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A NEW EARLY HOLOCENE SETTLEMENT IN CENTRAL ITALY: THE MESOLITHIC SITE OF CONTRADA PACE (MARCHE REGION).

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ABSTRACT: Early Holocene hunter-gatherer settlements are spread throughout Italy and testify to the exploitation of very different landscapes. Nonetheless, their preservation state is not always exceptional. This is not the case for Contrada Pace, an archaeological site recently discovered on a terrace of the Chienti river in central-eastern Italy. This paper reports on the geomorphological, pedo-stratigraphic, and archaeological record of one of the most complete and well-preserved Early Mesolithic open-air sites in Italy and southern Europe. Micro-stratigraphic excavations extended over more than 500 square meters have exposed a buried paleosol with anthropogenic features, which contained thousand lithic artefacts and organic remains framed in the context of a primary forest. These findings appear clustered in different functional areas that yielded multiple structured features. The field evidence integrated by radiocarbon dating and archaeobotanical, archaeomalacological and zooarchaeological data allowed to propose a first interpretation of the general structure of the site and the most significant features.

Keywords: Early Holocene; Mesolithic; open-air sites; river terraces; *escargotières*.

1. INTRODUCTION

Our knowledge of the intra-site spatial organisation of Mesolithic settlements in Italy is still relatively limited. One of the reasons for this is that most sites were explored on limited surfaces and in past decades, when there was little attention to such aspects. Nowadays, it is widely recognised that only the data generated by extensive excavations and analysed with a multidisciplinary approach can allow to catch the details of settlement dynamics and the complexity of the functional organisation of spaces. A confirmation of the high potential of this approach is represented by the numerous open-air contexts that were extensively excavated in the central-northern sectors of Europe. In these sites, it was possible to obtain important information on the settlement organisation and identify different features (Coutard et al., 2010; Kind, 2013; Mordant et al., 2013; Séara & Roncin, 2013; among others). Such contexts are rarer in the southern part of the continent, especially those excavated on relatively large surfaces. Therefore, their contribution is crucial to broaden our knowledge of the complexity of the organisation of Mesolithic spaces and open new perspectives on the functional roles of different locations and sites (cf. Amiel & Lelouvier, 2003; Martinez-Moreno & Mora Torcal, 2011; Boric et al., 2014; Bonsall & Boroneant, 2018).

Regarding the Italian territory, hundreds of Mesolithic sites have been discovered during the past decades, particularly in the Alpine region (Broglio, 1992; Cusinato et al., 2003; Fontana et al., 2011; 2016). These discoveries allowed a fairly consistent perception of the evolution of technical systems, settlement choices and subsistence strategies of Mesolithic groups (Cristiani, 2009; Fontana & Guerreschi, 2009; Wierer et al., 2016; Visentin, 2018; Gazzoni et al., 2021). Nevertheless, only few of them were excavated over surfaces large enough to allow the identification of specific features and were the object of spatial analyses enabling the reconstruction of their internal organisation. In most cases, such evidence attests to isolated and small size habitation units/specialised areas, usually characterised by single hearths either open air or under rock shelters/rock boulders (Bagolini & Dalmeri, 1987; Baroni & Biagi, 1997; Fontana & Vullo, 2000; Kompatscher et al., 2016; Visentin & Fontana, 2016; among others). A few of these sites also show paved areas made with local stones (Broglio, 1972; Fontana & Vullo, 2000). In central-southern Italy, our knowledge of the Mesolithic is more limited as the number of investigated sites decreases drastically, both along the Adriatic and Tyrrhenian sides, as well as in the most internal Apennines regions (Lo Vetro & Martini, 2016). Moreover, almost all this evidence concerns cave and rock-shelter sites which were excavated over limited surfaces. Therefore only very few of these sites have allowed to identify some evidence of spatial organisation of inhabited spaces as it will be further discussed (Tagliacozzo & Piperno, 1993; Bevilacqua, 1994; Mussi et al., 1995; Lubell et al., 1999; Girod, 2011). For this reason, the recent discovery and extensive excavation of a new Early Mesolithic site in the Marche region, in the locality known as Contrada Pace (Tolentino, Macerata), represents a unique opportunity to investigate in detail intra-site settlement dynamics in an open-air context with an exceptional preservation state and richness of the deposit. For the mid-Adriatic region, this site represents the only evidence so far discovered dated to the Early Mesolithic although the poor preservation of the lithic assemblage from Pieve Torina, another site located in the Marche region, does not allow us to exclude an occupation also including an Early Mesolithic (Sauveterrian) phase before the one referred to the Late Mesolithic (Castelnovian) (Martini, 2006).

This paper presents the first overview of the stratigraphic, zooarchaeological, malacological, archaeobotanical and archaeological evidence discovered at Contrada Pace. Although the study stands still at a preliminary stage, data collected during the excavation and the first laboratory analyses already provided support for understanding the spatial structure of the site and some taphonomic and anthropogenic features.

2. GEOMORPHOLOGICAL SETTING

The Chienti River is one of the major rivers of the Adriatic side of Central Italy and, similarly to the other rivers in the Marche Region (Lipparini, 1939; Villa, 1942; Coltorti et al., 1991), it forms a system of fluvial terraces along most of its course. In the distal mid-segment, the Chienti valley is asymmetrical, with the southern side presenting a stepped profile and the northern side characterised by a sequence of Pleistocene terraces at progressive elevations, originating from the interference of tectonic uplift with major cold climatic phases (Coltorti et al., 1991). The Late Pleistocene deposits are thick. The massive central gravelly bodies originated under a braided fluvial pattern during the Last Glacial Maximum when all the Marche rivers were tributaries of the Po River in the Great Adriatic Po Region (Calderoni et al., 1991; Peresani et al., 2021). The terrace of Contrada Pace was attributed to the Late Pleistocene based on characteristics shared with other Marche rivers. It is a thick sedimentary body made of horizontal and massive gravels, sometimes interfingered with sands and silts, related to a broad, aggrading braid-plain extended towards the continental platform of the north Adriatic Sea. Comparably to other terraces, Luvisols evolved on the top of the depositional surface (Cilla et al., 1994, 1996).

The evolution of this river during the Holocene was likely characterised by the modelling of unpaired terraces generated during the progressive downcutting of the valley (Cilla et al., 1996). The oldest phase was characterised by prolonged aggradation of the fluvial plain up to the early-middle Holocene when a substantial decrease of the solid load induced the incision and the evolution of the braid-plain to a meander pattern of clear water rivers. During the following phase, meander terraces evolved with the incision increase, even affecting the bedrock in the piedmont area. A few kilometres to the north, radiometric dating of the Potenza River deposits suggests that the evolution of this system occurred from ca. 8000 up to 4000 Cal BP. This development of the early-mid Holocene terraces is also indicated in other valleys, like the Tronto valley, by the presence of Neolithic settlements (Coltorti & Farabollini, 2008).

3. MATERIALS AND METHODS

Preventive archaeological research uncovered significant Early Mesolithic evidence in a wide area east of Tolentino (Macerata, Marche Region, central Italy) along the Chienti valley (Fig. 1A). A total surface of almost 40,000 m^2 was explored by digging 2 m wide trenches. This allowed to delimit the area of interest to a surface of around 5250 m^2. The first excavated plot was the one denominated Contrada Pace 1 (CP1; Fig. 1C). Here, the top of a buried paleosol (cf. Section 4) was reached under a 1-1.5 meter thick fine alluvial sedimentary cover on a surface of around 920 m^2; subsequently, an extensive excavation took place over a surface of 499 m^2. The excavation was carried out manually. All artefacts and ecofacts larger than 1 cm were individually positioned using a Total Station (13,478 points). Sediment was removed according to a 50x50 cm grid following the stratigraphic approach, with units defined on a lithological base. For the areas with the highest density, all the sediment referable to the Mesolithic surface was collected in plastic bags and stocked at the University of Ferrara. Totally, 1304 plastic bags were filled, corresponding to roughly 19 tons of sediment. The material is currently being processed in the laboratories of the University through floatation and water screening (meshes of 400 µm and 1 mm, respectively) to recover small items and anthracological, carpological, and malacological remains. An extensive sampling strategy led to the collection of numerous undisturbed soil samples for micromorphological analyses and loose soil samples for pollen, phytoliths, and other sedimentological analyses. Malacological remains were collected using the reference grid and stocked in plastic boxes. Faunal remains were characterised by a poor preservation state and were thus consolidated in the field using ACRIL 33 (acrylic resin in aqueous dispersion).

Around 300 meters to the east of CP1, a second terrain plot (Contrada Pace 2 - CP2) was investigated and allowed to confirm the presence of Early Mesolithic evidence over a vast stretch of land parallel to the Chienti river. Considering that construction activities would not have affected the archaeological layer, it was decided not to investigate the site extensively. Archaeological activities were aimed at documenting the stratigraphic sequence and mapping the extension of the site. A small excavation (10 m^2) was carried out in one of the trenches with the highest density. Overall, the evidence brought to light at CP2 by trenches, test pits, and the 10 m^2 excavation indicates the presence of numerous lithic scatters and other significant features such as two *escargotières* (Fig. 1C).

The stratigraphic and chronological (on techno-typological grounds) evidence of the two sites is comparable.

Soil horizons have been described according to the FAO guidelines (2006). The symbology for the soil classification and the definition of the horizons follows the criteria of Soil Taxonomy (Soil Survey Staff, 2010).

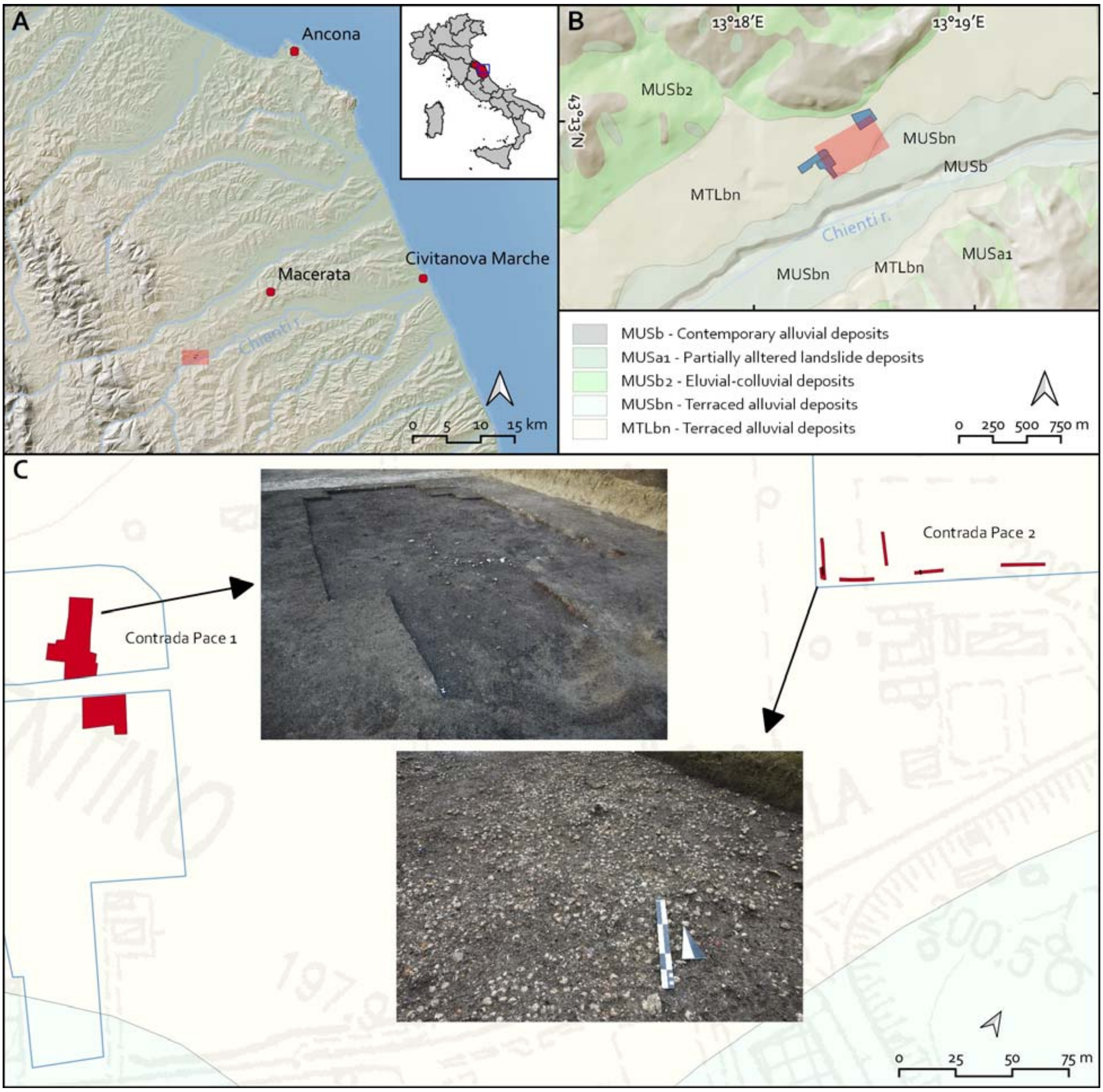

Fig. 1 - Geographical (A) and geological (B) setting of the site and map showing the excavation areas and trenches (in red) that yielded Mesolithic evidence (C). Map Layers downloaded from Geoportale Nazionale (http://www.pcn.minambiente.it/).

Soil classification follows the "World reference base for soil Resources" (IUSS Working Group WRB, 2015). Colours have been determined in the wet state and codified with the Munsell® Soil Colour Charts (2000). Preliminarily, three thin sections have been analysed: MM9 (F3), MM15 (enclosed space), and MM17 (*escargotière*). Thin sections were prepared by the "Laboratorio Servizi per la Geologia" (Piombino, Livorno) according to the method proposed by Murphy (1986). Their analysis has been carried out with a Prior Scientific MP3500A microscope with polarised light at 20, 40, 100, and 400 magnifications. The description follows the criteria adopted by Stoops (2021) while for the interpretation the references are Stoops et al. (2018), Nicosia & Stoops (2017).

Radiocarbon dating was performed on three samples of *Corylus avellana* (SU10, SU11, and SU15) that were sent for AMS radiocarbon dating to the Oxford Radiocarbon Accelerator Unit (ORAU) of the University of Oxford. The calibration of 14C dates was performed using OxCal v4.4.4 (Bronk Ramsey, 2021) and the Intcal20 calibration curve (Reimer et al., 2020).

Regarding carpological analysis, 37 soil samples from Stratigraphic Unit (SU) 10 underwent manual floatation in water to recover all the plant macro-remains. The samples volume is not even, depending on the thickness of the layer at a specific location (the entire sediment of the SU was collected). Overall, more than one litre of residue is derived from more than 600 litres of soil floatation. The dried residue was screened under the stereomicroscope (AXIO Zoom V16 with magnifications ranging from 10X to 100X) to extract malacofauna, microfauna, and plant macro remains (Appendix A). During this phase, anthracological remains larger than 3 mm were also sorted out for future analyses. The determination of the carpological remains was based on the comparison with specific atlases (mainly Cappers et al., 2012; www.actaplantarum.org) and a collection of modern seeds and fruits stored at the DANTE Laboratory (Sapienza University of Rome); Pignatti (2017) is the reference text for botanical nomenclature.

The determination and taxonomic attribution of malacological remains was carried out following the works of Fiorentino et al. (2016), Kerney & Cameron (1999), and Welter-Schultes (2012). The Minimum Number of Individuals (MNI) for each species was calculated by separately counting all unique morphological features (i.e., protoconch, lips, opercula) and then considering the one with the highest value.

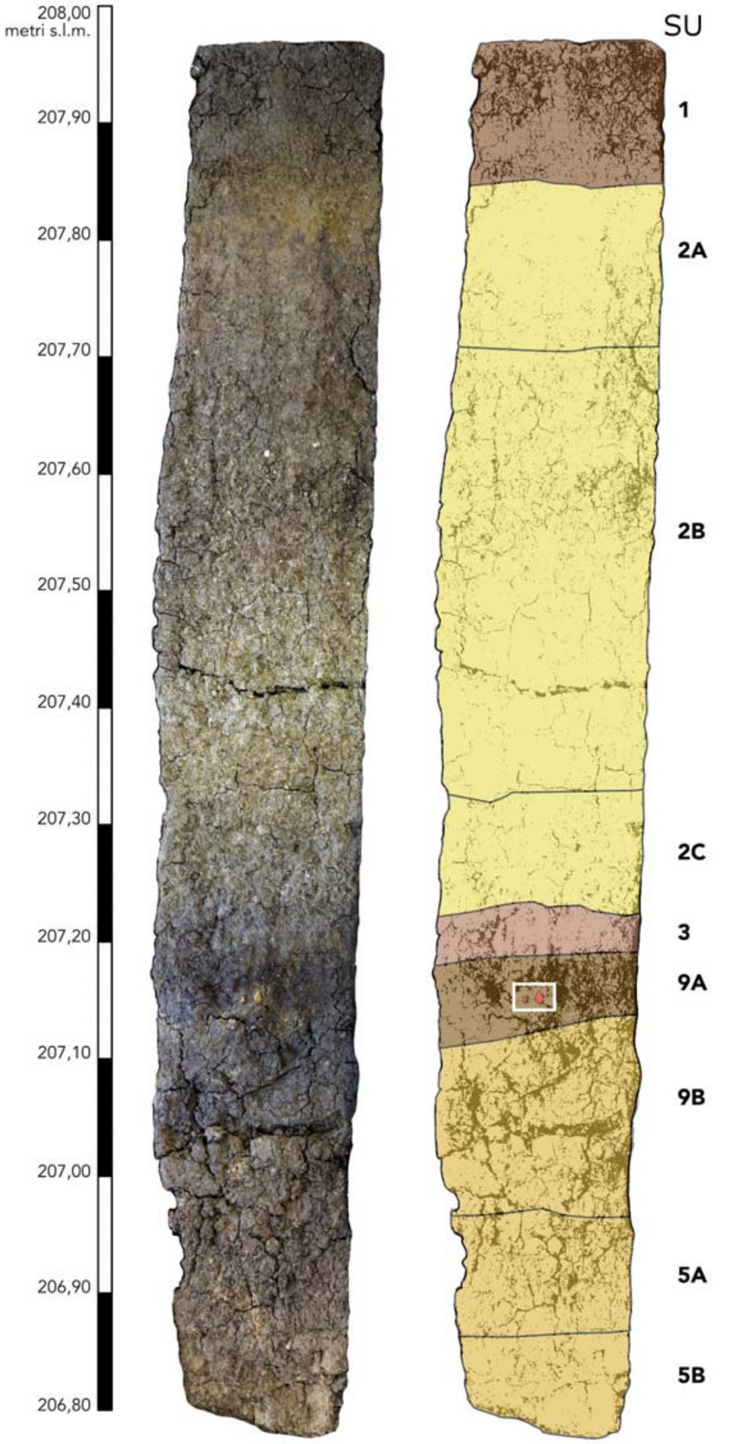

Fig. 2 - Contrada Pace 1 (CP1), left: monolith MM30; right: stratigraphic sequence (SU: stratigraphic unit). In red within the rectangle: lithic industry.

The taxonomic and anatomical determination of animal bone fragments was performed by comparing the archaeological material to the reference osteological collection of current and paleontological/archaeological fauna of the MUSE - Science Museum of Trento. The following indices were used to estimate the abundance of the species: NRDt, the number of remains determined anatomically and taxonomically (Grayson, 1984); MNI, the minimum number of individuals (Lyman, 1994); NISP, the number of identified specimens (Lyman, 1994). The estimation of the age of death was based only on the analysis of teeth eruption and degree of wear. For roe deer (*Capreolus capreolus*, L. 1758), the evaluation of the eruption time was done using the ranges proposed by Mustoni (2002), while for the degree of wear, the tables by Tomé & Vigne (2003) were used. For wild boar (*Sus scrofa*, L. 1758), the eruption time was evaluated through the comparison with the tables proposed by Habermehl (1961) and the teeth wear with those by Grant (1982).

4. THE SEDIMENTARY SEQUENCE

The sedimentary sequence of the Contrada Pace CP1 site was described on the eastern section of the excavation in correspondence with monolith MM30 (Tab. 1; Fig. 2). Here, four fluviatile aggradation cycles (overbanks) were recognised. The buried soil on which the Mesolithic occupation took place (SSUU9-5) is characterised by silty-clay loam texture (profile 4ABcb-4Bwb-4Bwcb -4Cc) and is classifiable as an Inceptisol (IUSS Working Group WRB, 2015). The main observed processes in the buried soil are the accumulation of organic matter (including charcoal and micro-charcoal), decarbonation, and weak shrinking and swelling phenomena due to the action of clay feeded by changes in the humidity rate. The cyclic repetition of this process in the upper portion of the sequence (SU9) resulted in an angular, prismatic structure with vertical and sub-horizontal cracks. The Mesolithic stratigraphy is sealed by a thin alluvial cover (SU3) on which a 3ABcb horizon with characteristics similar to SU9 developed. The prosecution of the alluvial aggradation (SU2) attests to the development of two inceptisols BCg-2Ccg1-2Ccg2 (Soil Survey Staff, 2010) marked by weak traces of water stagnation and carbonate illuviation. Consequently, secondary $CaCO_3$ concretions and coatings are frequent all along the sequence. Sub-actual agricultural activities truncate the upper portion of the sequence.

Unit	Description	Interpretation
1	0-12 cm, Ap, silt loam, brown (10YR 4/3)-olive brown (2.5Y 4/3), weak to moderate fine angular blocky, non-calcareous, firm. Clear smooth boundary to:	Current agrarian horizon (bottom)
2A	12-25 cm, BCg, loamy sand, light olive brown (2.5Y 5/4-5/6), weak fine angular (primary) moderate very coarse prismatic (secondary), strongly calcareous, few very fine mottles 2.5Y 5/6, common medium roots, common medium burrows, common fragmented mollusc shells (<1 mm). Gradual smooth boundary to:	Overbank deposit 4
2B	26-63 cm, 2Ccg1, silty clay loam, olive brown (2.5Y 4/4), weak medium angular blocky (primary) moderate very coarse prismatic (secondary), strongly calcareous, many to abundant very fine mottles 2.5Y 5/2, common CaCO3 hard concretions (1 to 5 mm), common distinct silt coatings, many fragmented and whole mollusc shells. Gradual smooth boundary to:	Overbank deposit 3
2C	63-73 cm, 2Ccg2, silty clay loam, olive brown (2.5Y 4/3), weak medium angular blocky (primary) moderate very coarse prismatic (secondary), strongly calcareous, common very fine mottles 2.5Y 5/2, common CaCO3 hard concretions (1 to 5mm), common distinct silt coatings, common microcharcoal <1mm (-64 to 68 cm), fine burnt clay aggregate (-63 cm). Clear smooth boundary to:	Overbank deposit 2
3	73-78 cm, 3ABcb, silty clay loam, 10YR 4/2 (dark grayish brown), moderate medium angular (primary) moderate very coarse prismatic (secondary), non-calcareous, common CaCO3 hard concretions (1 to 8 mm). Abrupt irregular boundary to:	Overbank deposit 1
9A	78-83 cm, 4ABcb, silty clay loam, very dark grayish brown (10YR 3/2) weak fine to very fine angular (primary) moderate to strong medium angular blocky (secondary), non-calcareous, common CaCO3 hard concretions (5-7 mm), common medium roots (78 to 85 cm), common medium burrows, common distinct silt coatings, common coating on peds of soft powdery lime, common faint pressure faces, common microcharcoal <1 mm, lithic artefact and fine burnt clay aggregates. Gradual irregular boundary to:	Mesolithic buried soil
9B	83-100 cm, 4Bwb, silty clay loam, very dark grayish brown (10YR 3/2), weak fine to very fine angular (primary) moderate medium angular blocky (secondary), non-calcareous, common medium burrows, common distinct silt coatings, common faint pressure faces. Gradual irregular boundary to:	
5A	100-110 cm, 4Bwcb, silty clay loam, very dark grayish brown (10YR 3/2), weak fine to very fine angular (primary) moderate medium angular blocky, non-calcareous, common CaCO3 hard concretions (5-10 mm), CaCO3 infilled large crack. Gradual irregular boundary to:	
5B	110-120 cm, 4Cc, silty clay loam, brown (10YR 4/3) weak fine to very fine angular (primary) moderate medium angular blocky, strongly calcareous, many very fine hard concretions (<1 mm).	

Tab. 1 - Archaeo-pedologic description of the stratigraphic sequence of monolith MM30.

5. MAIN ARCHAEOLOGICAL FEATURES

The excavation of the CP1 site yielded numerous anthropogenic structures and natural features distributed all over the investigated area (Fig. 3). The northern sector is characterised by multiple overlapping lithic scatters distributed around a simple open hearth (F1; *sensu* Mallol et al., 2017). Most likely, these represent the result of primary deposition events and can be preliminarily interpreted as knapping spots (Fig. 4). The scatters are composed of artefacts made from different lithologies. In some cases, hammerstones were identified next to them. In the northern sector, bone remains are rare.

The central area is characterised by a large and rich scatter of lithic artefacts and bone remains surrounding a wide *escargotière* (cf. 5.2) composed of tens of hundreds of shells (SU10). Noteworthy is the presence of a small and irregular pit (SU14) at the centre of the midden, with numerous thermally altered centimetric pebbles in its filling. Overall, this area may be interpreted as a toss zone dedicated to the disposal of stone tools and wastes.

A charcoal-rich layer partially covering a structured

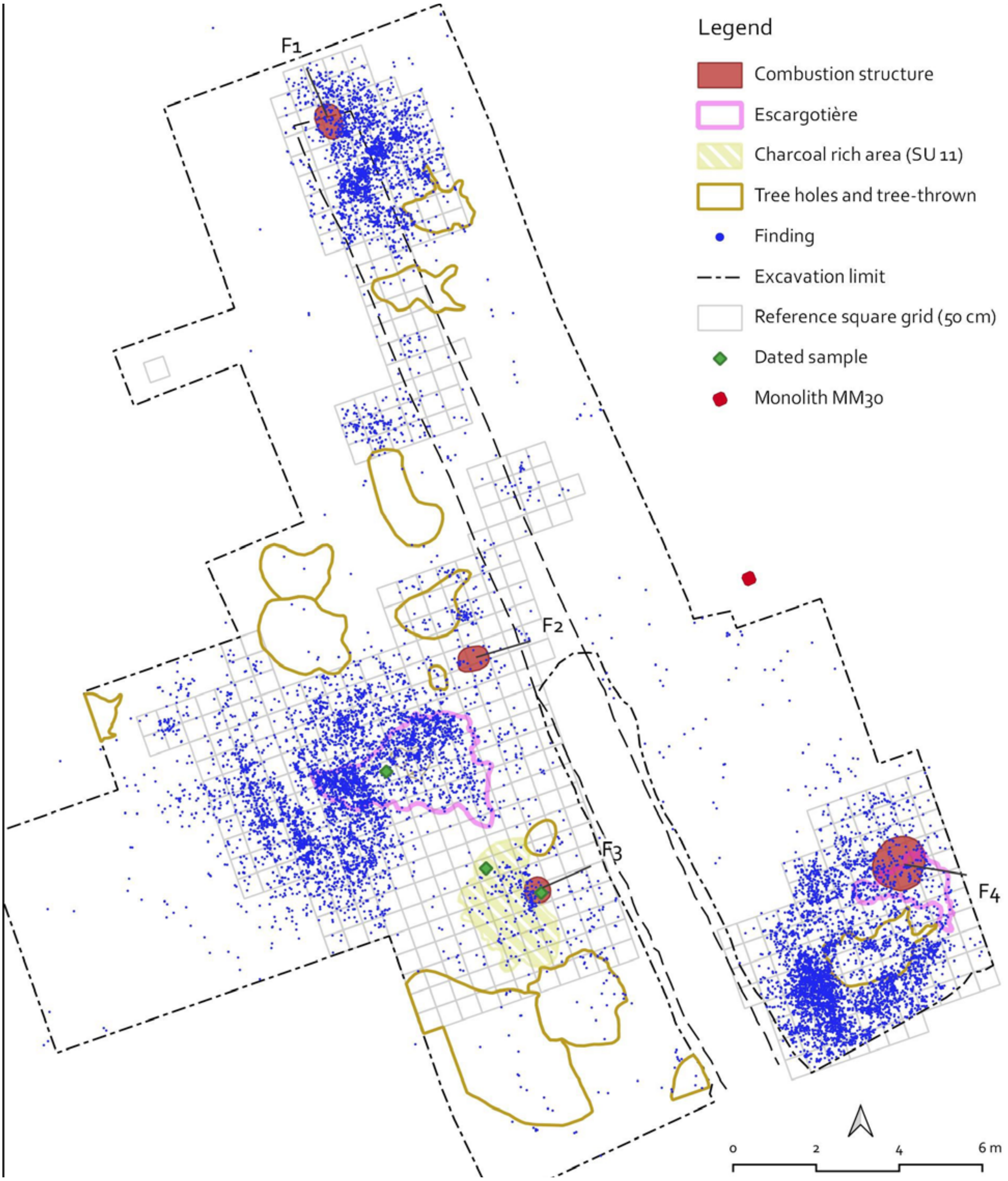

Fig. 3 - Map of the central area of the excavation with the indication of the main features discovered. The dashed line delimits the trench that led to the site's discovery.

Fig. 4 - A scatter of lithic artefacts on chert from the Scaglia Rossa formation and a hammerstone.

hearth (F3) was identified to the south. This structure will be described in detail in sub-section 5.3. This area presents a much lower density of artefacts than the other excavation sectors.

To the east of this latter, another extremely rich area was identified. Also, in this case, lithic artefacts, bone remains, and burnt clay chips seem to be connected to maintenance activities and the use of this sector as a dumping zone. Next to it, another structured hearth was found (F4). This latter presents very large dimensions (more than 1 m in diameter) and covers a smaller *escargotière*.

The area south of the dirt road is characterised by the presence of small lithic scatters and a simple open hearth (F5).

In all of the sectors, numerous natural features are attested. These are represented by the traces left by tree roots (tree holes). In some cases, they result from the decomposition of the plant in a living position (Fig. 5A). In others, it is possible to interpret them as tree-thrown, i.e., the result of the uprooting of the tree by either natural or human agents (Fig. 5B-C). Excavation data allowed to propose a relative chronology for the decomposition or tilting of the trees. This event mostly preceded the human occupation of the area. More rarely, it occurred contextually to the deposition of the stratigraphic unit covering the archaeological layer (SU2). It is also interesting to note that some of the tree stumps were burned, although it is not yet possible to assess whether this was the result of human activity or not. Generally, these natural features seem to have played an attractive role in the spatial distribution of some of the evidence uncovered at the site.

Fig. 5 - A) the tree-hole left by a plant that decomposed in a standing position; B) a typical tree-thrown that led to the verticalisation of the stratigraphic sequence. The two depressions are filled by the yellowish sediment of stratigraphic unit 2, indicating that the uprooting preceded the deposition of the alluvial cover that buried the paleosol; C) a tree-thrown in which part of the dark soil sediment is floating in the yellowish matrix. In this case, the uprooting happened after the deposition of stratigraphic layer 2.

5.1. Combustion structures

Three out of five combustion features identified during the excavation are simple open hearths with a diameter of a maximum of 50 cm (F1, F2, and F5). They derive from fires lit directly on the clayish soil and consist of sub-circular burned (oxidised) spots of sediment of orange colour (Fig. 6A). As a rule, the active surfaces are horizontal, while the thermal alteration of the sediment reaches a depth between 3 and 7 cm and is lens-shaped, being the thickest at the centre. The sediment surrounding the combustion features is characterised by chert artefacts, fragments of animal bones, charcoal, and dispersed concentrations of small aggregates of burned clay. Such clay chips may indicate the clear-out of the hearths or disaggregation phenomena due to erosion.

The remaining two combustion features (F3 and F4) were identified at the centre of the sheltered area and on the northeast side of the dumping zone, respectively (Fig. 6B-C). These features consist of a 4-to-6 cm thick plate of clayish-silty sediment deliberately laid on the grass to form a relieved surface. This contained combustion feature can be classified as a prepared burning surface (Mallol et al., 2017). While the structured hearth F3 measures ca. 50 cm in diameter, the one located near the dumping zone (F4) measures over one meter, representing the largest combustion structure discovered at the site. The clayey-silty layers present a maximum thickness of 4 cm for feature F3 and 6 cm for feature F4. In structure F3, below the burnt layer of clay and silt, it was possible to recognise the remains of the original organic soil burnt in an anoxic environment (Fig. 6D). This structure was radiocarbon dated to 10,203-9913 Cal BP (cf. Appendix B). Conversely, the hearth of the dumping zone was built on top of an *escargotière*. Also, in this case, the presence of patches of dark sediment indicates the development of the soil's organic level and its partial preservation under the burnt clayey-silty plate.

Thin section MM9 refers to the "prepared burning surface" named F3 (Fig. 7). The lower part of the structure is characterised by a ca. 2 cm thick blackish combustion substrate (CS1; Fig. 7a). This substrate was formed in a reducing environment due to pyrolysis phenomena of the fine organic matter of the occupational surface SU9. The formation of partially accommodated fine angular blocky peds with planar voids and blackened heated granular aggregates is attributable to the effects of combustion on poorly vegetated soils (Courty et al., 2012; Mallol et al., 2013; Friesem et al., 2014; Fig. 7b). Similarly, isolated microaggregates can also be found embedded in the groundmass of SU3, which covers the Mesolithic surface.

The rubified heated aggregates represent the residues of the original burning surface (combustion substrate CS2 = SU15; Fig. 7a). The features of the rubified aggregates' groundmass (cf. limit, coarse components, micromass) are similar to those of SU9. Following recent experiments performed under controlled conditions (Aldeias et al., 2016), rubefaction on similar substrates is obtained at temperatures above 240 °C, with the transition from goethite to hematite.

Burnt residues such as coal and ash are poorly preserved. Pseudomorphs of plant tissues are detectable within the micromass. Modifications produced by the impact of soil macrofauna on soil formation are indicated by the presence of a large burrow infilling (Fig. 7a). Overall, the combustion feature F3 has been partially reworked by post-depositional phenomena of biological origin. The development of the post-abandonment incipient soil SU3 gave the combustion feature a polyhedral aggregation formed by fine angular blocky peds with unaccommodated planes wholly filled with a silty-clayey matrix. Finally, the profile is affected by the process of

Fig. 6 - Some of the primary combustion features discovered at the site. A) simple open hearth testified by an oxidised spot of sediment; B) top view on the contained combustion feature named F3; C) oblique view on the contained combustion feature named F4, the largest of the site; D) a stratigraphic section of feature F3 in which the oxidised layer of sediment laid to prepare the burning surface is well visible on top of the burnt organic substrate.

carbonate illuviation in the form of complex microsparitic carbonate infillings in a non-carbonatic groundmass (Fig. 7c).

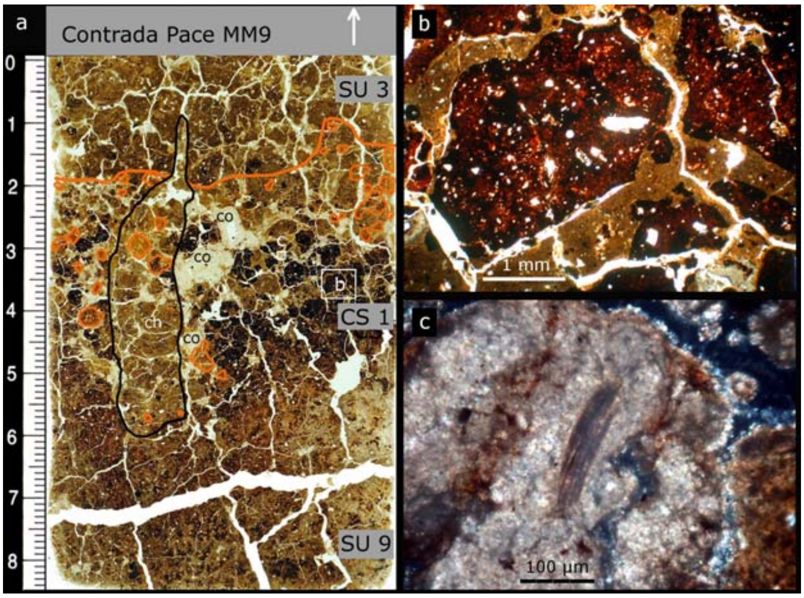

Fig. 7 - a) macrograph of thin section MM9 (combustion feature F3) and interpretation. SU9: Mesolithic buried soil. CS 1: combustion substrate at the top of SU9. The sediment is dark in colour due to the presence of fine organic matter that became charred in place; orange: isolated rubified aggregates of the combustion substrate (CS2) SU15; SU3: post-occupation buried soil; ch: channel; co: carbonate concretion. Rectangles indicate micrographs b and c. b) Micrograph with isolated rubified granular aggregate (PPL, plane-polarised light); c) Micrograph of carbonate concretion with a "ghost" of plant remains (XPL, cross-polarised light). For a detailed description, see Appendix C.

5.2. *Escargotières*

The largest of the two e*scargotières* identified (SU10), located a few meters NW of the charcoal-rich area (SU11), covers a surface of over 6 square meters (Fig. 8A). It is composed of hundreds of land-snail shells of the species *Helix* cf. *pomatella* (cf. section 6.3) along with lithic artefacts, osseous fragments, burnt clay chips, and small centimetric limestone pebbles (1-3 cm) embedded in a silty-clayey loam (Fig. 8B). Charcoal occurs abundantly throughout the unit. Radiometric dating of this unit indicated an age of 11,068-10,581 Cal BP (cf. Appendix B).

The thickness of the layer ranges from 4-5 cm in the peripheral belt up to 10-12 cm in the central area, where an irregular pit including thermally altered pebbles (often characterised by blackish coatings) was identified (SU14).

As a whole, this *escargotière* has known various phases of accumulation. It seems to be formed by numerous lenticular layers with limited lateral extension. Data collected lead to interpret it as an anthropogenic accumulation formed by the disposal of processing materials and meal wastes. Particularly relevant among the latter are bone remains that present a better degree of preservation than the other excavation sectors. This is probably connected to the shells' presence, which tempered the action of degradation of the soil. Among the bone remains, it is worth noting numerous teeth and jaws.

The second shell-rich layer (SU17) was identified below the large combustion feature F4 (Fig. 8C). It has an extension of 1.5 square meters and a thickness of ca. 5 cm. Although being more limited, this unit retains the same characteristics as SU10, being formed by shells of *Helix* cf. *pomatella*, lithic artefacts, bone remains, burnt clayey chips, charcoal, and small centimetric limestone pebbles. The *escargotière* is connected to a small pit (SU20) that shows traces of thermal alteration, although being a natural depression and not an intentionally dug feature like in the case of SU14 (Fig. 8D). A perforated *Columbella rustica* shell was also identified within the filling of this latter feature.

The lower part of the thin section MM17 shows the shell-rich layer SU10 (Fig. 9a). The dominant fine groundmass comprises microfaunal faecal pellets organised in porous spheroidal crumbs. Shells are mainly intact, planarly arranged, and loosely packed, testifying to the absence of trampling (Fig. 9b-c). The comparison with experimental data on molluscs subjected to various temperatures (Canti, 2017) shows that the birefringence degree is compatible with a 30 minute exposure to a 200° heating source. Within the matrix of SU3, fish bones were also identified. In particular, two vertebrae in transversal cut (Fig. 9e) and one fishbone present the typical denticulated edge (Fig. 9d). Under polarized light, the bones show a light yellow-to-grey colour, while with crossed polarizers, interference colours vary from weak-to-moderate grey to white. These optical characteristics indicate that fishbones were heated at around 300°C (Villagran et al., 2017). The possible presence of herbaceous plants shall be further investigated. The *escargotière* is covered by a thin alluvial cover (SU3) composed of a silty-clay loam matrix. The subsequent pedogenetic phase resulted in a well-developed subangular to angular blocky microstructure. The biologic activity brought about the partial dislocation of some faunal remains within SU3.

5.3. An enclosed space

Close to the most extensive *escargotière* (SU10), a charcoal-rich layer named Stratigraphic Unit 11 was found (Fig. 10). This was characterised by well-defined limits (in particular westward) and a half-moon shape. The layer was radiocarbon dated to 10,160-9779 Cal BP (cf. Appendix C). It presents a loam-clayey matrix rich in millimetric and centimetric charcoal fragments and has an average thickness of a few centimetres (up to 5 cm). At its centre is located the combustion structure named F3. The burnt clay layer of this latter (SU15) is partially covered by SU11. In the surroundings, three tree holes were found. The first one (C8) corresponds to a partially burnt tree hole and is directly connected to the charcoal layer as the latter ends in correspondence with the former. The two others are probably tree-throws. One of the two (C10) results from an event that preceded the

Fig. 8 - The two *escargotières* uncovered at CP1. A) the largest one named SU10; B) detail of SU10 showing the density of archaeological findings; C) the second *escargotière* named SU17, which was partially covered by combustion feature F4; D) after the removal of SU17 another oxidised surface appeared in correspondence of combustion feature F4.

occupation of the area as the filling was pedogenised. The distribution of the archaeological findings inside the depression suggests that it was already almost levelled. The second feature (C9) results from the falling of a large tree whose roots left a 4 metres large hole on the ground. The distribution of the tilted sediments and the orientation of the depression indicate that the tree fell north-eastward, in the direction of the first-mentioned tree-hole and the combustion structure. Archaeological findings were identified inside the backward depression formed by the tree thrown, indicating that the falling preceded the occupation of the area. Nonetheless, in this latter case, it had not started to fill, and it is thus supposed to be much more recent than the other.

In thin section MM15 (Fig. 11a), the charcoal-rich layer named SU11 is visible above the silty-clay loam that composes SU9. SU11 has an average thickness of around 1-to-1.5 cm and is characterised by a high presence of charcoal fragments (Fig. 11b), as large as 18 mm. Large pieces of charcoal and burnt vegetable fibres aligned and fragmented *in situ*, particularly abundant in the top portion of the soil, may indicate the use of fire for clearing the area. Vesicular porosity of SU9 can be related to trampling in over-saturated conditions due to the presence of water. Charcoal fragments show a well-developed *in situ* disaggregation. The holes produced by the fragmentation of charcoal pieces were later filled in by illuvial clay. Clay accumulation is favoured by an alkaline and potassium-rich environment derived from the presence of abundant ash. This latter was not preserved in the sediment because of the rapid chemical dissolution in sub-aerial or acid conditions (Huismann et al., 2012). Rare mollusc shells (Fig. 11c) are attested within SU11 and SU3.

6. THE MAIN *ESCARGOTIÈRE* (SU10): CARPOLOGICAL, MALACOLOGICAL AND ZOOARCHAEOLOGICAL ANALYSES

6.1. Carpological remains

Overall, 189 carpological remains were found within the sediment of SU10 (Tab. 2). Most of the macroremains are in a carbonised state (C); carbonisation results from contact with a heat source. Some finds are found in a mineralised state (M); the mineralisation is instead due to the transformation of the organic substance into calcium phosphate. No carpological remains were identified in four squares: E21, G20, I21, and I22. In the northern area of the stratigraphic unit, finds are more concentrated.

13% of the finds (28 macroremains, Fig. 12, 13) include small fragments of hazelnut stones. After the end of the great glacial impulses, hazel spread into deciduous and coniferous forests and wooded margin areas. It is a plant that grows from the plain to the mountain and subalpine belt, is a pioneer of the forest, and is easy to propagate (Pignatti, 2017). Hazel is one of the spontaneous plants that continued to be used even in post-domestication phases, thus tracing a continuity through a period of relevant changes in the subsistence economy (Rottoli, 2002).

The blackthorn (cf. *Prunus* sp. L.) and the Chinese lantern (*Physalis alkekengi* L.) are the other two edible fruits found in the studied samples. Only four stone fragments almost certainly referred to blackthorn were found in square G24. Blackthorn is also well represented in other European Mesolithic contexts, such as in Greece (Kotzamani & Livarda, 2018), Czech Republic (Divišováa & Šídaa, 2015), Serbia (Marinova et al., 2013), and south-eastern France (Henry et al., 2011), often documented both by stone fragments and anthracological remains. A single fragment of Chinese lantern seed has been identified in square I20, although other finds have also been recognised in other stratigraphic units not included in this work. Based on archaeological data, the consumption of this fruit is first attested in the Mesolithic and continued throughout the Neolithic in Italy and southern Europe (Marinova et al., 2013; Carra, 2014).

17% of the finds (36 fragments distributed in 8 squares) concerns macroremains attributable to fragments of the pulp of fleshy fruits, in which part of the peel (epicarp) is still visible. Although it is impossible to identify the type of plant, these fragments are probably related to peduncles and cicatrix, which attest to the elements connecting the fruit to the plant. The presence of other fruits, even if not determinable, confirms the picking of edible plant elements by the groups who settled at Contrada Pace.

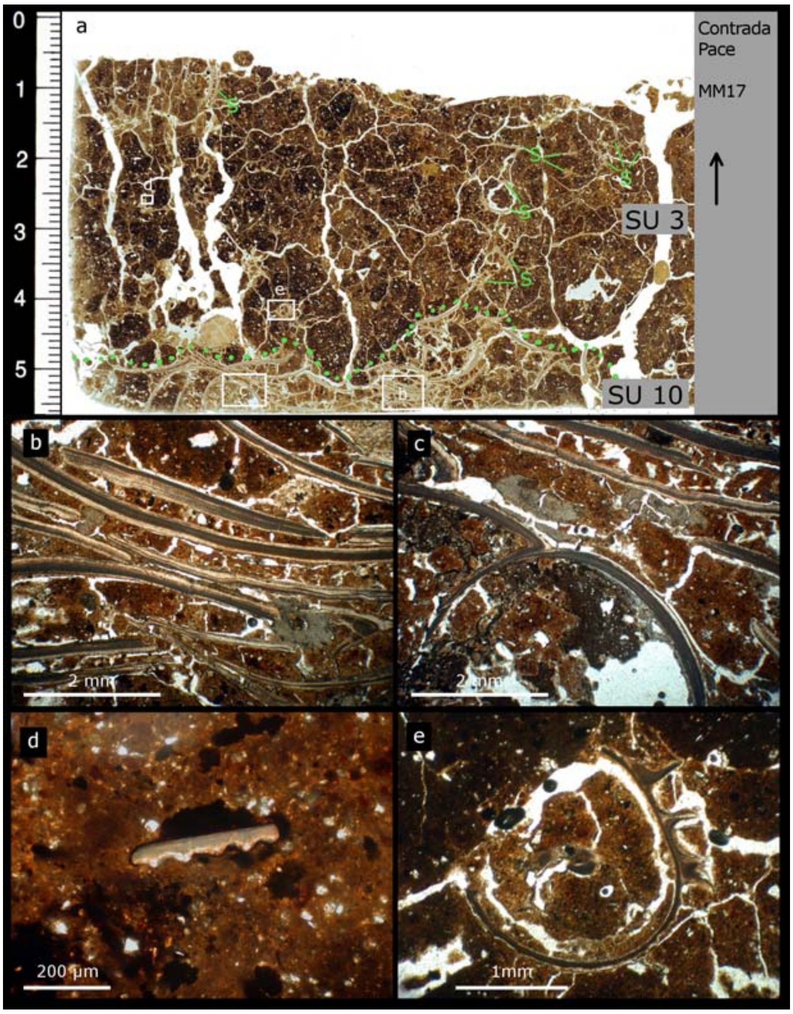

Fig. 9 - a) macrograph of thin section MM17 and interpretation. SU10: *escargotière*; SU3: post-occupation buried soil; green dotted line: top of *escargotière* (SU10); S: mollusc shell. Rectangles indicate micrographs b, c, d, and e. b) planarly arranged and loosely packed shells (PPL, plane-polarised light). c) gastropod shell (PPL, plane-polarised light). d) a fish scale with the typical denticulated edge (XPL, cross-polarised light). e) transversal cut of a fish vertebra (PPL, plane-polarised light). For a detailed

Eleven remains were determined as sclerotia and were mainly found in the eastern squares (J19-22 and J24). Sclerotia are hibernating mycelial bodies, i.e., aggregates of fungal hyphae that form a coating called pseudo parenchyma. This protective shell allows them to persist for a long time in the soil. Sclerotia often fossilise and can be found in archaeological sediments. Sclerotia can form as pathogens in the ears of cereals, of which *Claviceps purpurea* is probably the best known. It causes ergot disease but is also used for healing purposes. Its stride shape does not correspond to the finds from Contrada Pace, which are instead spherical in shape and smaller in size. Our macroremains are related to different types of hypogeal ectomycorrhizal fungi (symbiotic fungi of the root system of other vascular plants), which form associations with various types of tree plants (Musmarra, 1996). A more significant presence of sclerotia in the northern sector of the squares examined could reveal the proximity to roots not identified during the excavation phase. The uses of these types of sclerotia are not known.

Also, some fragments of seeds and fruits of herbaceous plants have been found: *Carex* sp. (H19), cf. *Carex* sp. (D22), cf. *Paris quadrifolia* (G24), cf. *Chaenorhinum* sp. (D22, G24), cf. *Rumex* sp. (I18). These species were widespread in the ancient environment. Some of them may have also been used: the sedge stem (*Carex*) for intertwining (e.g., basketry and cordage), the dock (*Rumex*) as plant food, and *Paris quadrifolia* as a medicinal narcotic and poisonous plant (Guarino et al., 2008). The small number of finds does not allow us to support these hypotheses further.

The identification of two achenes (one carbonised and one mineralised) was only possible to the botanical family, *Lamiaceae* (G24) and *Asteraceae* (D22); three fragments are attributable to wild *Poaceae caryopsis* (F20, G21, G23). The lack of specific determination does not allow us to hypothesise other uses for these macroremains; their distribution in the excavation squares appears completely random.

Finally, 91 remains (43%) are fragmentary and indeterminable. The absence of ornamentation and the small size do not allow further identification. The indeterminate fragments are numerous and homogeneously distributed in almost all the examined squares, but they do not add information to the carpological complex.

6.2. Faunal remains

A total of 306 bone fragments were recovered in SU10. The frequency of determinable elements is relatively low as only 16.3% (50) of them were determined taxonomically and anatomically, while indeterminate findings represent the remaining 83.7% (256).

The fauna from this unit is composed of three main species: two ungulates, roe deer (*Capreolus capreolus*) and wild boar (*Sus scrofa*), and one carnivore, fox (*Vulpes vulpes*)(Fig. 14).

The roe deer is the most represented mammal (NR 44), followed by the wild boar (NR 5) and the fox (NR 1) (Tab. 3).

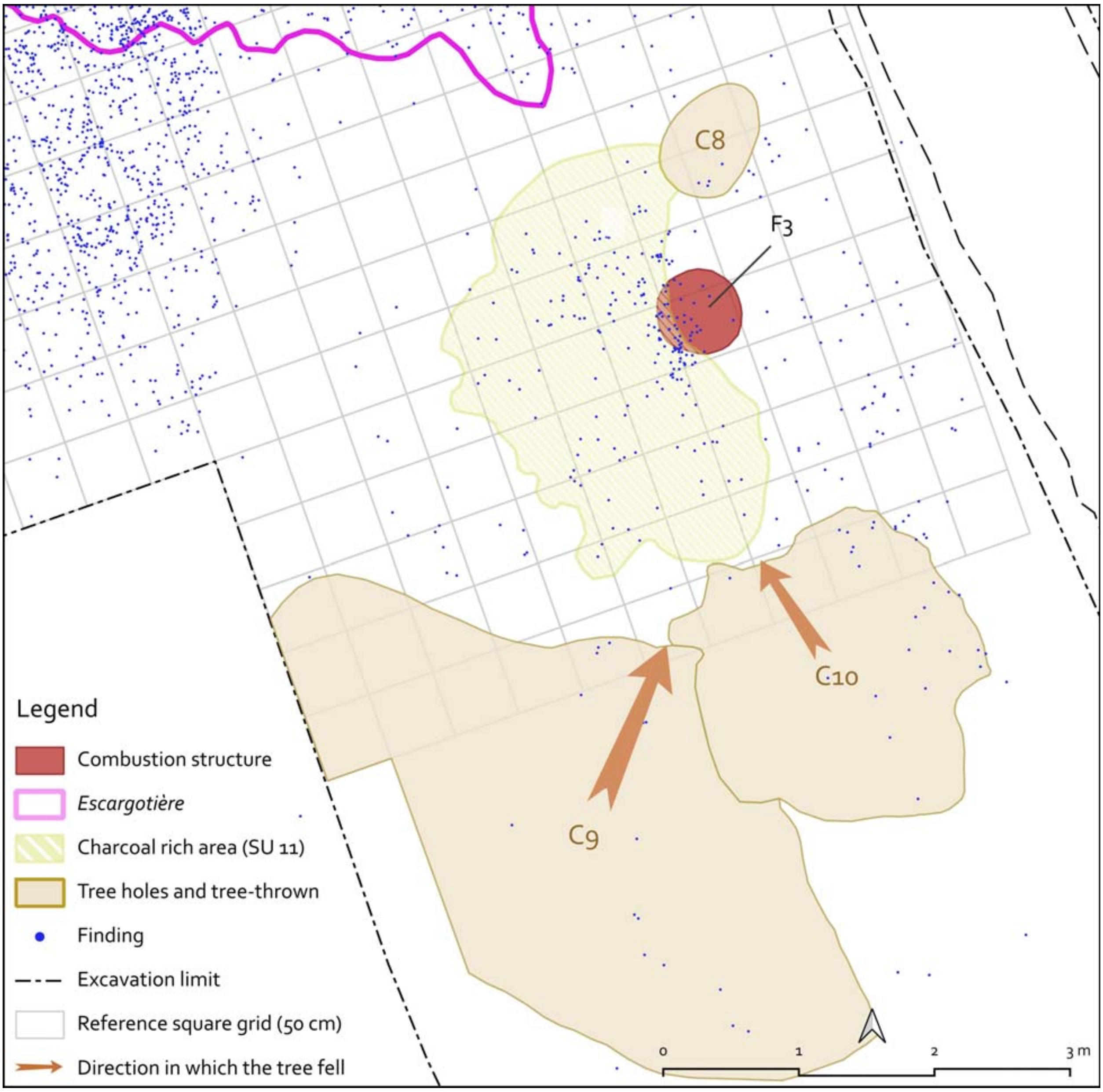

Fig. 10 - Planimetric map showing the relationship between the charcoal-rich layer called SU11 and the surrounding features.

Of roe deer remains (Tab. 4), teeth are the most attested anatomical portion (NR 27); there are also a few cranial fragments, three vertebrae, some fragments of appendicular skeleton consisting of fragments of phalanx, carpus-tarsus, metapodials and a single fragment of limb (distal portion of a tibia).

Wild boar is represented by five elements (Tab. 4): three teeth (an upper female canine, an upper left premolar and a fragment of a tooth crown), a fragment of the proximal diaphysis of the humerus and a maxilla of a young male individual. Regarding the fox, this species is represented by a single remain: a first lower molar.

From the analysis of dental eruption, it was possible to identify the minimum number of individuals present in SU10: roe deer, once again, is the most represented animal with six individuals; for wild boar, three individuals have been identified and only one individual for fox. From the study of the teeth, it was possible to obtain information about the likely age of death of the animals. This evaluation was carried out only for roe deer and wild boar; the molar of the fox had no diagnostic features regarding age.

Thanks to the comparison with the tables of Tomè & Vigne (1999) and Mustoni et al. (2002), five different adult age groups were recognised for roe deer (Tab. 5). No remains of very young individuals were identified, and all the analysed remains belong to individuals who had erupted the third molar at the time of death.

With the use of the tables proposed by Grant (1982), it was possible to identify the age of death of two boar individuals. Both the upper left premolar and the maxilla of the male boar belong to young individuals.

Regarding the taphonomic analysis, it was impossible to observe anthropogenic or natural traces other than those connected to weathering. All the materials were strongly compromised by the combined action of temperature and humidity that caused deep cracks in the bone matrix and extensive exfoliation of the cortical surfaces preventing any other observation and further analyses.

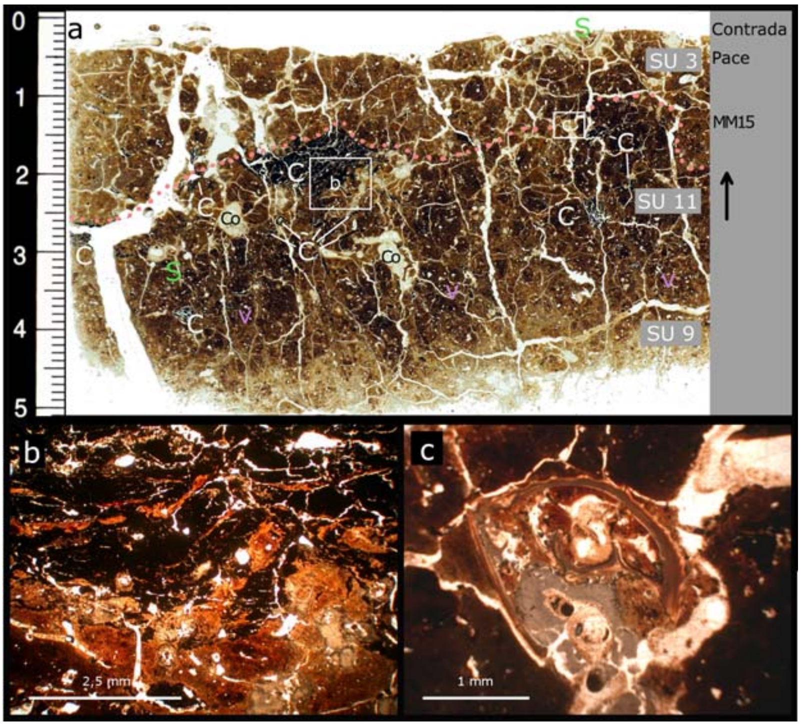

Fig. 11 - a) macrograph of thin section MM15 and interpretation. SU9: Mesolithic buried soil; SU11: fragmented charcoal in the surface horizon of enclosed space; SU3: post-occupation buried soil; C: charcoal; S: mollusc shell (SU3); V: vesicular porosity; Co: carbonate concretion. Rectangles indicate micrographs b and c. b) large charcoal fragment (PPL, plane-polarised light); c) mollusc shell (PPL, plane-polarised light). For a detailed description, see Appendix C.

6.3. Malacological remains

Malacological remains recovered within Stratigraphic Unit 10 are particularly abundant. During sediment processing, 6741 specimens were individually collected (Tab. 6). Other microscopic specimens recovered with floatation residue are still under study and are not included in this work. The assemblage comprises 18 different species and is partly the result of a natural thanatocoenosis, partly the collection and discard of mollusc shells by the Mesolithic hunter-gatherers that inhabited the site. The anthropogenic collection was aimed at a single species (*Helix* cf. *pomatella*) and probably took place in the site surroundings.

For this species, a MNI of 3754 specimens was calculated. Among these, 1500 shells are complete and could be analysed from a dimensional and traceological viewpoint. Shell diameter is between 21 and 29 mm (average value: 24.03 mm) and height between 20 and 29 (average value: 25.28 mm). They all belong to adult or almost adult individuals (Fig. 15). This indicates that collected specimens were carefully selected according to their dimensions. It is also interesting to note that other edible species were attested in the area and the archaeological record (e.g., *Cepaea nemoralis*) but were not the object of dedicated collection. The absence of macroscopically visible thermal alterations suggests that the gastropods were cooked without direct contact with the heating source (Mussi et al., 2004; Bisegna et al., 2011), as also testified by thin section analysis (cf. §5.2). Furthermore, shells do not present any evidence referable to their perforation or fracture connected to the extraction of the mollusc.

All the other species attested within SU10 belong to local coenosis and thus offer useful information on palaeoenvironment. The assemblage is dominated by *Pomatia elegans*, a gastropod typical of mesophilic environments. Additionally, numerous nemoral molluscs and micromolluscs occur: *Clausilia cruciata*, *Macrogastra attenuata*, *Discus rotundatus*, *Sphyradium doliolum*, *Vitrea diaphana,* and *Punctum pygmaeum*. On the other hand, xerophilous and meso-xerophilous species are

Sample	Family	Genus/Species	Type of remains	Preserv.	N.	Sample	Family	Genus/Species	Type of remains	Preserv.	N.
C 22	=	=	Indet. fr.	C	4	H 19	CYPERACEAE	*Carex* sp. L.	Fruit fr.	C	1
C 23	=	=	Fruit. fr.	C	6		=	=	Indet. fr.	C	2
D 21	=	=	Fruit. fr.	C	1	H 20	=	=	Indet. fr.	C	3
	=	=	Indet. fr.	C	2	H 21	=	=	Indet. fr.	C	5
D 22	ASTERACEAE	=	Indet. achene	M	1	H 22	BETULACEAE	cf. Corylus avellana L.	Stone fr.	C	6
	CYPERACEAE	cf. *Carex* sp. L.	Fruit	C	1		=	=	Group of sclerotia	C	1
	PLANTAGINACEAE	cf. *Chaenorhinum* sp. (DC) Rchb.	Seed	C	1		=	=	Fruit. fr.	C	11
	=	=	Indet. fr.	C	6		=	=	Indet. fr.	C	4
D 23	=	=	Fruit. fr.	C	4	H 23	=	=	Fruit. fr.	C	4
	=	=	Indet. fr.	C	2		=	=	Indet. fr.	C	4
E 22	=	=	Indet. fr.	C	1	H 24	BETULACEAE	cf. Corylus avellana L.	Stone fr.	C	3
E 23	BETULACEAE	Corylus avellana L.	Stone fr.	C	8		=	=	Peduncle/Cicatrix	C	1
	=	=	Indet. fr.	C	3		=	=	Indet. fr.	C	4
F 20	POACEAE	=	Grain fr.	C	1	I 18	POLYGONACEAE	cf. *Rumex* sp. L.	Fruit	C	1
	=	=	Peduncle/Cicatrix	C	1		=	=	Peduncle fr.	C	1
	=	=	Indet. fr.	C	1		=	=	Indet. fr.	C	1
F 21	BETULACEAE	Corylus avellana L.	Stone fr.	C	1	I 19	=	=	Fruit. fr.	C	1
	=	=	Indet. fr.	C	4		=	=	Indet. fr.	C	2
F 22	BETULACEAE	Corylus avellana L.	Stone fr.	C	2	I 20	SOLANACEAE	Physalis alkekengi L.	Seed fr.	C	1
	BETULACEAE	cf. Corylus avellana L.	Stone fr.	C	4	I 23	=	=	Indet. fr.	C	4
	=	=	Indet. fr.	C	2	I 24	=	=	Indet. fr.	C	2
F 23	=	=	Indet. fr.	C	3	J 18	=	=	Indet. fr.	C	2
G 21	POACEAE	=	Grain fr.	C	1	J 19	=	=	Sclerotium	C	1
	=	=	Peduncle/Cicatrix	C	1	J 20	=	=	Sclerotium	C	2
	=	=	Indet. fr.	C	2		=	=	Indet. fr.	C	1
G 22	=	=	Fruit. fr.	C	3		=	=	Indet. fr.	M	1
	=	=	Peduncle/Cicatrix	C	1	J 21	=	=	Sclerotium	C	4
	=	=	Indet. fr.	C	8		=	=	Indet. fr.	C	2
G 23	POACEAE	=	Grain fr.	C	1	J 22	BETULACEAE	Corylus avellana L.	Stone fr.	C	4
	=	=	Fruit. fr.	C	6		ROSACEAE	cf. *Prunus* sp. L.	Stone fr.	C	4
	=	=	Indet. fr.	C	9		=	=	Peduncle fr.	C	1
G 24	LAMIACEAE	=	Indet. achene	C	1		=	=	Sclerotium	C	2
	MELANTHIACEAE	cf. Paris quadrifolia L.	Seed	C	1		=	=	Indet. fr.	C	5
	PLANTAGINACEAE	cf. *Chaenorhinum* sp. (DC) Rchb.	Seed	C	1	J 23	=	=	Peduncle/Cicatrix	C	1
	=	=	Indet. fr.	C	2	J 24	=	=	Sclerotium	C	1
										Tot.	189

Tab. 2 - The determination of carpological remains of SU10. Samples correspond to the entire SU10 sediment of each square.

represented by a marginal number of specimens. Among them, the most numerous is *Rumina decollata*, an omnivorous species. Since it is a predator of other molluscs, it was likely drawn to the site by the abundance of trophic resources connected to the presence of food wastes.

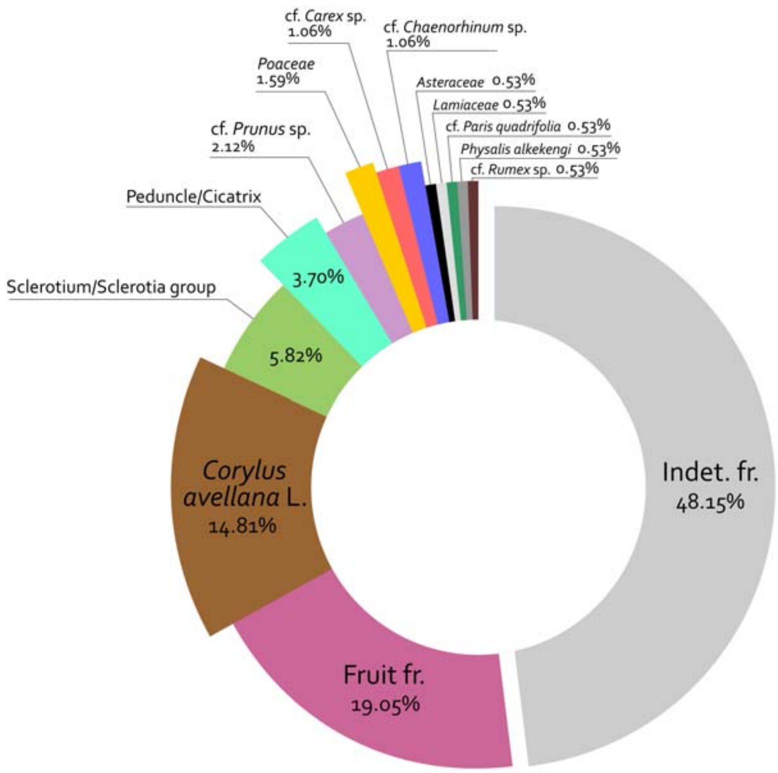

Fig. 12 - Total statistical incidence of carpological remains.

7. DISCUSSION AND CONCLUSIONS

The excavation at Contrada Pace undoubtedly yielded one of the richest and best-preserved open-air Early Mesolithic sites in Italy and, more generally, in southern Europe. Although post-excavation analyses are still in an initial state, the first data and results allowed to obtain insight into the lifeways of the hunter-gatherers who occupied the area. The large terrace formed by the Chienti river during the final Pleistocene was perceived as a landmark within the territory. It was repeatedly occupied during the Early Holocene, as testified by the first radiocarbon dates and the vast surface (stretching at least 500 m) that yielded similar Early Mesolithic evidence. In addition to the archaeological evidence, the radiocarbon dataset of Contrada Pace furtherly confirms that the aggradation of the alluvial plain ended after the very beginning of the Holocene. It thus predates the incision of the braid-plain and the correlated formation of this and possibly other terraces short after 9800 Cal BP, i.e., earlier than previously thought for other rivers of the Marche region (Cilla et al., 1996).

Unfortunately, the absence of contemporary evidence in the region does not allow us to comprehend the role of Contrada Pace on a territorial scale. Based on comparisons with northern areas (Fontana & Visentin, 2016), the working hypothesis is that the site could represent an intermediate seasonal settlement area located between the Adriatic shore and the central Apennines uplands.

In the main site (CP1), multiple scatters of lithic artefacts resulting from both primary (e.g., knapping and domestic activities) and secondary (e.g., dumping) actions were brought to light. The microlithic elements with geometric (triangles, crescents) and needle-like shapes

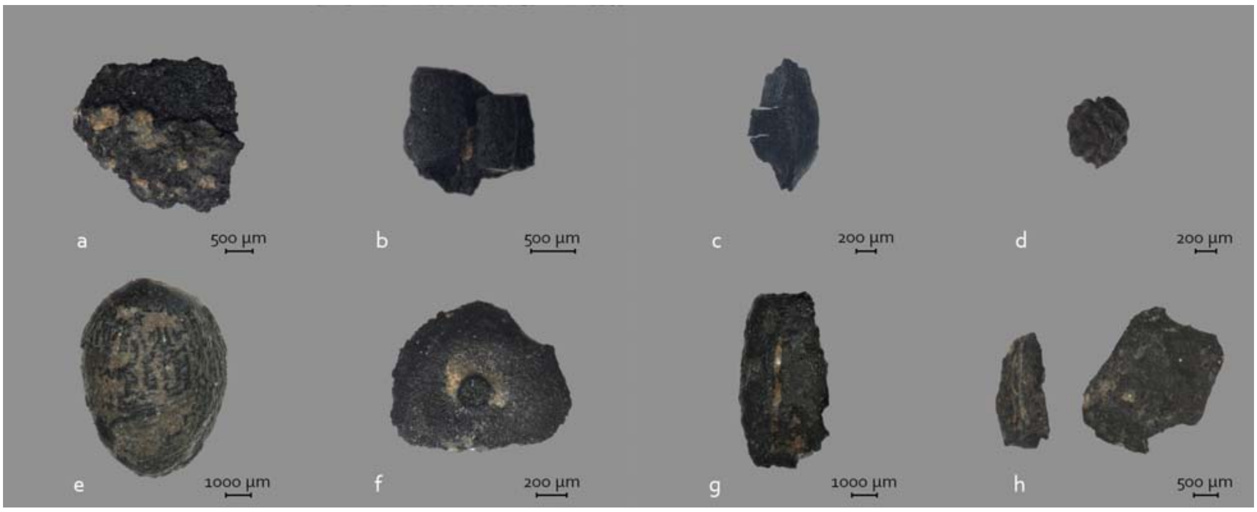

Fig. 13 - Carpological remains found in the various squares of SU10: fruit fragment (a); *Corylus avellana* (b); *Carex* sp. (c); cf. *Chaenorhinum* sp. (d); cf. *Paris quadrifolia* (e); peduncle/cicatrix (f); fragment of *Poaceae* grain (g); fragment of cf. *Prunus* sp. stone (h).

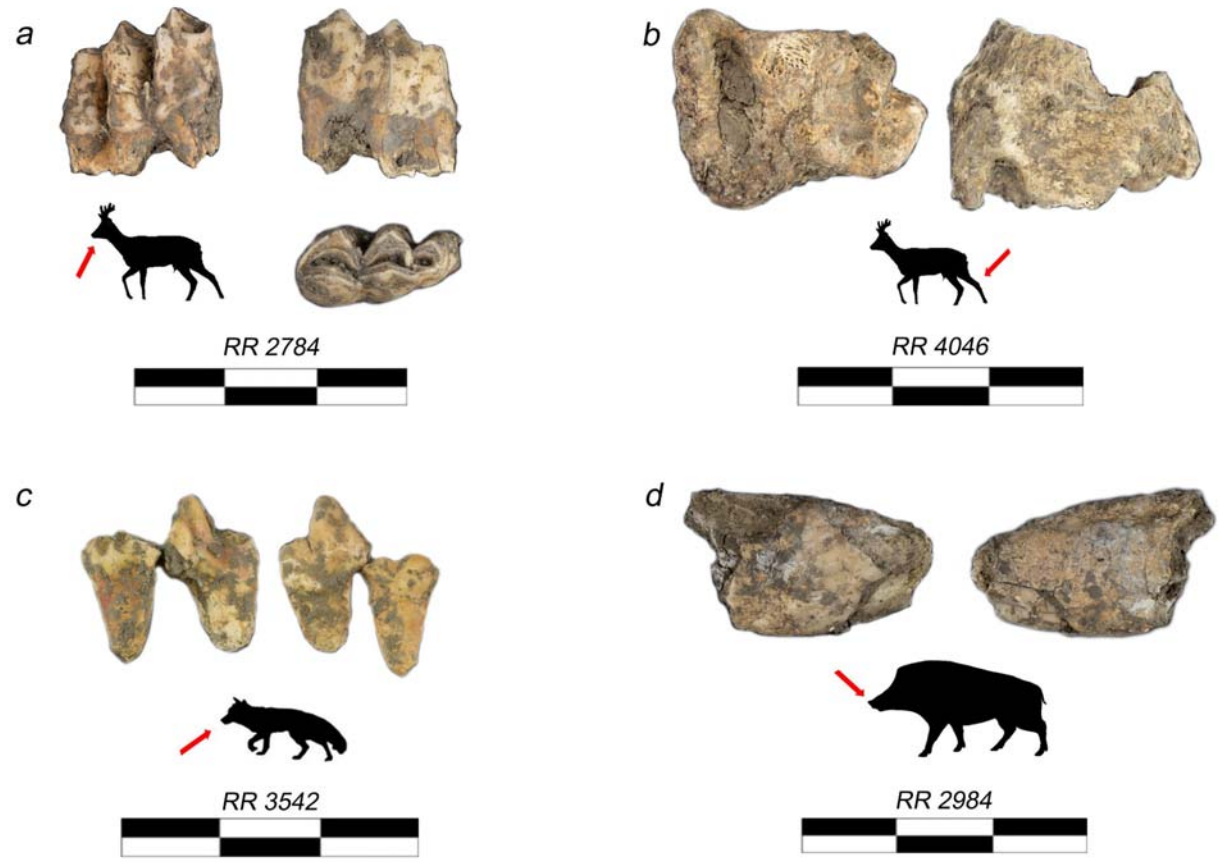

Fig. 14 - Some faunal remains from SU10 of Contrada Pace. *a*. right lower third molar of *Capreolus capreolus*; *b*. distal portion of left tibia of *Capreolus capreolus; c*. left lower first molar of *Vulpes vulpes*; *d*. upper canine of a female *Sus scrofa*.

(double-backed points, cf. Sauveterre) typical of the early phase of the Mesolithic (i.e., Sauveterrian; Visentin, 2018) are frequent. Nevertheless, radiometric evidence already pointed out that not all anthropogenic features are coeval: the samples from the sheltered area (SU11 and SU15) provided very similar ages, confirming the stratigraphic relationship between the two units. Conversely, the sample from the shell-rich layer SU10 returned a 500 years older radiocarbon age, documenting a previous occupational phase of the site. A systematic dating plan is required to sort the entire evidence by chronology, a task that will be carried out shortly.

One of the most interesting aspects of the site is the relationship between archaeological evidence and tree stumps, as these latter seem to represent hotspots for human activities up to the point that tree throws were used to build both sheltered and enclosed spaces. Stratigraphic Unit 11 and related features represent the best example of this behaviour. Their overall distribution suggests that this area had been arranged and that Mesolithic hunter-gatherers exploited the particular conformation of trees and tilted tree stumps for their needs. Although no post-hole was found, the barrier-effect influencing the distribution of charcoal remains suggests the existence of a wall or fence made of perishable material. Possibly, it represented a sort of hut made by exploiting the trunk of the surrounding trees. This is a working hypothesis based on field-collected data that will have to be confirmed with the prosecution of spatial and micromorphological analyses. Other examples concerning the exploitation of felled trees were recently brought to light in other Late Palaeolithic and Mesolithic sites discovered in the Alpine area (Mottes et al., 2018).

Of the five combustion features identified, the simplest type is represented by open hearths lighted directly

		NISP	%	MNI
Artiodactyla	*Capreolus capreolus*	44	13.2%	6
	Sus scrofa	5	1.7%	3
	total artiodactyls	49	14.9%	9
Carnivora	*Vulpes vulpes*	1	0.3%	1
	total carnivores	1	0.3%	1
	TOTAL DETERMINATE	50	16.3%	
	TOTAL INDETERMINATE	256	83.7%	
	TOTAL REMAINS	306	100%	

Tab. 3 - Quantification of species according to the number of remains (NISP) and the minimum number of individuals (MNI).

	Artiodactyla		*Carnivora*
	Capreolus capreolus	*Sus scrofa*	*Vulpes vulpes*
skull	2	-	-
maxilla	-	1	-
mandible	3	-	-
teeth	27	3	1
vertebra	3	-	-
humerus	-	1	-
tibia	1	-	-
astragalus	1	-	-
calcaneus	1	-	-
tarsal	2	-	-
metatarsal	3	-	-
phalanx I	1	-	-
TOTAL	44	5	1

Tab. 4 - Summary table of taxa divided by anatomical elements.

on the soil surface. In other cases, a relieved burning surface was created by laying a layer of clayey sediment on the grass. With the first uses of the fire, such accumulation hardens and becomes an efficient surface for burning and cooking. Variations in the form and type of the hearths over the investigated area seem to reflect changes in the functional destination of the combustion features or changes in the kind of occupation. As for the combustion features with a prepared burning surface, few comparisons can be found in other Mesolithic sites. At Duvensee WP11 in Germany, a clay plate was found within an Early Mesolithic layer (Lage, 2011), although its interpretation is still discussed. The closest reference is probably represented by the Uzzo cave in Sicily (Tagliacozzo & Piperno, 1993), where a 50 cm wide and 2-3 cm thick clay plate was found in association with an Early Mesolithic palaeosurface characterised by abundant combustion traces and several lithic artefacts, faunal and malacological remains (both marine and terrestrial). Additionally, two negative features, both connected to the *escargotières*, are considered combustion features possibly related to cooking activities, as suggested by the presence of heated pebbles.

One thing that particularly stands out in the Contrada Pace site is the large *escargotière* named SU10, totalling a large number of edible specimens (over 3700). Mollusc shells are associated with a very high quantity of archaeological materials, allowing us to interpret them as the result of an anthropogenic accumulation. This is also supported by microscopic alterations of the shell structure, indicating that the molluscs were cooked at low temperatures for a short time and not roasted. Direct contact with fire or burning charcoal would have led to a much more severe alteration of the surfaces and internal structures. Finally, *Helix* cf. *pomatella* is not a gregarious species, so the possibility of natural accumulations can be undoubtedly excluded. Numerous examples of *escargotières* dated between the Late Pleistocene and the Holocene are known from various archaeological contexts of the circum-Mediterranean area, in particular from sites of North Africa, the Iberian Peninsula, the Pyrenees, and the Near East (a synthesis in Lubell, 2004). Despite this, similar evidence is by no means common in Italy, where the importance of terrestrial molluscs as a food resource needs to be better defined and understood (Girod, 2011). Examples of land snails accumulations are documented in the Mesolithic levels at the inland sites of Grotta di Pozzo (Mussi et al., 1995; Lubell et al., 1999) and Grotta Continenza (Bevilacqua, 1994) in the Fucino basin and a few cave contexts in the Trieste Karst area (Cannarella & Cremonesi, 1967; Cremonesi, 1967). Some other evidence is known from late Pleistocene/early Holocene sites on the Tyrrhenian coast and South Italy, where shell-rich deposits containing marine and terrestrial molluscs have been reported (Girod, 2011; Mussi et al., 1995 and reference therein). Nonetheless, the character of such finds and their role in the human diet remains to be better defined.

The clayey sediment of SU10 also favoured the preservation of carpological findings. A rich assemblage of organic remains was recovered during floatation. The identified carpological finds, among which hazelnuts, blackthorns and Chinese lanterns, are well framed within the southern European Mesolithic (Costantini, 1981; Lubell et al., 1999; Leoni et al., 2002; Holst, 2010; Regnell, 2012; Bishop et al., 2014; Divišováa & Šídaa, 2015; Mariotti Lippi et al., 2016), although in other cases, like for example at Franchthi Cave (Asouti et al., 2018), the selection of plant foods seems more oriented towards spontaneous pulses and grasses. Indeed, the research progress, including ongoing analyses of the archaeological materials from the other stratigraphic units, will bring about new data on the exploitation of plants at Contrada Pace. Another important goal will be to establish the role of plant resources in the site economy, which will only be possible at the end of the analysis of the entire archaeological deposit.

Regarding the faunal remains, the soil chemistry did not allow for optimal preservation of the assemblage.

Remains	Stage and ages (Tomè & Vigne 1999)		Stage and ages (Mustoni 2005)
RR 4787 (dP^4)		-	4 - 13 months
RR 3692 (P_4, M_1, M_2, M_3)	stage 6	ca. 12 months	-
RR 2819 ($M_{1/2}$), RR 4021 ($M_{1/2}$), RR 4001 (M_3)	stage 9	31 - 81 months	-
RR 3541 ind 1(P_4, M_1, M_2); RR 2784 (M_3)	stage 10	31 - 72 months	-
RR 3541 ind 2 (M_2, M_3)	stage 10	ca. 103 months	-

Tab. 5 - Age groups recognised for roe deer.

Only three species are attested among the determined specimens in SU10: two ungulates (wild boar and roe deer) and a carnivore (fox). However, the ongoing study of the faunal remains from the other stratigraphic units has highlighted the presence of other species, such as red deer. These are all animals typical of forested environments, such as those that characterised the Italian peninsula in the early Holocene. The discovery of hundreds of bone fragments belonging to different mammal species confirms the importance of hunting for the subsistence of the Mesolithic groups of Contrada Pace and the harvesting of terrestrial molluscs and wild vegetables and fruits.

Fig. 15 - Archaeological specimens of *Helix* cf. *pomatella* belonging to SU10.

By continuing to process the sediment collected during the excavation and proceeding with laboratory analysis of the archaeological findings and samples, it will be possible to deepen the study of the site and better understand its spatial organisation and function and reconstruct its formation processes. The evidence collected at Contrada Pace will undoubtedly represent a significant reference for studying the lifeways of the last European hunter-gatherer groups in this part of the southern regions of the continent.

AUTHOR CONTRIBUTIONS

Conceptualisation: D. Visentin, A. Potì, F. Fontana, M. Peresani; original draft: A. Potì, D. Visentin, M. Bassetti, S. Bertola, M. Carra, E. Cristiani, N. Dipino, A. Fontana, M. Palmieri, M. Peresani; archaeological excavation: A. D'Ulizia, A. Potì, D. Visentin, G. Cattabriga, A. Cocilova, N. Fasser, direction of archaeological excavation: S. Finocchi; P. Mazzieri; archaeo-pedologic description and micromorphological analysis: M. Bassetti; carpological analysis: M. Carra; study of faunal assemblages: N. Dipino, A. Fontana; malacological analysis: M. Palmieri; review and editing: all authors.

Family	Species	M.N.I.
Helicidae	*Helix* cf. *pomatella*	3754
Pomatiidae	*Pomatias elegans*	2631
Clausiliidae	*Clausilia cruciata*	155
Subulinidae	*Rumina decollata*	57
Clausiliidae	*Macrogastra attenuata*	50
Clausiliidae	*Siciliaria piceata*	36
Discidae	*Discus rotundatus*	27
Orculidae	*Sphyradium doliolum*	11
Enidae	*Chondrula tridens*	4
Limacidae	undet.	4
Helicidae	*Cepaea nemoralis*	3
Valloniidae	*Vallonia pulchella*	2
Enidae	*Zebrina detrita*	2
Succineidae	*Succinella oblonga*	1
Testacellidae	*Testacella* sp.	1
Pristilomatidae	*Vitrea diaphana*	1
Punctidae	*Punctum pygmaeum*	1
Agriolimacidae / Milacidae	undet.	1
Total		6741

Tab. 6 - Malacological remains identified within SU10.

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