All or Nothing: Spatial Analysis and Interpretation of Archaeological Record Based on the Integration of Artifactual, Ecofactual, and Contextual Data at the Medieval Site of Komana

Mustafa Nuri Tatbul

1 Introduction

This paper is derived from one of two pilot studies implemented in order to integrate multiple ecofactual and artifactual data types and to deal with highly disturbed archaeological record (For the application and results of the first pilot study see Tatbul 2013). It aims at defying function of a complex and densely built area from the twelfth- to thirteenth-century Danishmend/Seljuk phase at Hamamtepe. This area has multiple rooms, and almost each of them has oven installations. Often, several ovens are found within each room. Despite the fact that the ovens seem to have been used for cooking, their high number may indicate that they also supported industrial activities. Another difficulty in specifying the function of these rooms was the small number of in situ artifacts and the very poor preservation of floor deposits for which very little and fragmentary evidence remained. The study presented in this article involves a spatial investigation of one of the rooms aimed at understanding the character of the archaeological record, especially the room fill as a potential indication of the room function in terms of different activities carried out inside (For the detailed spatial analysis of the archaeological data of Danishmend/Seljuk occupation phase at Komana, see Tatbul 2017).

In particular the objectives of this study are threefold: (1) to understand the nature of the archaeological record in terms of *primary* and *secondary refuse* depositions (see Schiffer 1996; 1972) and understand a complex of post-abandonment processes, (2) to integrate different categories of artifacts and ecofacts and reconstruct the character of activities card out in these contexts, and (3) to define strong contextual ties between space, features, and artifacts/ecofacts as the elements of this spatial unity.

M. N. Tatbul (✉)
ANAMED-GABAM Post-Doctoral Research Fellow (2017–2018), Koç University, İstanbul, Turkey
e-mail: mtatbul17@ku.edu.tr

E. Pişkin et al. (eds.), *Environmental Archaeology*, Interdisciplinary Contributions to Archaeology, https://doi.org/10.1007/978-3-319-75082-8_11

2 Historical and Archaeological Context of Komana/Hamamtepe

Komana/Hamamtepe archaeological site is located in the Gümenek village, ca. 10 km northeast of the Tokat province of Turkey. It has been uninterruptedly occupied for about 2000 years from the Hellenistic to Ottoman periods. The modern-day village is expanded over the remains of the ancient settlement (Fig. 1).

As a result of the excavations carried out since 2009, a large number of ceramics and architectural remains from the Hellenistic and Roman periods have been revealed (Erciyas and Tatbul 2017; Erciyas and Tatbul 2016; Erciyas and Tatbul 2015; Erciyas 2014; Erciyas et al. 2011). The earliest evidence of architecture comes from the early Byzantine period and is represented by mortared wall foundations (for detailed information on the phases and layers, see Erciyas et al. 2015). It was followed by a cemetery phase accompanied by two adjacent middle Byzantine chapels dated back to the tenth to eleventh centuries and later by Danishmend/Seljuk occupation of twelfth to thirteenth centuries, where the archaeological record reflects a prosperous period at the site, as indicated by dense industrial and domestic production, consumption, and discard behaviors. The twelfth to thirteenth centuries occupation at the site is represented with rooms that were constructed with dry walls. Numerous ovens and pits were recovered within these spaces. These features have rich contents of refuse disposals such as artifacts, animal bones and plant

Fig. 1 Aerial view of Komana/Hamamtepe archaeological site (Source: KARP archive)

remains. Density of utility features and archaeological materials suggests a very busy daily life at the site. The site is encircled with a fortification wall, which was first used in the earlier Byzantine times and then restored and used during the twelfth to thirteenth centuries by the Danishmends/Seljuks.

The latest occupational level comprises the sixteenth- to seventeenth-century Ottoman dwelling units and probably stables, where larger spaces with fewer utility features (ovens and pits) have been observed. The only material evidence from the Ottoman phase comprises a very small number of pottery, coins, and terra-cotta tobacco pipes.

The site is significant for its elevated position in the middle of a valley, its location in the Yeşilırmak (Iris River) basin and trade as well as transportation route, fertile agricultural and pasture lands, and a variety of natural resources.

3 The Nature of Archaeological Record

3.1 Formation and Depositional Processes

The excavations at Hamamtepe revealed a significant degree of depositional and postdepositional processes. A number of the tenth- to eleventh-century graves got truncated by the construction of the twelfth- to thirteenth-century Danishmend/Seljuk structures. Similarly, the construction of the sixteenth- to seventeenth-century Ottoman floors and wall foundations considerably truncated the twelfth- to thirteenth-century occupational levels by destroying different features and disturbing spatial arrangements of different types of artifacts.

Hence, while studying the twelfth- to thirteenth-century deposits, it is required to understand the character of formation processes and their impact upon archaeological deposits. In terms of interpreting the archaeological record while conducting spatial analysis at intrasite level, Schiffer's definitions of behavioral patterns, whether *primary* or *secondary refuse* originated from intrasite activities, are required for comprehensive understanding of the nature of archaeological record.

Accordingly, the archaeological materials originating from the twelfth- to thirteenth-century room have been systematically investigated in order to define *primary* and *secondary* refuse patterns taking place at Hamamtepe. Following Schiffer (1996: 1972), I defined primary refuse as originating from domestic activities within the room limits whenever these are associated with in-built feature. At the same time, I attempted to test whether any of the highly disturbed and fragmented materials from the room fill can be used to discern human behavior. In contrast to the room fill, plant data from oven and pit deposits are considered as direct evidence of human activities.

3.2 *Integration, Evaluation, and Interpretation of Different Strands of Evidence*

Integration of plant remains and animal bone data remains one of the major tenets of environmental archaeology since the late 1980s (Marston et al. 2014). This goes in tandem with studies of formation and depositional processes of botanical assemblages (Marston et al. 2014). A thorough understanding and definition of preservation conditions and formation of macrobotanical assemblages from archaeological contexts is based upon routine procedures (Gallagher 2014).

In many archaeological studies, however, different categories of data such as pottery, metals, or glass still remain to be studied separately. However, in some other instances, plant remains and animal bones are studied separately, but their interpretation is coordinated and integrated (Van Derwarker 2010, 65). A quantitative integration of both types of data is rather uncommon. Van Derwarker (2010) proposes five simple measures of data integration: ubiquity, diversity, ratios, correlation, and spatial analysis (Van Derwarker 2010). Integration of flora and fauna is particularly crucial as both types of data are of significant value for studies of agropastoral economic production, exchange, and consumption. Moreover, they are the strongest indication of primary domestic activity in the form of consumption refuse and storage (See Twiss et al. 2009: a spatial analysis case study of a Neolithic house at Çatalhöyük, where the team identified household organization in food storing activities through organic data types).

Not only integration of plant remains and animal bones but also artifactual data are important for studying the past processes. Different categories of artifacts can be used for studying different forms of production, storage, and consumption. These can also be used for recognizing activity areas and function of different in-built features, such as fire installations and pits.

An efficient integration of these three types of data is only possible by careful examination of contexts in which they occur (See Putzeys 2007: for his spatial and contextual analysis of entire archaeological data recovered in specific areas at the Roman site of Sagalassos. His comprehensive analysis integrates all data in hand). Smith (2013) proposed a procedure for identifying a cesspit in archaeological record integrating contextual stratigraphic formation and faunal, floral, and cultural data. By studying the twelfth- to thirteenth-century medieval cesspit at Komana, we distinguished a combination of rich mineralized macrobotanical remains mostly grapes and fig seeds; animal bones of nonfood species such as rodents, cat, and insects; well-preserved artifacts; and pit fill of greenish sandy soil with a suitable structure for water retention in the bottom (Fig. 2).

While studying household activities at Fortuna Domus (Cartagena, Spain), Bermejo and Quevedo (2014) have undertaken a comparative spatial analysis between two occupation phases integrating all artifact groups and macrofaunal remains aimed at recognizing production, redistribution, and consumption patterns. This approach made it possible to distinguish social and economic patterns of household activities in successive occupational phases, even though the quality and

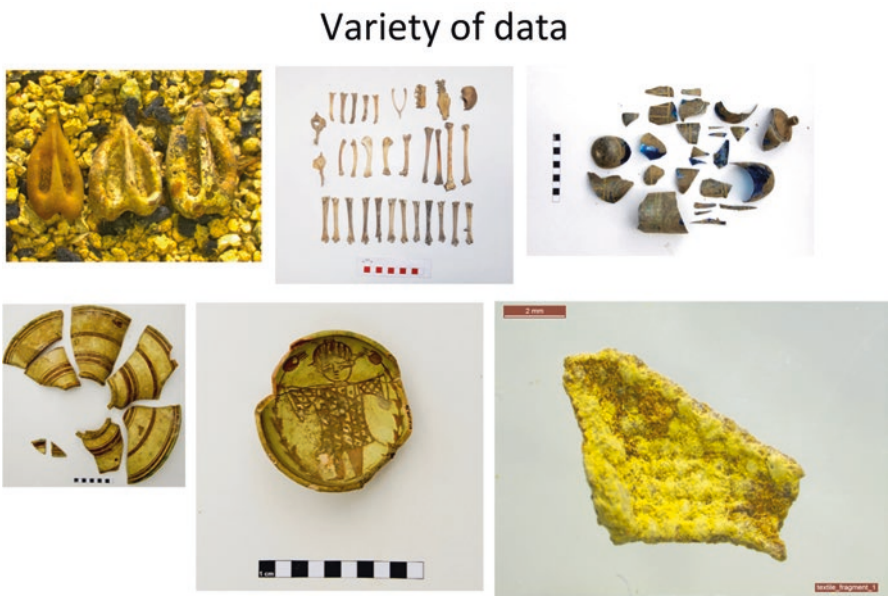


Fig. 2 Composition of materials recovered from the twelfth- to thirteenth-century Medieval cesspit at Komana (Source: KARP Archive) from left to right, at top row mineralized grape seeds, bird bones, blue perfume bottle, refitable fine ceramics, and a cloth fragment

quantity of available data was not always satisfactory. The analysis led to interesting results, e.g., recognition of different consumption patterns in two Roman phases, one dominated by a mixed seafood and ovicaprid diet while the other focused exclusively upon consumption of maritime resources.

Hardin (2004), in his study of activities related to food preparation and serving at domestic setting at the Iron Age Tel Halif, integrated architectural elements, various artifact types, microartifacts, and economic macrofauna and flora originating from a burned and well-preserved sealed context that was formed when a building collapsed due to a destructive event. He was able to differentiate artifactual, macrobotanical, and macrofaunal contents of five rooms to suggest activity types for each room such as food preparation, food storing, or weaving activities.

4 Methods and Materials

In this paper, a combined spatial, contextual, and statistical analysis has been adopted to study the case from the Komana site. However, due to a small number of available samples, neither ubiquity nor diversity measures have been studied.

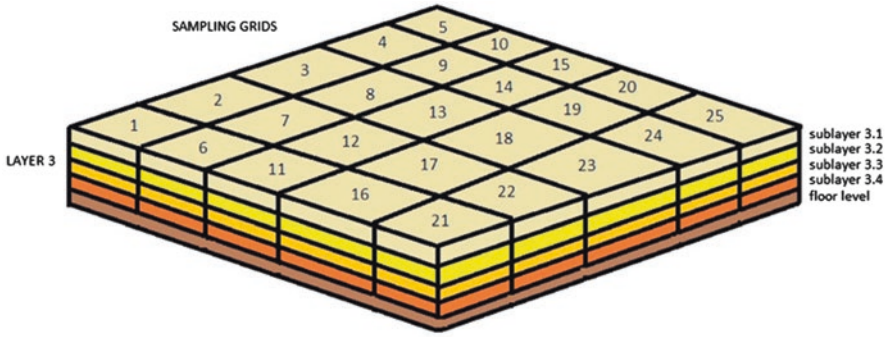


Fig. 3 An example of gridding applied in a 5 × 5 m trench

Fig. 4 Trench sampled in the case study (Source: KARP Archive)

4.1 Data Collection

In order to understand the formation of room fill right above the twelfth- to thirteenth-century floor and recognition of spatial patterning of different types of data pertaining to human behavior, the excavations were carried out in nine grids, each 1 m × 1 m, located in selected parts (Figs. 3, 4, and 5). The materials were collected in vertical and horizontal artificial delimited units in order to systematically record dispersal of different types of data, such as ceramics, metals, glass, small

Fig. 5 Grid sampling (Source: KARP Archive)

finds, animal bones, and plant remains. They were then identified and quantified and their distribution carefully recorded. After the establishment of the grids, remaining parts of the room that were out of the grids were also collected. In order to see any possible pattern of all the materials recovered within the room fill, these were later combined with the grid materials and evaluated together (as total materials of the room).

4.2 Soil Sampling

Soil samples were taken from layers and oven; a small container on a platform; an ashy pit, most likely related to ovens; as well as patches of open burnt layer.

4.3 Data

4.3.1 Ceramic Data

Ceramics recovered from the room were highly fragmented. They represented three major types: fine ware, cooking ware, and storage ware. The frequency of each type was calculated. Despite a significant postdepositional disturbance, their presence, along with ovens and faunal and botanical materials, was believed to indicate food-related practices.

4.3.2 Metal Data

Amorphous metal fragments and slags were found in room fill. They are indicative of metal production activity. The most common were nails, mainly associated with elements of wooden construction, both decorative and constructional.

4.3.3 Glass Data

Relatively common bracelets imply presence of fine glassware use, while frits and are indicative of glass production.

4.3.4 Botanical Data

Archaeobotanical data were recovered from the soil samples originating from four different contexts: container on a platform, the oven base, an ashy pit, and burnt layer patches. Cereals, legumes, and fruits were recovered but for the sake of simplicity were analyzed together. However, grapes were treated separately due to a special role it played.

4.3.5 Faunal Data

Animal bones were identified at species and anatomical element level. Highly fragmented and unidentifiable to species bones were also recorded at size categories as ox size, sheep size, pig size, and small mammal sized taxa. A distribution of bones within the room was analyzed in order to discern a mode of refuse disposal as well as subsistence-related practices.

4.3.6 Heavy Residue Data

HR of the soil samples was analyzed in order to see whether there was industrial acitivity within the sampled space. Fragments of production wasters such as glass, metal and ceramic slags were sought for.

5 Interpretation of Integrated Datasets

Out of three major types of ceramics, the most common was fine ware followed by cooking ware and storage ware (Fig. 6). The frequency of these types of ceramics was then calculated in subsequent layers above the floor.

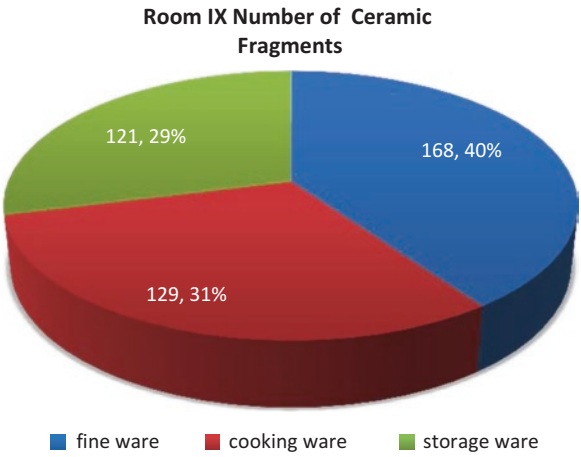
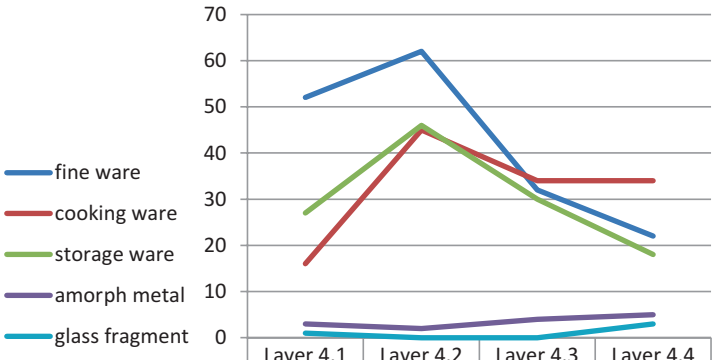


Fig. 6 Proportion of ceramic types in the fill of room IX



	Layer 4.1	Layer 4.2	Layer 4.3	Layer 4.4
fine ware	52	62	32	22
cooking ware	16	45	34	34
storage ware	27	46	30	18
amorph metal	3	2	4	5
glass fragment	1	0	0	3

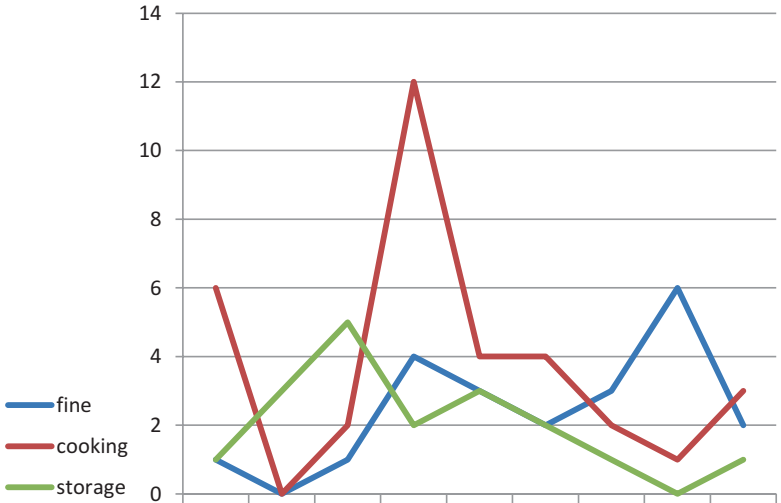
Fig. 7 Frequency of different categories of material in subsequent sublayers of room IX

Out of the four analyzed sublayers, Layer 4.2 contained the highest number of ceramics. In the absence of in situ ceramic vessels from the room floor, all three distinguished types are represented in a similar number. Pottery is accompanied by a few fragments of glass and metals (Fig. 7).

The horizontal distribution of ceramic fragments was only shown for the last sublayer (Layer 4.4), which was immediately over the occupation floor. Grid number 4 and 5 had the most concentration of ceramics (Fig. 8).

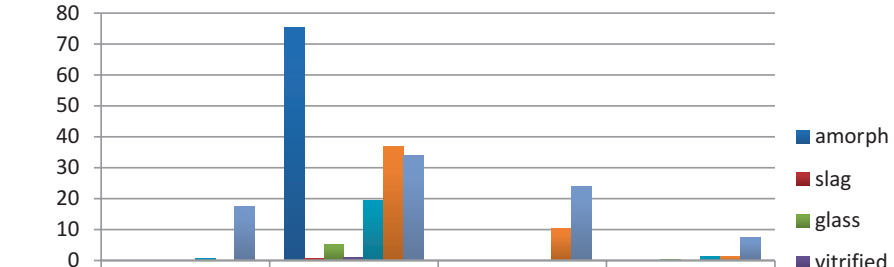
When the functional ceramic groups among the grids were analyzed, grid 4 showed significant concentration of cooking ware fragments, grid 8 fine ware, and grid 3 storage ware (Fig. 9).

Fig. 8 Layer 4.4 distribution of total ceramics among nine grids. The darker the coloring, the higher the number of ceramics



	4.4.1	4.4.2	4.4.3	4.4.4	4.4.5	4.4.6	4.4.7	4.4.8	4.4.9
fine	1	0	1	4	3	2	3	6	2
cooking	6	0	2	12	4	4	2	1	3
storage	1	3	5	2	3	2	1	0	1

Fig. 9 Horizontal distribution of ceramic groups among the grids of sublayer 4.4



	oven F38	pit Fx5	container F39	fill
amorph	0	75.27	0	0.08
slag	0	0.76	0	0
glass	0	5.04	0	0.44
vitrified	0	0.84	0	0.15
fine	0.6	19.51	0	1.16
cooking	0	36.85	10.26	1.22
storage	17.46	33.88	24.07	7.38

Fig. 10 Quantified HR samples (grams)

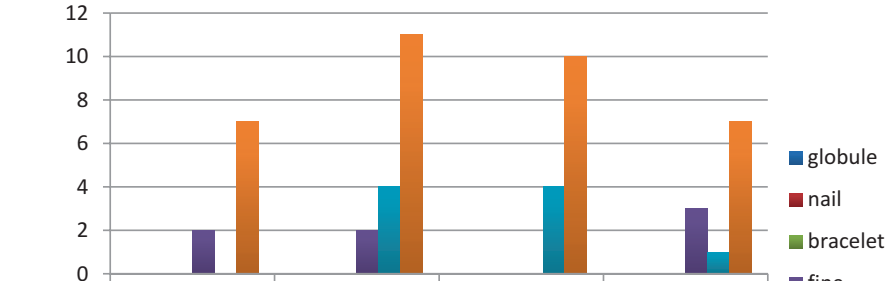
A lack of slag and other waste-related materials related to the production of ceramics, metal, or glass implies a domestic character of the room, most likely related to food preparation. This is irrespective of a discovery of a piece of metal slag (260 gr) from the pit. It was most likely intrusive and may have originated from the adjacent area used for metal production.

HR sample from the oven F.38 does not contain any metal, glass, and slag fragments except for a few small pieces of fine and storage wares, most likely from the room fill. This indicates that the oven was used for nonindustrial purposes (Figs. 10 and 11).

HR sample from a soft pit (Fx5) contained a very low number of metal, glass, slag, and ceramic fragments which were insufficient to imply any special refuse or industrial activities. These results rather imply food-related activities in room IX.

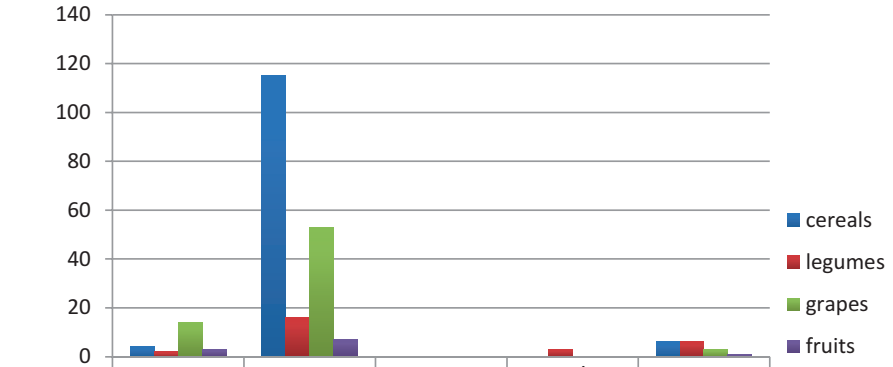
Archaeobotanical data recovered from the oven and pit was the most direct evidence of food preparation activities (for the preliminary archaeobotanical report on the excavations see Pişkin and Tatbul 2015). This is further corroborated by presence of a considerable number of cooking pots from the room fill as well as an oven rake-out.

Soil samples from oven (F38) revealed presence of charred economic plant remains such as cereals (4), legumes (2), grapes (14), and fruits (3). A large number of organic material including 115 cereals, 16 legumes, 53 grapes, and 7 charred fruit remains were found on another pit (Fx5) (Fig. 12). Both oven and pit clearly contained refuse materials, in particular charred plant remains, most likely related to food preparation.



	oven F38	pit Fx5	container F39	fill
globule	0	0	0	0
nail	0	0	0	0
bracelet	0	0	0	0
fine	2	2	0	3
cooking	0	4	4	1
storage	7	11	10	7

Fig. 11 Quantified HR samples (No. of specimens)



	oven F38	pit Fx5	cooking pot	container F39	fill
cereals	4	115	0	0	6
legumes	2	16	0	3	6
grapes	14	53	0	0	3
fruits	3	7	0	0	1

Fig. 12 Plant remains in different contexts

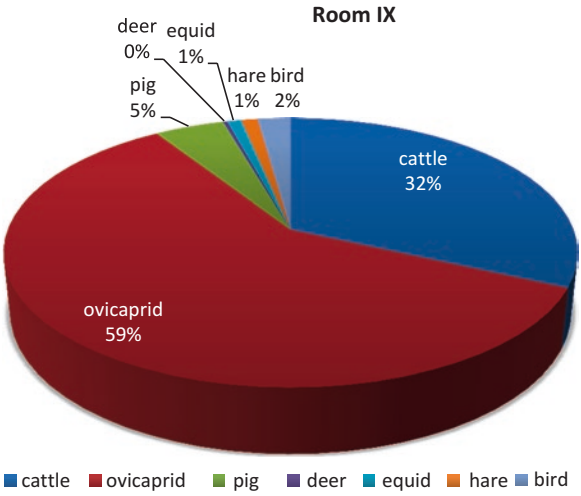


Fig. 13 Animal species composition in room IX

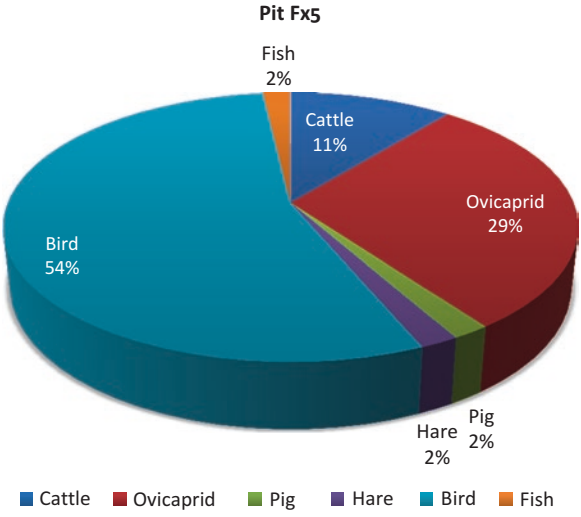
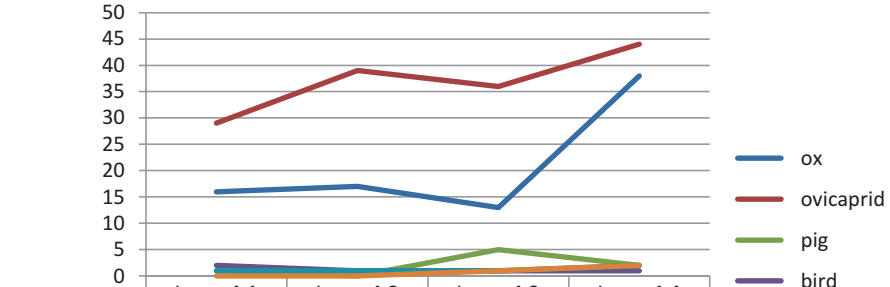


Fig. 14 Animal species composition in Pit Fx5

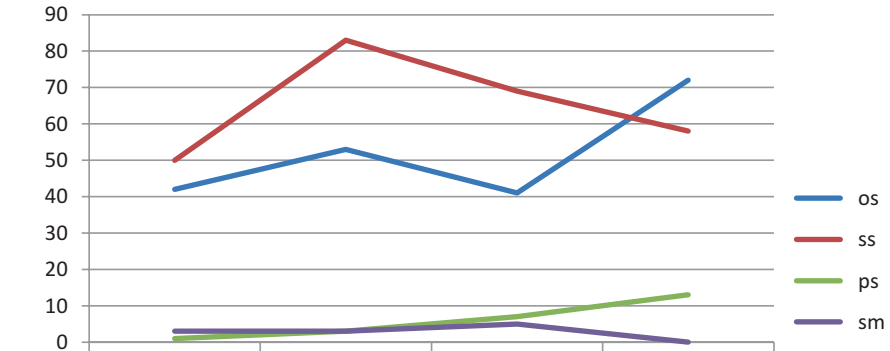
Zooarchaeological data indicate the exploitation of ovicaprid, cattle, pig, as well as birds, hare, and fish. The assemblage is dominated by sheep/goats (59%) and cattle (32%) (Fig. 13). Interestingly, bird bones are by far the most common species in pit (54%) followed by ovicaprids (29%) and cattle (11%) (Fig. 14). Through HR analysis, it was possible to record fish (2%).

NISP showed that ovicaprid bones are the most abundant species in all sublayers, outnumbering cattle, the second most common species (Fig. 15). Pig, bird, hare, and equid bones are much less common. The same pattern is observed for the unidentified fragments at animal size level. While sheep-size bone fragments dominate in



	Layer 4.1	Layer 4.2	Layer 4.3	Layer 4.4
ox	16	17	13	38
ovicaprid	29	39	36	44
pig	1	0	5	2
bird	2	1	1	1
hare	1	1	1	2
equid	0	0	1	2

Fig. 15 Animal species composition in subsequent sublayers



	Layer 4.1	Layer 4.2	Layer 4.3	Layer 4.4
os	42	53	41	72
ss	50	83	69	58
ps	1	3	7	13
sm	3	3	5	0

Fig. 16 Unidentifiable animal bone fragments in size categories (ox size, sheep size, pig size, and small mammal size)

three uppermost sublayers, cattle-size bones dominate in Layer 4.4 (Fig. 16). Pig-size and small mammal bones are much less common.

In sublayer 4.4, animal bones are mainly concentrated in grids 4 and 5 (Fig. 17). This corresponds with the concentration of ceramics in these contexts. However, the reason for overrepresentation of both categories of data in both grids is unclear.

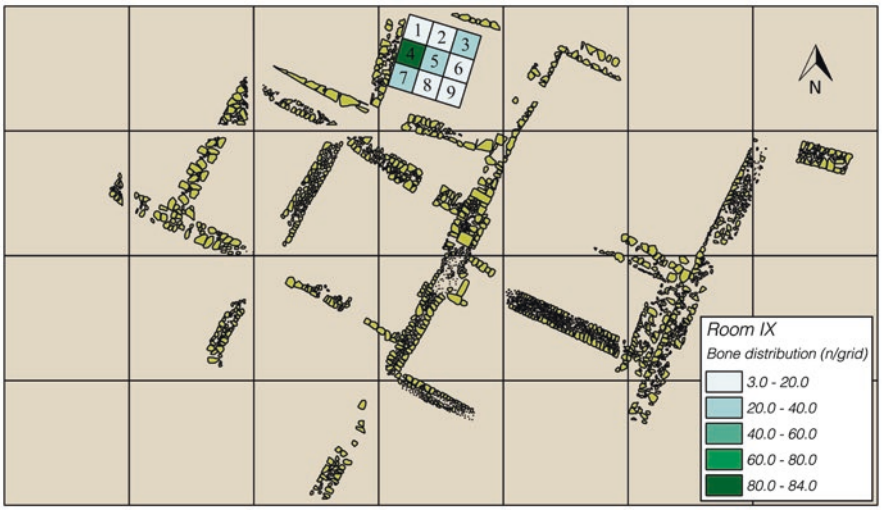


Fig. 17 NISP of animal species in grids of Layer 4.4

The faunal assemblage from the room IX fill (59% ovicaprid and 32% cattle) (Fig. 13) was quite similar to a species composition at the twelfth- to thirteenth-century Komana with dominance of ovicaprids (66.3%) and cattle (30.6%) (Pişkin 2015, 117–8). However, the assemblage recovered from a pit context (Fx5), most likely a primary refuse, is characterized by entirely different species composition dominated by bird bones (54%), followed by sheep/goats (29%), cattle (11%), pig (2%), and hare (2%) (Fig. 14).

These assemblages imply a significant difference between room fill and pit contexts. This difference is most likely attributed to distinct behavioral pattern indicating special refuse disposal practices related to consumption of birds.

6 Conclusions

At glance, it is clear that all major pottery types, animal and plant species are present in the assemblages.

A detailed contextual sampling strategy employed at the site made it possible to discern spatial distribution of different categories of data. Accordingly, clusters of ceramics and bones have been recorded in two grids, but they do not remain associated with in-built structures such as oven and pit. This does not come as a surprise considering a high level of fragmentation of different categories of materials implying a significant impact of postdepositional processes. The character of paleoenvironmental data is also very informative. For instance, animal species composition was clearly different in room fill and pit. While the former is similar to species

composition for the entire settlement, the corresponding species proportions in pit are completely different.

These differences are most likely attributed to the origin of these two assemblages. Both the oven and pit are closed contexts more likely representing the remains of the "last use" of these features and therefore the "last use" of the room while materials from the room fill may have been accumulated over a significant period of time. These observations prompt us conclude that the room fill appears to be unsuitable for recognizing its spatial organization and that the fill itself can be highly differentiated.

Integration of archaeobotanical, zooarchaeological, and artifactual data, along with their clearly contextual analysis, offers a heuristically valuable solution for discerning and understating activity patterns in different dwelling structures. The analyzed materials from both in-built structures and the fill of room IX at Komana clearly indicate food-related activities. While the importance of artifacts from this standpoint is problematic, ecofacts provided more reliable and direct evidence.

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