowledge of the territory and of the variety of resources that it may have offered; resources that were systematically exploited by the hunter-gatherers living at Grotta della Madonna.

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