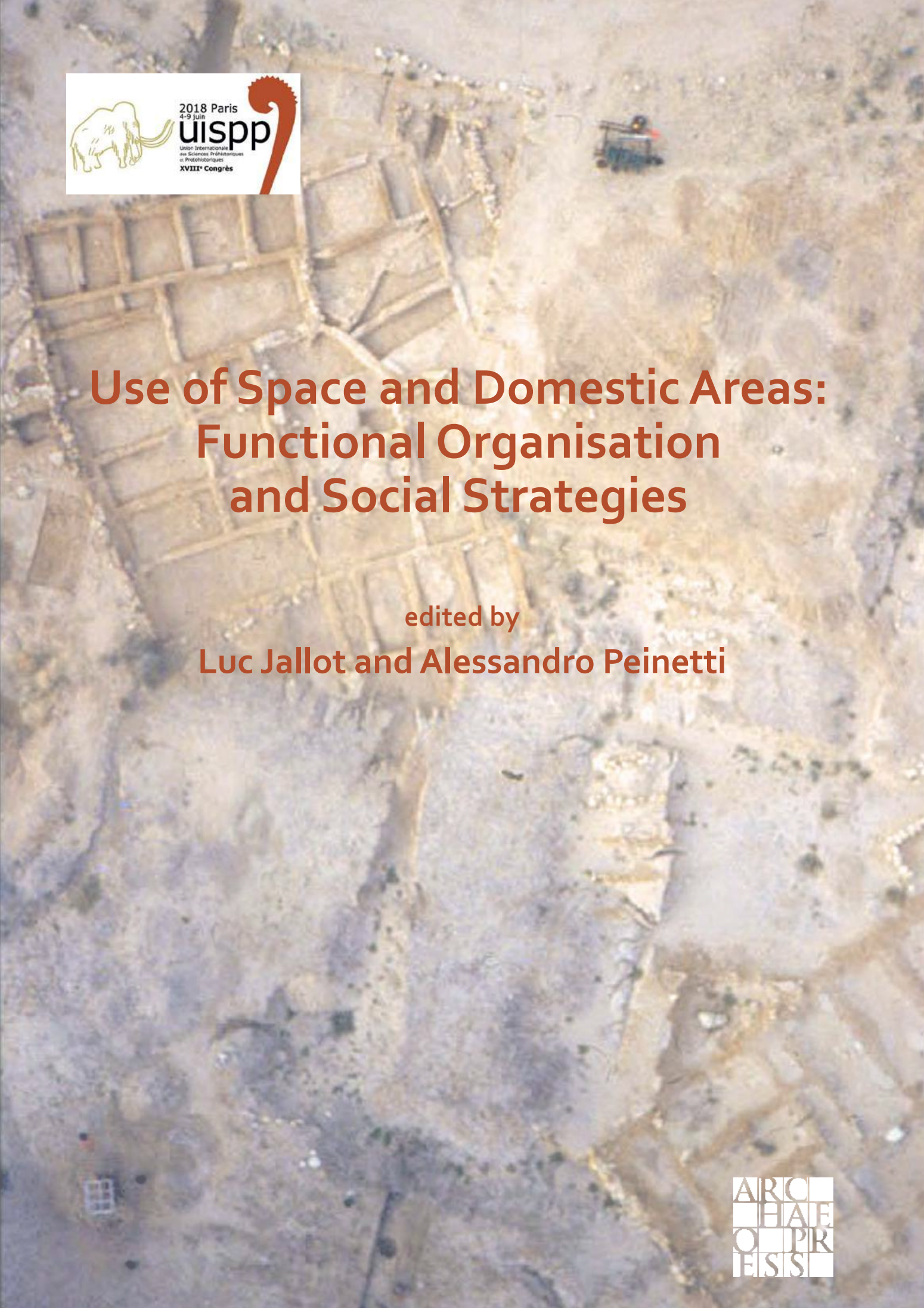

Use of Space and Domestic Areas: Functional Organisation and Social Strategies

edited by

Luc Jallot and Alessandro Peinetti

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Interpreting long-lived-in dwelling spaces: integrated spatial analysis of a Late Bronze Age area at Coppa Nevigata (south-eastern Italy)

Giulia Recchia[1], Enrico Lucci[2], Girolamo Fiorentino[3], Claudia Minniti[4], Vittorio Mironti[5], Milena Primavera[6], Gianni Siracusano[7], Melissa Vilmercati[8]

[1] Sapienza University of Rome, Department of Antiquities
giulia.recchia@uniroma1.it (corresponding author)
[2] Sapienza University of Rome, Department of Antiquities
enrico.lucci@uniroma1.it
[3] University of Salento, Laboratory of Archaeobotany and Palaeoecology, Department of Cultural Heritage
girolamo.fiorentino@unisalento.it
[4] Salento University, Department of Cultural Heritage
claudia.minniti@unisalento.it
[5] Phd Sapienza University of Rome
v.mironti@gmail.com
[6] University of Salento, Laboratory of Archaeobotany and Palaeoecology, Department of Cultural Heritage
milena.primavera@unisalento.it
[7] Indipendent researcher
sir_gianni@libero.it
[8] Sapienza University of Rome, Department of Antiquities
melissavilmercati@gmail.com

Abstract

Spatial analyses have been increasingly used to investigate behavioural patterns and human activities in archaeological and ethnoarchaeological studies. For the Bronze Age in the central Mediterranean spatial analyses integrating various ranges of data, from artefacts to ecofacts, still remain limited in number. Moreover, studies have mainly focussed on well-preserved contexts affected by sudden destructions; spaces inhabited over long periods and so subjected to dynamic depositional processes, are more challenging to interpret as to their function(s). Yet, these latter are commonly encountered archaeological contexts. Representing palimpsests of repeated activities, they are valuable case studies for investigating the spatial organisation of activities.

This paper presents an integrated spatial analysis of a long-occupied area of the Coppa Nevigata settlement from the Late Bronze Age. It is a trial, aimed at both building a viable methodology to deal with 'dynamic' deposits and verifying the potential of the observed record in terms of activity areas and fossilised patterns of behaviour.

Keywords: Spatial Analysis, Activity Areas, Interdisciplinary Approach, Bronze Age, Coppa Nevigata

Résumé

Les analyses spatiales sont de plus en plus utilisées pour étudier les modèles comportementaux et les activités humaines dans les études archéologiques et ethnoarchéologiques. Pour l'âge du bronze en Méditerranée centrale, les analyses spatiales intégrant diverses gammes de données, des artefacts aux écofacts, restent encore limitées. De plus, les études ont principalement porté sur des contextes bien préservés affectés par des destructions soudaines; les espaces habités pendant de longues périodes et soumis à des processus de dépôt dynamiques sont plus difficiles à interpréter quant à leur fonction. Cependant, ces derniers sont des

contextes archéologiques couramment rencontrés. Représentant des palimpsestes d'activités répétées, ils constituent des études de cas utiles pour étudier l'organisation spatiale des activités.

Cet article présente une analyse spatiale intégrée d'une zone occupée depuis longtemps dans le site de Coppa Nevigata depuis la fin de l'âge du bronze. Il s'agit d'un essai visant à mettre au point une méthodologie viable pour traiter les dépôts «dynamiques» et à vérifier le potentiel des données observées en termes de zones d'activité et de comportements fossilisés.

Mots-cles : analyse spatiale, aires d'activité, approche interdisciplinaire, âge du Bronze, Coppa Nevigata

1. Introduction

Spatial analyses have been increasingly used to investigate patterns of behaviour and human activities in archaeological and ethnoarchaeological studies (Carrer 2015; Lancelotti *et al.* 2017; Rondelli *et al.* 2014). These are even more telling if they combine different sources of data, from portable artefacts and ecofacts, to structures, to depositional processes. GIS-based analyses and statistical elaborations allow for correlating of different sets of data, placing both functionally characterised artefacts and by-products of activities (i.e. ecofacts) within a spatial dimension (Achino and Barceló 2019; Barceló 2002; Blankholm 1991; Djindjian 1999; Domínguez-Rodrigo and Cobo-Sánchez 2017; Hietala and Larson 1984; Merrill and Read 2010). An interdisciplinary integrated approach is vital to achieve an in-depth understanding of activity areas as proxies for cultural patterns of behaviour and the social organisation of activities.

In recent years our knowledge about Bronze Age settlements in Italy has expanded. More and more varied, evidence is now available to explore the socio-economic organisation of these communities. In so doing, the characterisation of the spatial configuration and functional variability of the spaces in settlement areas represents a key step. However, though spatial studies have indeed increased (Achino and Barceló 2019; Alberti 2017; Aquino *et al.* 2016; Cantisani 2015; Moroni *et al.* 2020; Peinetti *et al.* 2015; Vullo *et al.* 1999), holistic analyses integrating various ranges of data, particularly the bio-archaeological ones, still remain limited (Speciale *et al.* 2016). Moreover, studies have mainly focussed on well-preserved contexts, such as those affected by sudden destructions and collapses (Cazzella *et al.* 2002; Malorgio and Maggiulli 2011; Scarano 2011; Vullo *et al.* 1999). Long-lived-in spaces and activity areas, on the other hand, more affected by occupational disturbances and dynamic depositional processes, yield apparently chaotic records that are challenging to interpret concerning their function(s). Yet, not only are these types of deposits very common among archaeological contexts, but they also represent the palimpsests of repeated activities and thus are good candidates for the identification of socially accepted patterns of behaviour (Childe 1956, ch. 3).

This paper presents an integrated spatial analysis of an area of the settlement of Coppa Nevigata dating to the Late Bronze Age. It is a trial study, aimed at both building a viable methodology to deal with 'dynamic' deposits, possibly resulting from repeated activities, and verifying the potential of the observed record and reliability of portable-finds distributions in terms of activity areas and fossilised patterns of behaviour. (G.R., E.L., G.F., C.M., M.P., V.M., G.S., M.V.)

2. The archaeological context

2.1. The settlement of Coppa Nevigata

The Bronze Age settlement of Coppa Nevigata, in north Apulia (Figure 1), is one of the most extensively excavated sites in Italy (Cazzella and Recchia 2012). It was located on the shore of an ancient lagoon, now reclaimed, which connected the village to the sea. A very long-lasting settlement, it was continuously occupied for over one millennium (from the 18th to the 8th centuries BC) and was well integrated into the maritime exchange networks operating in the

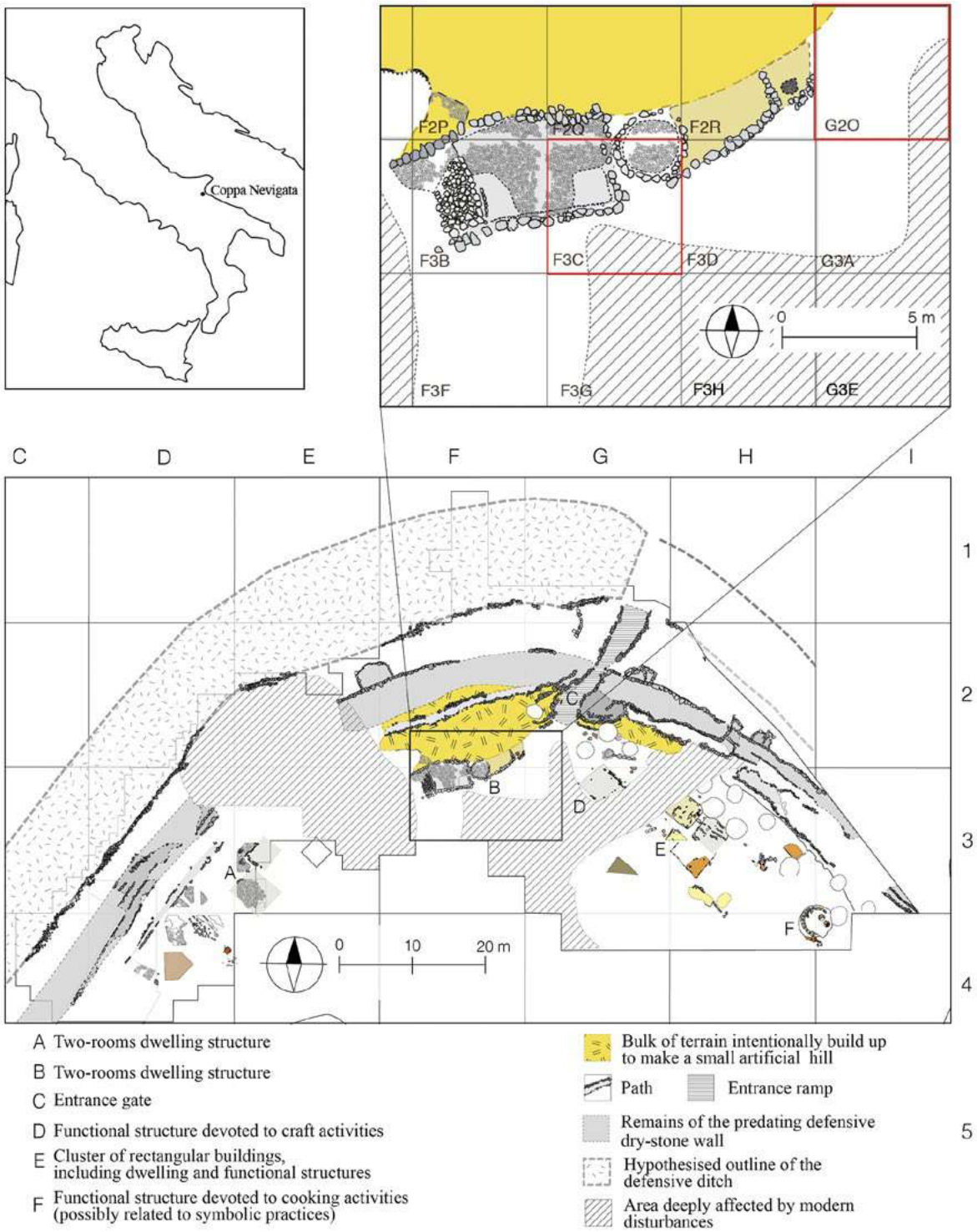

Figure 1. Bottom: map of the Coppa Nevigata settlement showing the features pertaining to the Late Bronze Age (12th century BC). The black rectangle marks the area under scrutiny. Top: the area under scrutiny: the red squares mark the grids analysed in detail.

eastern Adriatic and the Aegean (Cazzella and Recchia 2009). A distinct feature of the settlement is the complex defensive system that was rebuilt and reshaped several times. The spatial organisation of the habitation also changed significantly through time due to socio-economic transformations of the resident community, but the settlement always remained in the same physical position despite the changes in the surrounding environment (Caldara and Simone 2012). A notable reorganisation of the spatial arrangement of both domestic architecture and

the management of goods occurred in the Late Bronze Age (13th-12th centuries BC). At the same time, the level of craft activities increased considerably, probably owing to the rise of elite groups (Cazzella and Recchia 2013).

Interdisciplinary studies have shed light on different socio-economic aspects of Coppa Nevigata and the dynamics of the surrounding environment(s), from subsistence economy strategies to the technology and organisation of productions and the development of specialised activities (Fiorentino and D'Oronzo 2012; Jones and Levi 2012; Levi *et al.* 1994; Minniti 2012; Siracusano 2012). Since the late 1990s spatial distribution analyses integrating diverse sources of data (artefacts, ecofacts, characteristics of the deposits etc.) have been carried out in order to explore the patterns of use of the spaces at the settlement (Cazzella *et al.* 2002; Moscoloni *et al.* 2002). The research has included organic residues analyses on pottery samples, which have provided evidence for an early production of olive oil at the site (Evans and Recchia 2001-2003).

2.2. Case study area

In this paper, we discuss a new integrated spatial analysis of a distinct area of the settlement dating to a late phase of the Late Bronze Age (12th century BC). Located on the north-eastern side of the village, on the slope of a small artificial mound that overlooks both the settlement's entrance gate (or one of the entrances) and a large open space (Cazzella and Recchia 2015), this area was possibly the residency of an elite group. It is characterised by a domestic building consisting of two adjoined rectangular rooms: the west one is provided with a small cobbled patio, while the east one includes a cobbled circular structure (Figure 1). No hearths/cooking structures were preserved inside these rooms, but an external hearth adjoined the eastern one. This building and the surrounding spaces have yielded thousands of ecofacts and artefacts (including pottery, metal objects and scrap metals, stone and bone artefacts). Moreover, a substantial amount of fine wheel-made Mycenaean-type sherds occur, which may well indicate a distinctive status of the residents and/or activities with specific symbolic and social meanings (Bettelli *et al.* 2017).

Unlike the areas that have been previously analysed from a functional spatial distribution perspective (§2.1), mostly characterised by undisturbed primary deposits sealed by collapse layers, the area under scrutiny was occupied over a certain span of time without significant episodes of fire and/or collapse. Thus, a danger exists that the incidence of occupational disturbances was so high as to ultimately interfere with any attempt to use data drawn from portable artefacts/ecofacts to ascertain activities and space function. Nonetheless, as we shall see below (§3), spatial distribution analyses may provide evidence to test the nature of the deposits and the impact of occupational disturbances. Therefore, two specific zones (falling into two grid-squares: F3C and G2O respectively; Figure 1) that are representative of diverse activity-spaces related to the building have been selected as trial case studies for the spatial analysis. The first zone (F3C) encompasses: a portion of each of the building's rooms (west and east) and the area just outside them to the south. The second one (G2O) corresponds to an open area, neither too close not yet too far from the building, in the proximity of a hearth adjoining the east room. All the deposits from the life-span of the structure have been taken into consideration. A positive result showing but a moderate impact of disturbances and fair reliability of observed portable-artefact/ecofact distributions, will encourage the extension of the analytical process to the entire area.

2.3. Strategies of collecting finds and sampling of archaeobotanical remains

The strategies adopted during the excavations for collecting finds allow for their quite accurate positioning on GIS maps. With particular reference to this area, finds (including faunal remains) have been collected, either with exact spatial coordinates or in grids of 1 x 1 m. (G.R.)

Area	Sample	Litres	% of sampling	n. of remains	Concentration (n. of remains per litre)
Room west (F3C)	89/011	8	100%	132	17
Room west (F3C)	89/015	7	20%	142	20
Room west (F3C)	90/002	21	20%	60	3
Room west (F3C)	90/009	14	20%	21	2
Room west (F3C)	90/012	14	20%	1487	106
Room west (F3C)	90/013	7	20%	17	2
Room west (F3C)	90/015	14	20%	142	10
Room west (F3C)	90/018	7	20%	77	11
Room west (F3C)	90/028	4,6	100%	767	167
Room west (F3C)	90/030	4,2	100%	6	1
Room west (F3C)	90/031	2,6	100%	1390	535
Room west (F3C)	90/032	1,6	100%	56	35
Entrance/outside (F3C)	89/010	7	20%	206	29
Entrance/outside (F3C)	89/012	7	20%	821	117
Entrance/outside (F3C)	89/014	7	20%	216	31
Room east (F3C)	90/020	7	20%	222	32
Total		**133**		**5762**	

Table 1. Soil samples for the collection of archaeobotanical remains from grid F3C. The quantity (in litres) of sampled soil and the sampled percentage of removed soil is indicated, as well as the amount of detected remains and their incidence per litre of soil.

Each layer on the site is sampled for the collection of archaeobotanical remains. Each sample, usually comprising a minimum of 20% of the whole soil removed, is wet sieved using two different mesh (0.5 and 2.0 mm). Depending on the nature of the deposits and the visible concentration of plant remains, up to the 100% of the removed soil was sampled (Hastorf and Popper 1988; Marston *et al.* 2014). This latter course was followed for most of the samples taken in room west of the analysed area (Table 1). (M.P.)

3. Understanding depositional processes

The record under scrutiny is far removed from the 'Pompeii premise' (Binford 1981). In fact, the evidence results from the repeated use of the area over a certain span of time, without significant gaps or episodes of collapse. Thus, the first step is to evaluate the deposit formation and the impact of anthropic disturbances on the primary deposition of artefacts/ecofacts. According to Michael Shiffer and Martin Kuna's categories of refuse (Kuna 2015; Schiffer 1972, 1983), 'primary refuse' deposits are the best candidates for the study of activity areas.

3.1. Hypotheses on the nature of the deposits

On the basis both of the nature of the strata and the spatial organisation of this area we have put forward three working hypotheses to consider: 1) the deposit is a midden, mainly resulting from the discard of waste from the closest dwelling structures; 2) it is a midden, mainly constituted by the waste of activities carried out in other areas and then discarded there; 3) it is waste, mainly resulting from repeated activities carried out on the spot. Obviously, each of these different actions could have contributed to the deposit formation, but the main point to be assessed is: to what extent does the observed distribution of artefacts/ecofacts tell us about the various activities performed in these spaces? Is the deposit under scrutiny chiefly a 'primary-refuse' one or a 'secondary-refuse' one?

Another important aspect to be weighted is the extent to which the deposit has been affected by post-depositional disturbances, such as trampling effects. For this particular factor, the degree of pottery fragmentation and the size-distribution of sherds is widely considered a valuable proxy. Generally speaking, the smaller (and more non-matching) the fragments are, the higher the possibility that the deposit underwent trampling and disturbances. Yet the fragmentation ratio *per se* it is not decisive for achieving an understanding as to whether the deposit is a primary or a secondary, since even this latter may contain fairly-well preserved pots. A more viable approach is to combine different types of data, such as the fragmentation ratio and the consistency in the spatial distribution of artefacts judged by types/style and function. In fact, a high rate of entropy results from (repeated) dislocations of finds/deposits and/or repeated disturbances. Therefore, the spatial distribution analysis itself helps reveal the nature of the deposits and the reliability of the assemblages under scrutiny as records of the social organisation of activities inside the settlement. Whatever the nature of the deposit, a high fragmentation rate hampers one's ability to recognise the overall shape and functional attributes of the vessels. This means that in areas where the fragmentation index is very high the patterns of performed activities will be hardly readable.

3.2. Fragmentation ratio of pottery

In order to assess the fragmentation ratio, all the ceramic sherds (diagnostic and non-diagnostic, approximately 7300 in total) recovered not just from the two selected zones but from the entire area, have been measured and divided into size-groups and thickness-groups whose parameters have been fixed on the basis of statistical analyses of the characteristics of the pottery assemblage (Recchia *et al.* 2018; Lucci in press).

For the observed area as a whole, the chart of Figure 2.A shows that the overwhelming majority of fragments are small, while their number proportionally decreases as their size increases. Yet, if we divide up and consider the data space by space, (Figure 2.B), it becomes clear that the sherd fragmentation ratios tend to differ. Medium-size sherds outnumber small-size fragments in both inner spaces and the areas closer to the building. Conversely, moving away from the building small-size sherds become the vast majority. The spatial distribution of fairly-preserved vessels is partially comparable with that of the sherds, but it tells us something more too: the best-preserved vessels chiefly occur outside the building, although close by it, with a notable cluster beside the hearth (G20). Thus, one can declare that open areas, especially those further from the structures, were indeed affected by agents such as trampling. This action could have altered the deposit, but not necessarily so dramatically as to affect a spatial distribution analysis. (E.L.)

4. Criteria of functional classification

4.1. Functional classification of artefacts

In developing functional analyses and functional classifications some general issues should be taken into account: pottery and tools are multifunctional, especially in societies whose level of productions is neither highly specialised nor standardised (Van der Leeuw 1984); the intended (or potential) function and actual function of a given object may differ (Skibo 1993). Use-wear analyses and organic analyses of trapped residues to detect the vessels' content(s) are indeed crucial to assess the actual function of tools and pots.

Use-wear analyses on stone and bone/antler artefacts and organic analyses on pottery samples from the assemblage under scrutiny are ongoing. In the present study, however, the practical function of artefacts has been inferred also by using the results from analyses carried out on other assemblages from the site as a basis for comparisons (§ 2.1). Moreover, this study

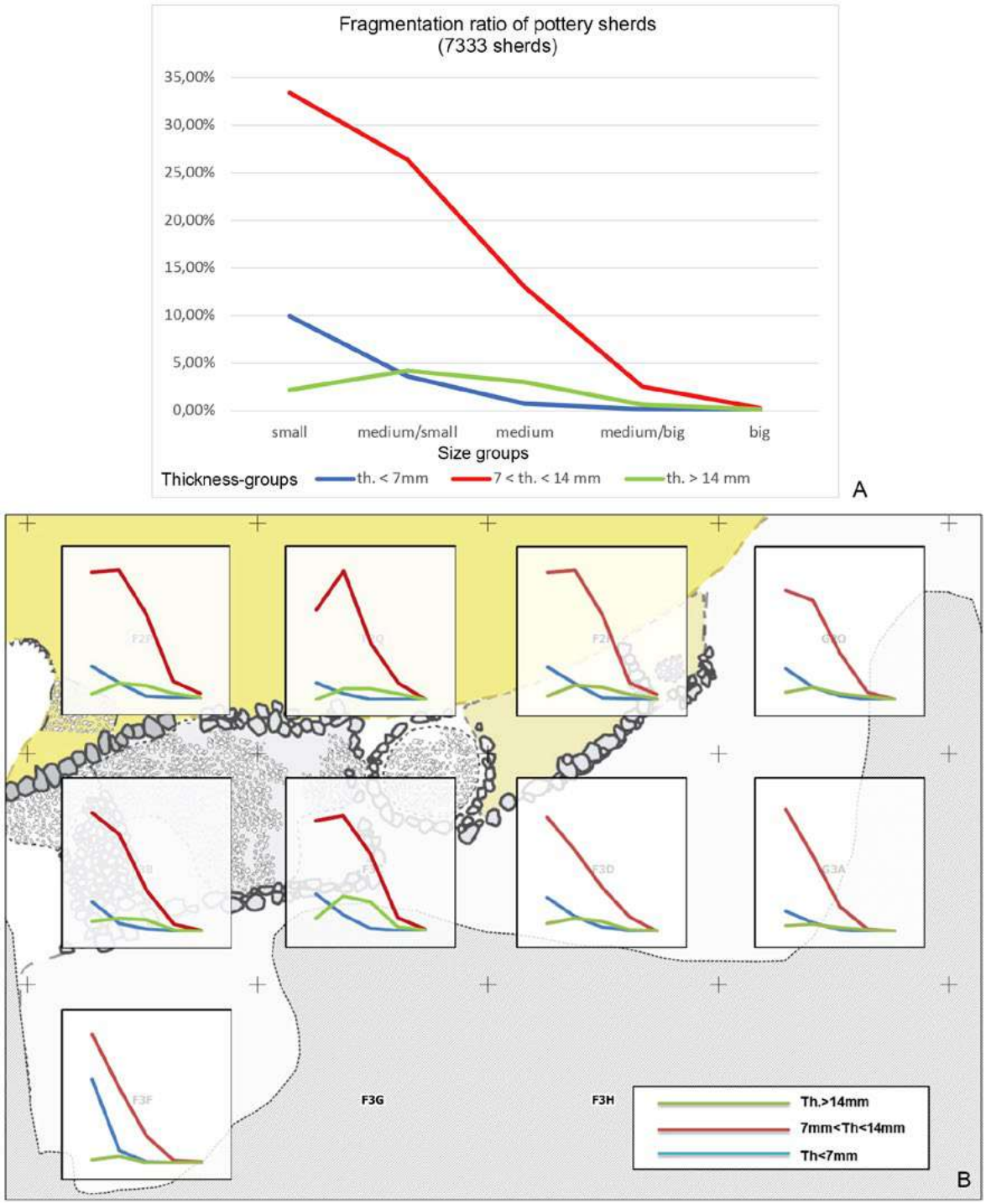

Figure 2. Fragmentation ratio of pottery. A: incidence of ceramic sherds per size-groups and thickness groups – all diagnostic and non-diagnostic sherds from the entire area have been considered; B: fragmentation ratio data space by space.

adopts a multiscale approach that ranges from the functional classification of each find to the analysis of depositional contexts and associations between different types of remains and structures. This process helps to both reduce the number of hypotheses put forward to explain the pattern(s) of potential use of the artefacts and figure out the main types of activities performed. A further element considered is the condition of each find (complete, half preserved and fragment). Broken vessels (especially large portions or specific parts) or tools might well have been recycled or reutilised for different purposes than their original function.

4.2. Pottery

Our functional classification of pottery (Recchia 1997) is based on the observation of the vessels in terms of technological factors (chiefly pottery fabric and finishing; Recchia and Levi 1999), ergonomic factors and the range of actions allowed or prevented by its morphology (pouring, closing, manipulating the content, holding, thermal-shock resistance etc.). Any recurrent sets of technological and morpho-functional attributes detected have then been related to more general practical functions (consuming, preparing/transforming, cooking, storing, transporting) according to specific ways of use and in relation to distinct types of substances being handled (dry, liquid, semi liquid, semi-solid). Thus, each sherd/vessel has been categorised according to the range of practical functions it can (easily) perform (Figure 3.1-6).

4.3. Other artefacts

Non-vessel ceramic artefacts, stone, bone/antler and bronze artefacts have been first classified according to categories of practical intended functions (i.e. knives, daggers, axes, arrowheads, awls, spatulas, pins, brooches, grips etc.). Then they have been assigned to broad functional categories, such as tools/implements, ornaments, weapons, blanks, non-finished pieces and waste debris. The three latter, in particular, are good pointers for the occurrence of processing activities in a specific area. Tools/implements may well represent either the artefacts that were utilised in processing materials or artefacts that were being processed/just finished. Similarly, ornaments may occur in a given deposit either as lost/hidden objects or, especially when found in clusters, as artefacts that were being processed/assembled. Moreover, as with multi-purpose vessels, some types of artefacts can be used for different purposes: telling examples are axes, that are both tools and weapons. (G.R.)

4.4. Functional classification of ecofacts

Botanical and animal remains, mainly those from domestic contexts, are proxies for a wide range of human activities, from economic strategies and dietary habits, social patterns of processing and storing food, to carpentry and the production of tools/implements and commodities of various kinds. Therefore, they have been classified in categories that are specifically designed to cover and interpret all their potential range of usage in specific contexts.

Charcoals for instance can be mainly related to both fuel and carpentry. The choice of taxon depends on various factors, from the environment through the advantageousness of specific plants for a given use to specific cultural choices and traditions. Charred seeds and fruit-remains in particular have been classified according to the main type of crops and elements indicative of harvesting patterns, storage patterns and crop processing patterns (i.e. grains, chaff and weeds).

Animal bones can be related to two main spheres of activities: that pertaining to food (butchery, storage and consumption) and that connected to further use of by-products (leather and animal skins working, exploitation of raw material such as tendons, bones and antlers). Therefore, in addition to the analysis of species frequency, the remains belonging to the major edible species have been classified according to meat-yielding categories following Barker (1982). (C.M., M.P.)

5. Spatial distribution analysis

5.1. Pottery

Ceramic sherds (*impasto* pottery, 2902 in total) represent the vast majority of both the ceramic assemblage and of all the artefacts found in these spaces. However, the overwhelming portion

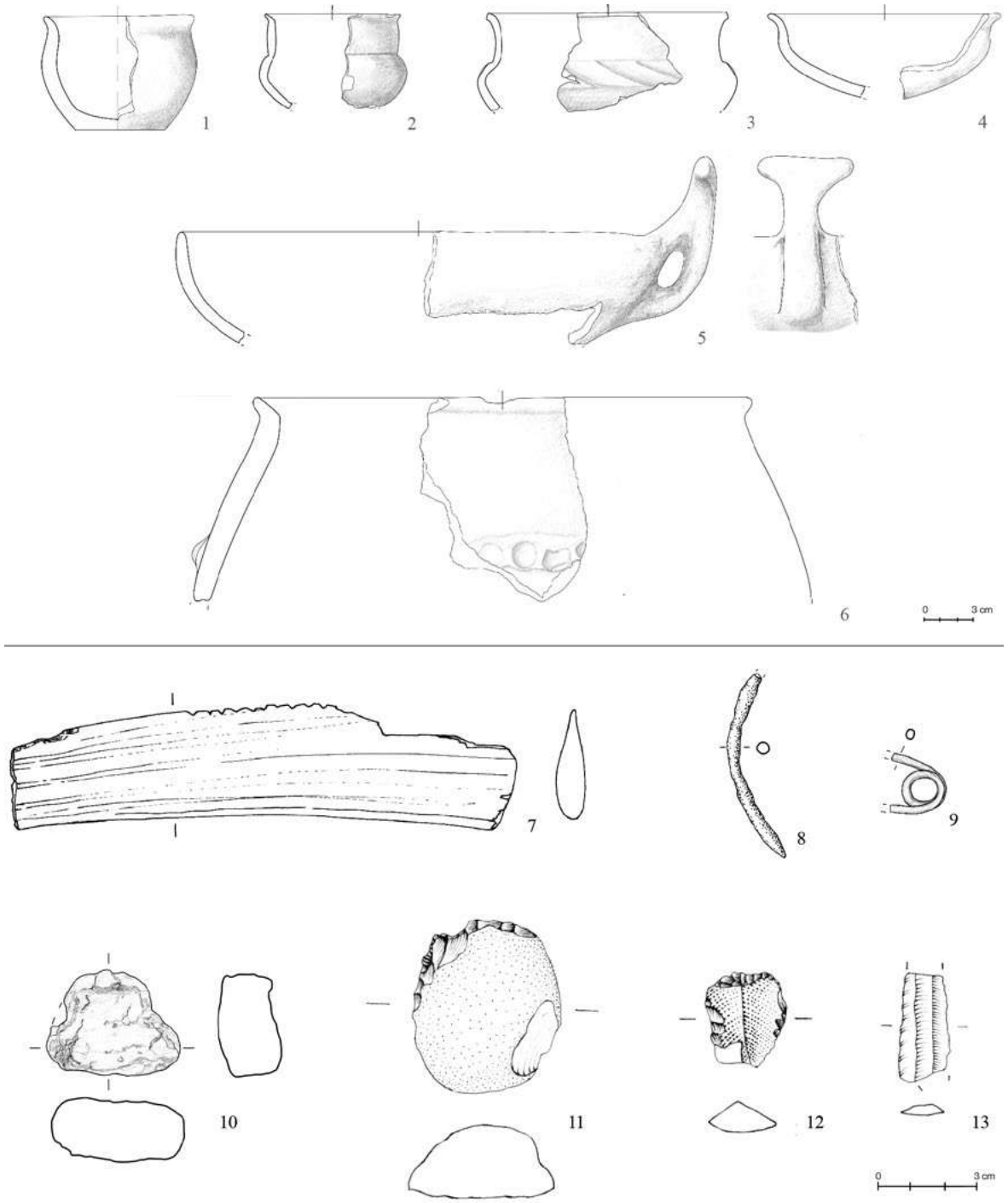

Figure 3. Coppa Nevigata, examples of artefacts from the area under scrutiny.
1-2: Individual-consuming vessels (storing of small quantities?); 3-4: Individual-consuming vessels; 5: collective-consuming/preparing vessel; 6: cooking/storing vessel; 7: bone notched implement; 8: bronze ornament/tool; 9: bronze ornament (*fibula*); 10: bronze thick trapezoidal-shaped object; 11-12 flint tools (scrapers); 13: flint tool (blade).

is quite small and/or non-diagnostic and therefore unviable for functional classification (§ 3.1). Functionally recognisable sherds/ fairly preserved vessels amount to only 132 (Table 2). Functional categories that have a notable incidence are those for consuming and consuming/preparing (approximately the 60%) and those for cooking/storing and storing (approximately the 25%), while potentially multifunctional vessels tend to be rarer. Among the better attested classes, individual-consumption vessels represent the vast majority (29% out of the total functionally recognisable

General intended functions	Ind. cons.	Coll. cons.	Preparing	Cooking	Storing	> two functions
Individual consumption	38					
Collective consumption		9				
Preparing		30	8			
Cooking		3	2	1		
Storing	1		2	22	12	
More than two functions						4

Table 2. Number of sherds/vessels per functional categories. Grey shadowed cells highlight the cases that are mainly suitable for a specific function.

sherds), followed by collective-consumption/preparing vessels (23%), then by cooking/storing vessels (17%), storing vessels (9%) and collective-consumption vessels (7%).

The spatial distribution of both sherds and fairly preserved vessels is not random, but rather it reflects repeated pattern(s) of use of each area for specific purposes (Figure 4). Sherds belonging to cooking/storing and storing vessels (Figure 3.6; yellow and brown dots) chiefly occur in the south-east corner of the west room (F3C). Conversely, collective-consumption and preparation/transformation vessels/sherds (Figure 3.5; sky blue and green dots) are significantly concentrated in the open space near the hearth (G2O). On the other hand, individual-consumption vessel/sherds are scattered broad scale across the various areas, with no notable clusters. In this assessment, though, it needs to be taken into account that: 1) sherds from small-vessel (such as the individual-consumption sorts; Figure 3.1-4) tend to be generally diagnostic (especially in comparison with large-container shards, among which walls fragments have an high incidence) and thus are likely to be overrepresented; 2) small bowls, which represent the majority of the recognised individual-consumption pottery, might have been used not only for eating/dinking but also for other purposes, possibly related to storing practices (i.e. covering other containers, drawing up liquids from large-mouth containers etc.). Therefore, their ubiquitous presence might be, to some extent, related to their functional versatility. On the other hand, the occurrence of well-preserved individual-consumption pottery in G2O sits well with the concentration of collective-consumption and preparation/transformation vessel and sherds in the same area, giving weight to the functional consistency of this cluster.

The pattern of fragmentation of the Mycenaean-type vessels reflects that of *impasto* pottery: sherds tend to be larger inside and near the structure. The repertoire includes both bowls and jars, yet all of them are likely to have been used in consuming activities, possibly carrying a symbolic meaning. We can assume that these were kept inside the structure and used both there and in the open space near the hearth (G2O).

5.2. Metal, bone/antler and ceramic objects

Despite being quite few in number (four), metal artefacts show an interesting distribution (Figure 5.A). Only one item has been found in grid F3C, just outside the building. This is a thick trapezoidal-shaped object whose use is difficult to ascertain (Figure 3.10; a possible weight?). By contrast, all the metals in the open area to the east (G2O) are fragmented ornaments or ornaments/tools (Figure 3.8-9). Bone/antler artefacts are five in total. Just outside the building lay a notched implement of bone that was possibly used in wool processing (Figure 3.7; Cristiani and Lemorini 2006). The remaining four items were scattered in the open area to the east (G2O). These include two awls (one of which is fragmented), one broken pin/awl and one half-processed antler item. Deer antler blanks are mostly located inside room west (four, while only two in the open area -G20).

Ceramic tools involve two spindle-whorls (both from room west) and nine disc-shaped objects (fashioned from recycles sherds): one was inside room west, while eight were clustered in the

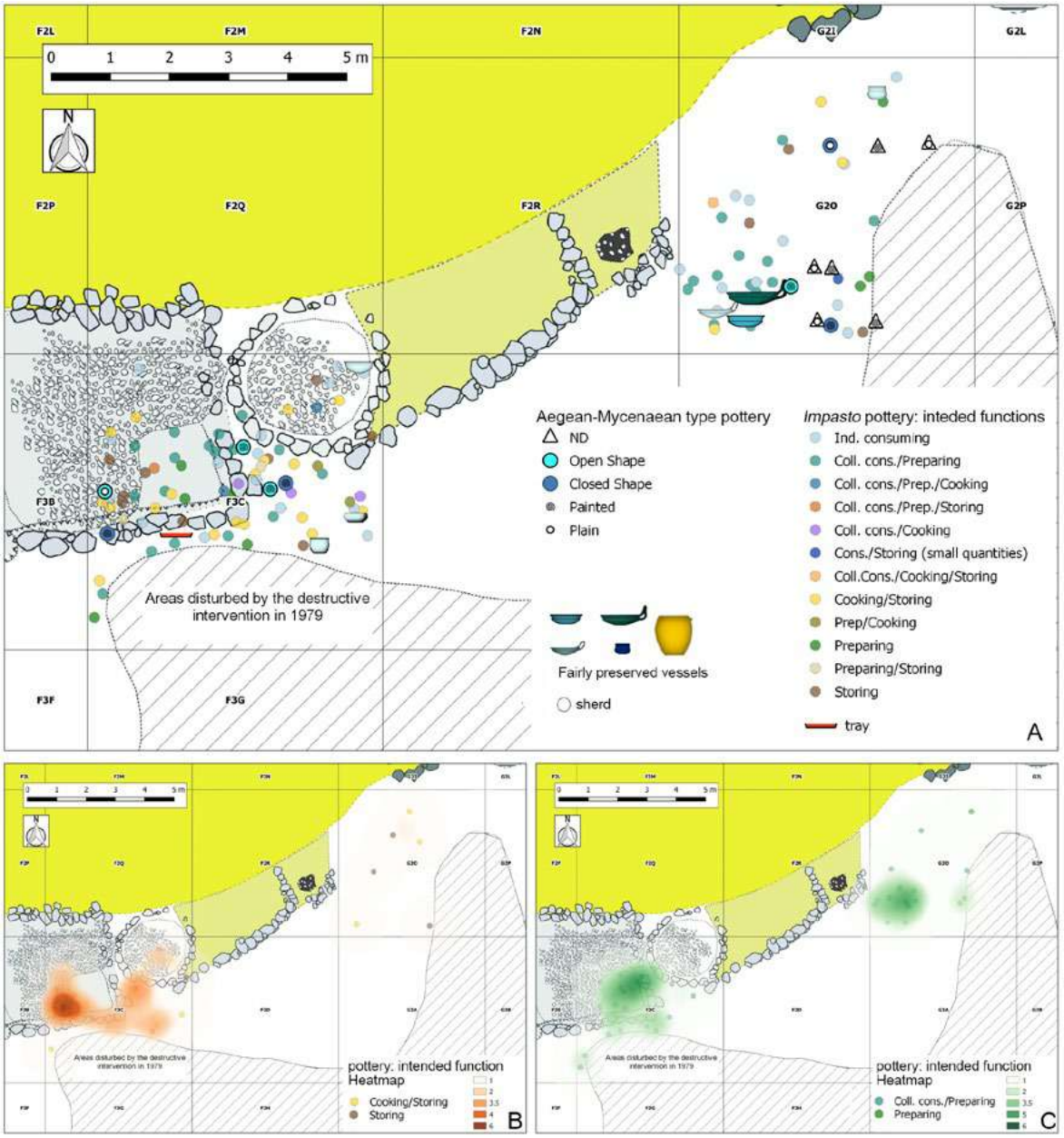

Figure 4. A: Spatial distribution of *impasto* and Mycenaean-type pottery. B: Kernel Density Estimation of cooking/storing vessels/sherds distribution. C: Kernel Density Estimation of collective-consuming/preparing vessels/sherds distribution.

eastern part of the open space (G2O; this is the largest collection in the entire settlement, see Recchia 2012). Their function is puzzling indeed. Similar yet smaller objects have been interpreted as tokens (Mammina *et al.* 1999), but they might have served a range of purposes from that of game-pieces to functional tools.

Generally speaking, there is a clear difference between the distribution of items in the various zones, both on a quantitative and qualitative basis. Virtually none occur just outside the building in F3C (apart from the thick metal item), while inside the building, tools related to textile productions chiefly occur. Antler blanks also appear to be kept inside the room. Conversely, the open space (G2O) has yielded a different array of objects, mostly including tools (often fragmented) but also blanks and semi-processed pieces, besides fragments of bronze ornaments. (E.L.)

Type of tool	F3C (room west)	F3C (entrance/outside)	G2O (open space)	Total
Retouched flake	0	1	1	2
End-scraper	1	3	0	4
Side-scraper	0	0	1	1
Notch	1	0	1	2
Denticulate	1	0	0	1
Total	**3**	**4**	**3**	**10**

Table 3. Number of stone artefacts per types across the various zones.

5.3. Stone artefacts

During the Late Bronze Age, the production and use of stone tools, especially knapped flint tools, was gradually decreasing in Italy until it virtually ceased in the Final Bronze Age/Early Iron Age. Most of the products at the site in this period were indeed expedient (Mironti 2018; Mironti and Moscoloni 2016, 2014). The knapped stone assemblage from the analysed spaces consists of 107 items (Table 3). Of these some 20% have fractures that hamper the observation of specific features and their correct classification. All the objects are made of flint and the vast majority (approximately 95%) are obtained from flint pebbles, which are the commonly exploited raw materials at the site. The overwhelming majority of artefacts (87) are unretouched, with retouched tools (Figure 3.11-13) and cores numbering but 10 respectively. The considerable number of cores possibly testifies of knapping activity in this area. On the other hand, refitting has proven fruitless, which fact argues for the flakes being obtained from different cores, which seem not to have been preserved in this area. Nonetheless, the pebble nature of the exploited raw materials indeed hampers the refitting procedure. It is very likely then that the entire process of knapping, use and discard took place in this general area. Retouched tools mostly include implements suitable for bidirectional longitudinal movements (van Gijn 2010), i.e. end-scrapers, side-scrapers and notches. Two of the retouched tools (an end-scraper and a denticulate) show traces of re-use, such as the removal of the patina: re-use of stone tools was a common practice at the site throughout the Bronze Age. (V.M.)

The distribution of stone artefacts across the various areas is uneven, in terms of both quantity and functionality (Figure 5.A). Only a few items were preserved inside room west (F3C), while the vast majority appear to be clustered in between the entrance area of room east and the open space just outside it (F3C), which we consider as a single zone. A certain number of artefacts occur in the open area near the hearth (G2O). The core/flakes ratio in the west room is quite low (1 core for every 18 flakes) and it is even lower in the area near the hearth (1 core for every 23 flakes), while in the entrance/outside area of the building it tends to increase (1 core for every 6 flakes). Conversely, the ratio between tools and flakes in the west room and in the space near the hearth is similar (1 tool for every 8 flakes), but this drops very slightly in the entrance/outside area (1 tool for every 9 flakes). The observed differences speak in favour of diverse activities having been performed at the various zones. Knapping in all likelihood took place in the entrance/outside area of the building: this was well-lit (a pattern similar to what has been observed at the other Late Bronze Age building analysed in the site: Moscoloni *et al.* 2002). The stone assemblage in the open area (G2O) may well be related to craft activities and/or butchering: this would fit quite well with the distribution of both semi-processed/blanks and animal remains (§5.5). (M.V.)

5.4. Plant macro- remains

Plant remains retrieved from the analysed samples (6782 in total, grid F3C) reveal a rich assemblage (more than 50 taxa) dominated by charred cereal grains. Since the quantity of sediment per samples differ (Table 1), values of remains have been standardised based on the concentration of

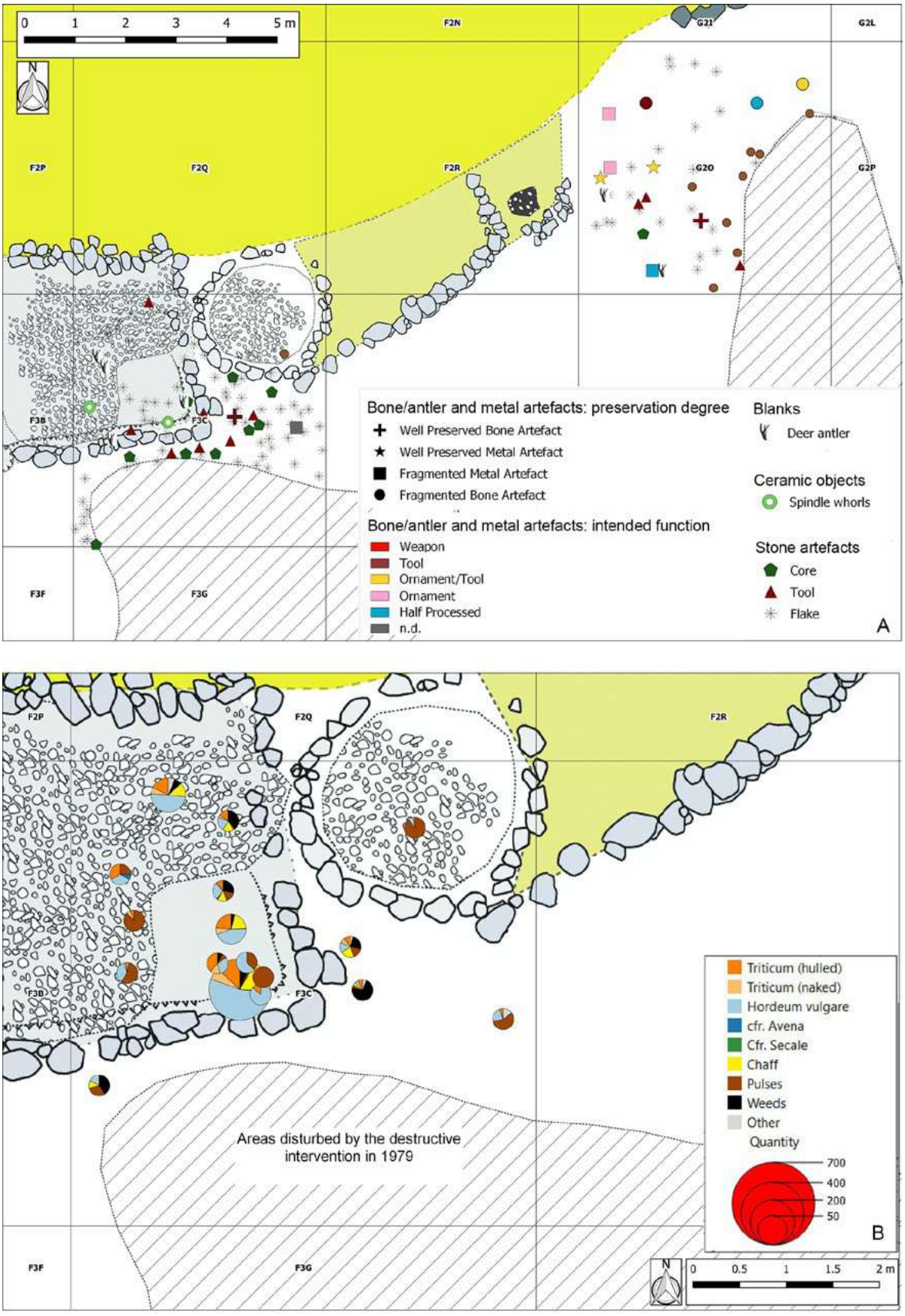

Figure 5. A: Spatial distribution of stone artefacts and metal, bone/antler and ceramic objects. B: Localisation and assemblage pattern of botanical samples from grid F3C.

plant remains per litre of soil. Among the cereals, barley (*Hordeum vulgare*, *H. vulgare* var. *nudum)* and hulled wheat (*Triticum monococcum, T. dicoccum, T. spelta*) have the highest incidence, with chaff elements very common and characteristic (spikelet fork, glume bases, rachis fragments). Charred remains of weeds are also well attested (such as *Chenopodium*, *Medicago*, *Malva*, *Lithospermum*, *Stellaria*, *Fumaria*, etc), followed by naked wheat (*T. aestivum/durum/compactum*), pulses (especially *Vicia faba* var. *minor*) and other wild species, including those typical of marsh environment (*Cladium mariscus, Carex, Suaeda*).

The spatial distribution of plant remains across the two rooms and the adjacent open space falling in grid F3C (Figure 5.B) significantly differ, showing distinctive patterns (grains *vs* chaff and weed ratio) in the recovered assemblages. Samples from the south-east corner of the west room have the highest concentration of cereal grains and a large proportion of chaff that is always accompanied by a few weed seeds. This combination has been often interpreted as the result of crops storage practices in which cereals were preserved as spikelets, before being subjected to the final steps of the processing (Hillman 1984; Jones 1984). The samples recovered in the zone of the entrance and in the adjacent open area are marked by a notable percentage of weed seeds and moderate percentage of chaff and fragmented cereal grains. According to the ethnobotanical literature this evidence can be interpreted as the residual by-products (deliberately charred) of the processing activities (winnowing and sieving) that possibly took place in nearby areas. The plant macro-remain assemblage in the sample from the east room significantly differs: the concentration per litre is low and is dominated by charred pulses. Since no traces of burning have been detected in the west room (nor anywhere in the entire area), the high concentration of charred cereal grains, chaff and weeds there possibly represents a secondary (deliberate?) dumping of refuse (*sensu* Schiffer). We must assume, in fact, that already burnt crops were brought into the room on purpose, but what was this purpose is very difficult to figure out. As this assemblage includes small-size remains and its nature reflects that of stored crops, the original storing place (that got burnt) must have been close by. (G.F., M.P.)

5.5. Animal remains

A total of 2,212 animal remains are recorded in the two analysed grids (F3C and G2O). The animal bone assemblage follows the general pattern already observed at the settlement during the Late Bronze Age (Minniti in press; Siracusano 2012). It is dominated by the remains of the main domestic animals – cattle, sheep, goats and pigs – totalling 74% of the material recovered. Sheep and goat are the most common species, according to the number of identified specimens (NISP) with 64%; cattle and pigs are less represented respectively with 20 and 15%. The remains of wild animals are less in number, but a certain variety of species can be observed. Red deer is the main one represented, followed by roe deer and wild boar; badger, wolf, fox and hare are added to them. Wild birds, tortoise and fish should have also contributed to the diet of the inhabitants, although in a very minor role.

The representation of body parts suggest that red and roe deer were mainly hunted for meat, although antlers (§ 5.2) were certainly worked. Cattle were mainly slaughtered as adults. This suggests an economy probably geared towards the use of cattle as traction animals for ploughing. Sheep and goats were kept for mixed purpose, both meat and secondary products. All pigs were slaughtered before reaching two years of age; a certain consumption of suckling pigs is also documented.

The 50% circa of animal remains in the areas under scrutiny is made up of small fragments that were not identified as species and body part. These are far more abundant in the open space, which echoes the pattern seen in the pottery fragmentation. Looking at the spatial distribution (Figure 6), species frequency across areas differs greatly in term of meat yield. The red deer sample is characterised by a strong bias towards certain body parts, such as limb extremities; these are

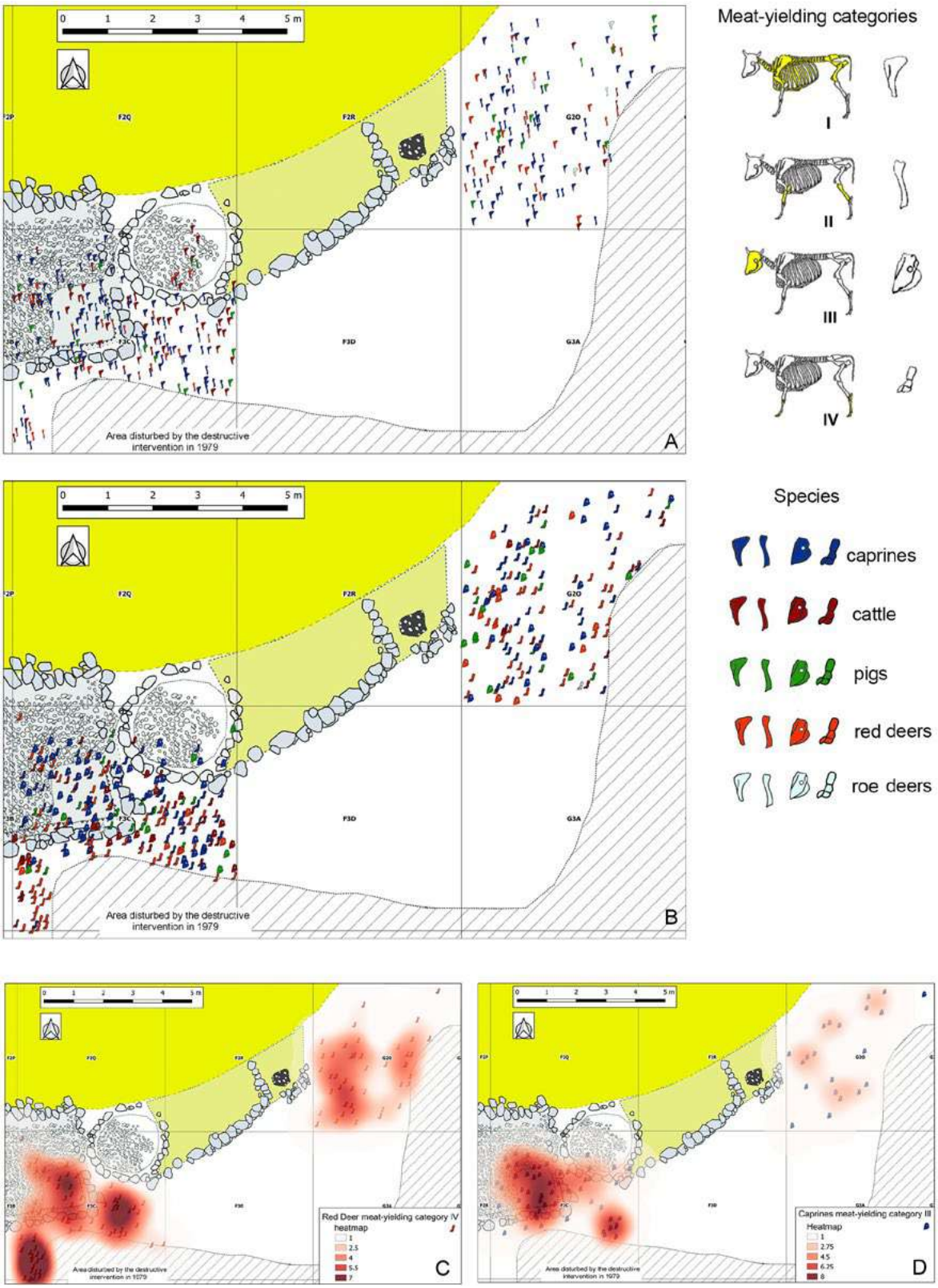

Figure 6. Spatial distribution of animal remains according to meat-yielding categories. A: distribution of high-meat-yielding elements (all species); B: distribution of low-meat-yielding elements (all species); C: Kernel Density Estimation of red deer limb extremities (4th meat-yielding category); D: Kernel Density Estimation of caprine skull bones (3th meat-yielding category).

particularly met with in the western room (F3C), the outside adjoining space, and the open space near the hearth (G2O), suggesting evidence of either leather working or the occurrence of processed animal skins. High-meat-yielding elements of all main domesticates, cattle, caprines and pigs, are clustered in the west room. This may reflect the storage of animal food. Bones yielding high-quality meat also occur in large number in the open area close to the hearth. As these are associated with elements with little or no meat, it is most likely that carcasses where processed in this space and/or entire animals were cooked and/or consumed. This latter hypothesis fits quite well with the distribution of pottery (mostly collective consumption/preparation vessels) and lithics. In the western room the concentration of low-meat-yielding elements, mainly represented by caprine mandibles with their teeth well preserved, is particularly high. If their collection here inside the structure was deliberate, they might represent raw material for producing smoothing tools. (C.M.)

6. Concluding remarks

The statistics and spatial distribution analyses have proven fruitful; they suggest that the observed depositional set, despite being affected by anthropic agents, falls into the category of 'primary refuse', chiefly resulting from repeated activities carried out on the spot. In particular, the integrated analysis of artefacts and ecofacts has revealed specific patterns of management, processing and consumption of primary goods.

The analysed area is thought to be the residency of an emerging kin-group (§ 2.2). Various pieces of evidence prompt this opinion: these include the distinctive location of the building and the occurrence of a number of Aegean-Mycenaean-type sherds. Some of the recognised activities are indeed consistent with a differentiated role of the group using the area, yet other activities appear to be more ordinary.

In the open area close to the hearth (G2O) animal bones reveal activities of butchering and/or consumption of the entire animal. This coupled with the evidence of pottery, suggesting possible practices of consumption with symbolic meaning, such as feasting (Cazzella and Recchia 2013). This would fit well with the hypothesis of the group that occupied this area having an emerging social position and role. In the same open area (G2O), the occurrence of blanks/half-processed antler/bone items and stone tools/flakes plus some bronze ornaments/tools can be related to craft activities and possibly jewellery making. These items were probably connected with the existence of a kind of atelier located just to the east of this area (Cazzella and Recchia 2015). Was this latter – and the performed craft activities, controlled by the kin-group occupying the analysed building?

The interpretation of evidence from the west room is not straightforward. The pottery assemblage dominated by storing/cooking vessels and the occurrence of high-meat-yielding animal bones suggest that this part of the building could have been devoted to storage purposes, which would have included that of blanks/animal raw materials. On the other hand, the conspicuous assemblage of plant macro-remains is the result of a deliberate action of discard from a (close) burnt crop-storage structure. Nonetheless, we cannot rule out that crops were actually kept there, but have vanished from the archaeological record (as might other organic remains) in the absence of fire events. Every day activities, such as those related to textile manufacture and stone knapping were probably carried out in the zone of the building's entrance and the adjacent open area.

The positive results obtained from the zones here studied are such as to encourage one to expand the spatial distribution analysis to the entire area and furthermore to the adjacent sectors. Despite this part of the Late Bronze Age settlement not having been subjected to sudden collapse/destructive events, deposits recovered there are not dramatically altered by post-depositional agents. The relation between artefacts and ecofacts appear to be telling about past activities and differentiated pattern of uses of the spaces. Comparisons with both other areas of the Coppa Nevigata settlement and further coeval contexts will produce a deeper understanding of the social organisation of

both management/consumption of primary goods and craft activities; it will further highlight similarities and differences within and between communities. (G.R., E.L., G.F., C.M., M.P., V.M., G.S., M.V.)

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