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RESEARCH

Zooarchaeological perspectives on the medieval consumptionscape at Monte Iato (Sicily)

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Abstract

This paper presents faunal remains from medieval Monte Iato in Western Sicily. Five assemblages from independent architectural structures in close spatial proximity are discussed. The architectural features from which the material was recovered date to the 13th century AD. At this time Monte Iato was a stronghold of insurrectionists under Arab leadership against Emperor Frederick II. During the ensuing power struggles the settlement on the mountain plateau was destroyed twice according to literary sources – in 1222/1223 AD and again in 1246 AD. Faunal remains from this time highlight different synchronous consumption patterns in close proximity. Three architectural units show a basic subsistence strategy focussing predominantly on sheep and goat. The other two units diverge significantly. Faunal remains from one house show a high percentage of deer and equid remains which can tentatively be linked to an elevated social status. The material from another house is dominated by pig, possibly due to a high proportion of residual bones. While the assemblages' diverging patterns were in part created by contrasting taphonomic pathways, they may also reflect the different socio-economic status of the consumers involved.

Keywords Zooarchaeology · Faunal remains · Medieval · Sicily · Monte Iato

Introduction

Since the 1970s the multi-phase settlement on the mountain top plateau of Monte Iato in the Western Sicilian hinterland of Palermo (archaeological site: 37°58'02"N 13°11'43"E) has been excavated by the University of Zurich. In addition, the University of Innsbruck has carried out excavations since 2011. During these excavations, which focussed on the (pre-)Greek and Roman periods, numerous medieval structures and finds were uncovered, providing ample evidence for a considerable settlement in the 13th c. AD (Weiss 2019; Isler 2000, 2018). This settlement served as one of the last strongholds of insurrectionists under Arab leadership against Emperor Frederick II. It was largely destroyed in 1222/1223 AD and again in 1246 AD (Isler 2000; Taylor 2003). Recent excavations uncovered evidence for destructions on Monte Iato in the 13th century AD (Kistler et al. 2013, 2014, 2018, 2021) and even for some limited rebuilding after the presumed final destruction in 1246 AD (Kistler et al. 2014; Feil et al. 2015; Mölk 2021). The medieval structures were found in close spatial proximity, arranged around a central courtyard (Fig. 1). Their scale and layout are comparable to hamlets of the Mediterranean/Islamic world (e.g. Gutiérrez Lloret 2013). One garbage pit and four houses/rooms (here numbered 1–4) were excavated. The faunal remains found within these structures are presented in this paper.

The garbage Pit lies to the southwest of the courtyard. It was approximately circular in shape, 80 cm deep and lined as well as covered with limestone-slabs (Kistler et al. 2021). House 1 consists of one room to the east of the courtyard and was built over an older medieval structure, which had been in use in the second half of the 12th century (Kistler et al. 2013). House 2 (Kistler et al. 2014), located at the north-eastern corner of the yard, originally consisted of a single room opening to the south, its northern wall built against the slope. This room was divided by a north-south wall into an eastern and a western compartment in a second

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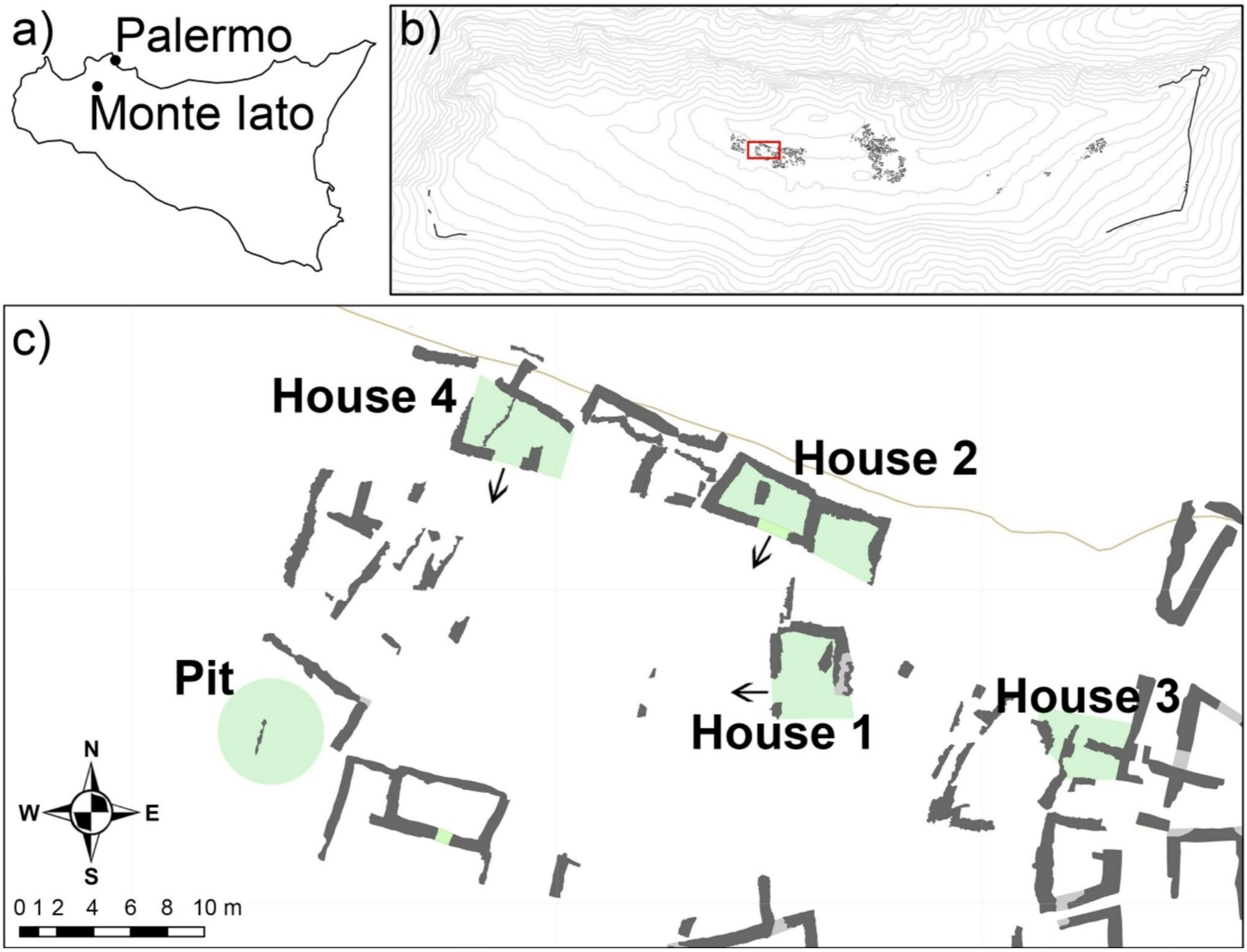


Fig. 1 Location of structures from which faunal assemblages are presented – (**a**) location of Monte Iato, (**b**) location of the courtyard complex on the mountain plateau, and (**c**) individual structures

phase. Abutting its north-eastern corner a new room was added to the east after 1254 AD, dated by a coin of King Conradin below the foundations of its northern wall. The artefactual inventory of this last phase was exceptionally rich and has been interpreted as a store of salvaged valuable materials from older medieval settlement layers (Kistler et al. 2014). House 4 is situated in the north-west corner of the courtyard-house group and opens to the south (Kistler et al. 2018). Its oldest phase, dated to the early 13th century, consists of parts of a south-Wall and a floor covered with a substantial layer of burnt debris. This destruction has been tentatively linked to the confrontation of Muslim warbands under the leadership of Muhammad Ibn ʻAbbād and troops of Emperor Fredrick II, resulting in the siege of Iato in 1222–1223 AD (Kistler et al. 2018; cf. Metcalfe 2009, p. 282; Böhmer 1881, p. 296; *1395; Friedrich II. 1222. Ind. 10. Imp. 2. Sic. 24). House 3 is located approximately 10 metres east of House 1. It is probably not part of the courtyard complex formed by the other structures presented here. Small portions of the walls with their stone floor paving were preserved. The recovered ceramic material shows an admixture of some medieval ware with abundant material from the Hellenistic/Early Roman period, suggesting a high proportion of residual faunal material (*sensu* Albarella 1996). This assemblage is nevertheless included, as it serves as a convenient counterpoint for comparison.

Materials and methods

From the floor and debris layers of the five contexts outlined above a total of 1,195 faunal remains with a weight of approximately 13 kg were collected by hand. Of these 367 remain unidentified, 191 were attributable to a size class, and 637 could be identified to species or in some cases to family level. A list of concordance with stratigraphical units analysed and presented is provided in Supplement 1. Some soil samples for wet sieving were taken from medieval contexts. However, their quantity and coverage of diverse medieval assemblages is not sufficient to effectively mitigate recovery bias against smaller animals and elements (cf. Payne 1972).

The faunal material was bagged with labels containing contextual data on site and washed at the excavation headquarters. The material was identified with the aid of a comparative collection and relevant literature (Pales and Lambert 1971; Schmid 1972; Barone 1976; Pales and Garcia 1981; Varela and Rodríguez 2004). Taxonomic nomenclature follows Gentry et al. (2004). Differentiation between sheep and goat, as well as roe deer, was attempted following morphological and osteometric criteria (Boessneck et al. 1964; Lemppenau 1964; Boessneck 1969; Payne 1985; Fernández 2001; Halstead et al. 2002; Zeder and Lapham 2010; Zeder and Pilaar 2010; Salvagno and Albarella 2017). Differentiation between red and fallow deer followed Di Stefano (1995) and Lister (1996). Differentiation between horse, donkey and hybrids was based on morphological and osteometric considerations (Eisenmann and Beckouche 1986; Peters 1998; Johnstone 2004). Three approaches to quantification are employed: Firstly, due to small sample size all identifiable specimens (NISP) were used for quantification, without restrictions to diagnostic zones, although this creates the risk of counting some fragmented elements more than once. Secondly, specimens were also weighed and quantified accordingly. This, however, will inevitably overrepresent larger and heavier animals in interspecific comparisons. For 17 specimens no weight was available, because they were inventoried as artifacts and therefore not stored with the faunal material. Thirdly, minimum numbers of individuals (MNI) were calculated based on element and side counts. Individual quantifications of the faunal materials by context are provided in Supplement 2.

Surface preservation was graded qualitatively on a five-stage scale from excellent to awful (loosely modelled on Behrensmeyer 1978). The presence of modifications was also recorded. Heat induced modifications were classified into singed, burnt, and calcined. Traces of gnawing were divided by their agent into modifications left by carnivores and rodents. Butchery marks comprise cut, chop and saw marks, as well as combinations thereof.

To estimate the animals' age, tooth eruption and wear was recorded based on the systems proposed by Grant (1982) for cattle, by Payne (1973 and 1987) for sheep and goat, and by Wright et al. (2014) for pigs, as well as the more general codes for development and eruption used by Ewbank et al. (1964). Age categories follow the definition given by O'Connor (1988) for cattle and pig, and Payne (1973) for sheep/goat. Wear of maxillary teeth was assessed employing these systems by recording the nearest morphological equivalent. To increase sample size loose teeth were also assigned to a probable range of age classes, based on the observed combinations provided by Grant (1982), Payne (1973) and Wright et al. (2014). Although including maxillary and loose teeth certainly decreases accuracy, it simultaneously increases sample size, which was imperative to enable the still tentative reconstruction of kill-off patterns from the small sized assemblages. In addition, fusions of diaphysis and epiphyses were recorded distinguishing between unfused, fully fused, and fusing, indicated by a still visible fusion line. The timing of long bone fusion is taken from Habermehl (1975) for domestic animals, Tomé and Vigne (2003) for roe deer, Mariezkurrena (1983) for red deer and Carden and Hayden (2002) for fallow deer. Ratios of females to males were established on a morphological and osteometric basis. Linear measurements are provided in Supplement 3. These follow the definitions given by von den Driesch (1976), with some additional measurements provided by Payne and Bull (1988), Davis (1987 and 1992), Albarella and Payne (2005), Llorente Rodríguez (2010), Viner (2011), Grimmberger (2017), Salvagno and Albarella (2017), Davis and Sendim (2020). For size comparison and to mitigate the small sample size the LSI method (Simpson et al. 1960; Meadow 1999) was employed for postcranial sheep elements. To assert compatibility with regional data summarised by Aniceti and Albarella (2022b) their standard – mean values of measurements on Shetland sheep published by Davis (1996) – was used, and their method in selecting specimens was largely followed: Only width measurements were used and identified goats were excluded. In contrast to their method, for the Monte Iato sheep also diaphysis widths (SD) were retained to increase the already very low sample size. Elements from young animals, identified by an unfused epiphysis or by the still forming bone surface in conjunction with a distinctively small size, were excluded to mitigate against the large variability of the diaphyseal measurement.

Results

Preservation, residuality and recovery bias

Regardless of identification, the faunal material can be described in terms of its modifications, fragmentation and surface preservation (Table 1; Fig. 2). Assemblage size is variable and ranges from only 36 specimens in the Pit to 459 in House 4. Average specimen weight indicates that fragmentation of material from the protected environment of the stone lined Pit was less severe compared to material from the floor surfaces and wall debris in the Houses 1–4. This trend is also observable in surface preservation, with a high percentage of well-preserved specimens from the Pit. In turn, this resulted in a higher percentage

Table 1 Summary of surface preservation and modifications

	Pit	House 1	House 2	House 3	House 4
number of specimens	36	142	320	238	459
weight (g)	575.6	1324.8	3499.7	2649.6	4913.6
average weight	16.0	9.3	10.9	11.1	10.7
Surface preservation					
excellent	10	16	45	23	54
good	23	59	155	137	283
medium	2	53	92	70	107
bad	1	13	26	8	15
awful	-	1	2	-	-
Carnivore gnawing	6	17	12	27	16
% of specimens with gnawing	16.7%	12.0%	3.8%	11.3%	3.5%
Butchery marks					
cut	7	10	14	5	16
chop	6	15	48	35	40
chop and cut	-	-	7	-	5
sawing	-	-	-	2	1
sawing and chop	-	-	1	2	-
% of specimens with butchery marks	36.1%	17.6%	21.9%	18.5%	13.5%
Heat modification					
singed	-	-	3	2	27
burnt	-	3	22	1	71
calcined	-	1	3	-	53
% of heat modified specimens	-	2.8%	8.8%	1.3%	32.9%

of identified specimens, corresponding to their better preservation. Comparatively few specimens could be identified from House 4 where surface preservation is worse and over 30% of specimens exhibit heat modifications. In fact, faunal material from House 4 was recovered mainly from the burnt debris of the structure, thereby preserving the inventory of a distinct moment in time, probably in the 1220s AD. As indicated by the low percentage of specimens with carnivore gnawing, this material was not accessible to dogs or other animals, testifying to the rapid interment and negating the possibility of an extended time of accumulation. Mirroring this explanation is the material from the Pit, where no heat modifications were observed, but carnivore gnawing affected a considerable portion of bones. Finally, the percentage of butchery marks also fits these diverse taphonomic pathways. While the Pit was a designated endpoint of the *chaîne opératoire* transforming an animal carcass into consumable portions and finally refuse, the material from House 4 never went through the latter stages of such a chain of events, due to the sudden destruction by fire.

Another assemblage, the material from House 3, on the other hand is likely to have an extended taphonomic history. Although the architectural features defining the house have been dated to the medieval phase of the settlement on Monte Iato by glazed medieval pottery, the bulk of the recovered pottery dates to Hellenistic and Roman times. Apparently older material must have eroded downhill from somewhere upslope to the north and covered the floor of the medieval structure. The faunal assemblage, originally in large part from pre-medieval times, thus ended its taphonomic history sometime after the abandonment of the medieval house, possibly even after the extensive destructions documented in literary sources for the middle of the 13th century AD. This case highlights what is to be expected and considered for other assemblages which have not been sealed either intentionally (e.g. with stone slabs in case of the Pit) or unintentionally by fast destruction and a massive layer of (wall) debris.

Another factor impacting the results needs to be mentioned: recovery bias. Soil from the five medieval contexts presented here was not sieved. Therefore, it is possible that smaller specimens were not recovered. Research by Öhlinger et al. (2021) on the Archaic contexts located in the same area on Monte Iato has highlighted the considerable impact of different recovery methods on the resulting composition of assemblages. However, the difference between the number of loose molars to premolars, with 8:3 for sheep/goat and 3:1 for cattle, is not too large thus suggesting low recovery bias.

Species frequency and consumption patterns

The total of the five assemblages is dominated by domestic animals (83 NISP%) (Table 2). Wild animals are best represented by deer (16 NISP% of total; 91 NISP% of wild animals). The very low number of small animals is probably reflecting a recovery bias. In many cases the fragmentary remains of morphologically similar species (Caprini, Equidae, Cervidae) could not be differentiated. Nevertheless, sheep seem to outnumber goats in a ratio of approximately 6:1. Most equid remains were not identified to species, but some definitive cases of horse and donkey testify to the simultaneous occurrence of both species on Monte Iato. One hundred remains of three different species of cervids – roe deer, red deer and fallow deer – have been found. While the identification of the four roe deer elements – two *Pelves*, a *Femur*, and a *Tibia* (cf. Supplement 2) – with the aid of modern reference material and according to the criteria published by Lemppenau (1964) and Fernández (2001) was less problematic, the differentiation between the similarly sized small insular red deer and fallow deer is complicated in many cases by fragmentation and surface preservation (cf. Aniceti et al. 2021). However, it is noteworthy that securely identified fallow deer was almost exclusively found in House 4, with only two other specimens in House 2. While House 4 has no definitive cases of roe and red deer, they

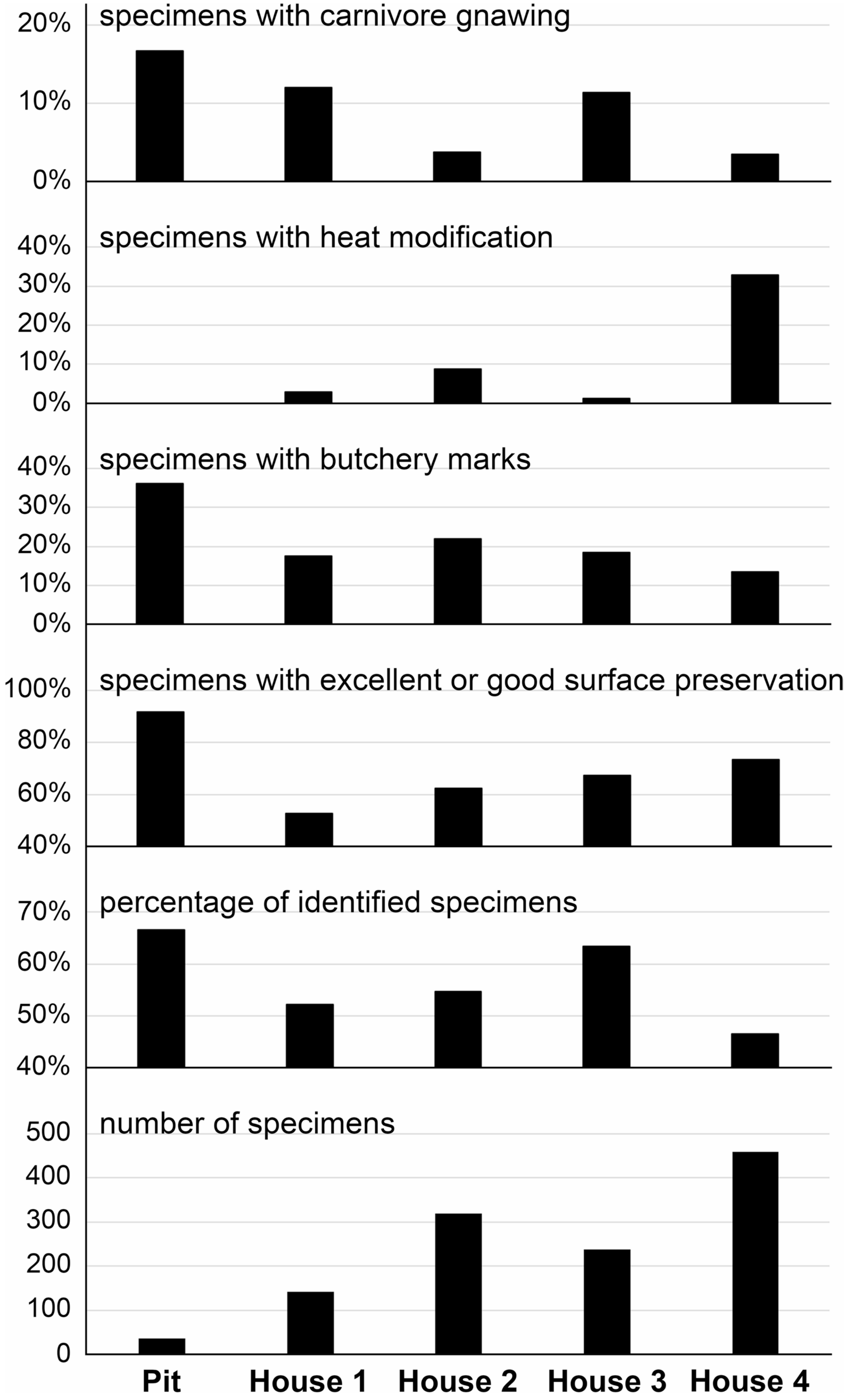


Fig. 2 Graphical summary of surface preservation and modifications

Table 2 NISP per taxa and assemblage

	Taxa	Pit	House 1	House 2	House 3	House 4	Total
domestic	Cattle *(Bos taurus)*	7	18	62	23	57	167
	Sheep *(Ovis aries)*	2	5	5	2	5	19
	Goat *(Capra hircus)*	-	-	2	-	1	3
	Sheep/Goat	11	24	65	26	45	171
	Pig *(Sus domesticus)*	-	14	15	86	8	123
	Horse *(Equus caballus)*	-	-	-	-	3	3
	Donkey *(Equus asinus)*	-	-	1	-	-	1
	Equidae	1	4	8	-	22	35
	Dog *(Canis familiaris)*	1	-	-	-	1	2
	Chicken *(Gallus gallus)*	-	-	1	-	1	2
?	Goose *(Anser* sp.)	-	1	-	-	-	1
wild	Roe deer *(Capreolus capreolus)*	1	2	1	-	-	4
	Red deer *(Cervus elaphus)*	1	1	1	7	-	10
	Fallow deer *(Dama dama)*	-	-	2	-	45	47
	Cervidae	-	4	9	6	20	39
	Hare *(Lepus* sp.)	-	-	-	1	2	3
	Hedgehog *(Erinaceus europaeus)*	-	-	-	-	1	1
	Tortoise *(Testudo hermanni)*	-	1	-	-	-	1
	Bittersweet clam *(Glycymeris* sp.)	-	-	2	-	1	3
	Cockle (Cardiidae)	-	-	1	-	1	2
	Total	**24**	**74**	**175**	**151**	**213**	**637**

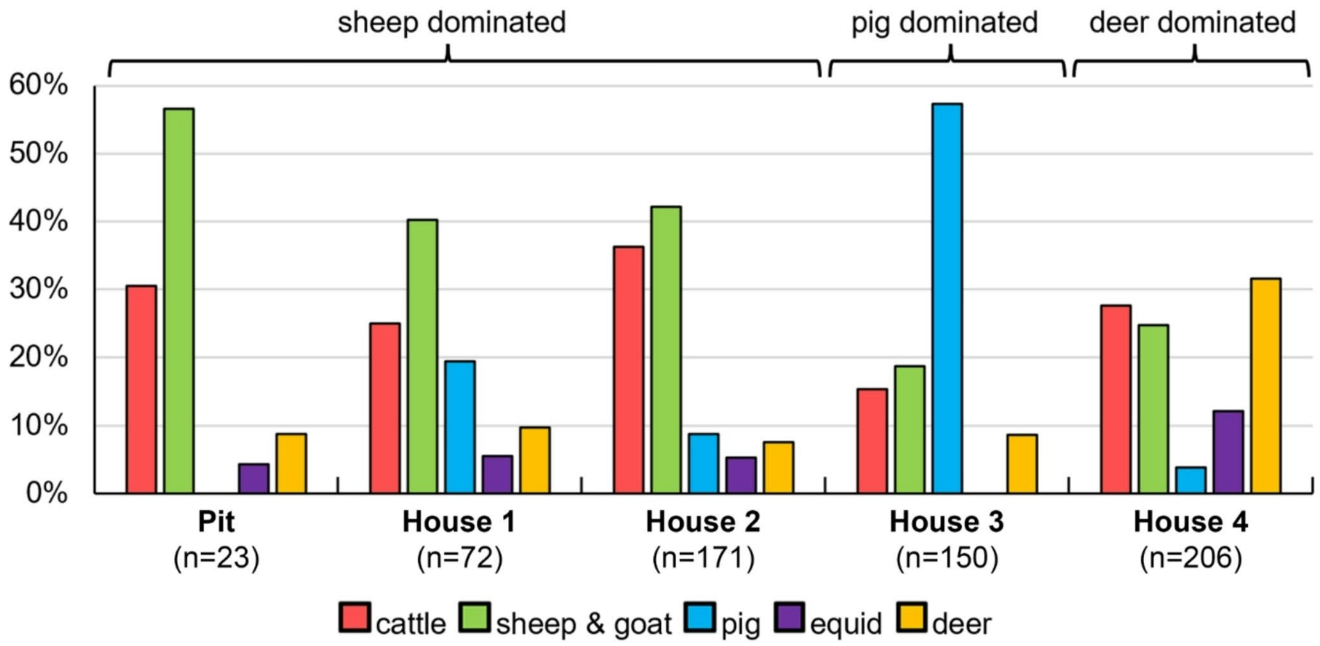


Fig. 3 NISP% of main taxa by assemblage

are found, although in low numbers, in almost all the other assemblages.

Although the assemblages are nearly synchronous and from structures in close spatial proximity, three distinct consumption patterns in the frequency of the taxa emerge (Fig. 3). The first, a *sheep dominated pattern*, is evidenced in the Pit, House 1 and House 2. Based on NISP, cattle only played a secondary role in this pattern. Moreover, equids and cervids are present but only in very low numbers. The most variable factor seems to be the frequency of pig bones. Secondly, the assemblage from the burnt debris of House 4 shows a distinct *deer dominated pattern*. The exceptionally high proportion of cervid remains is complemented by a high proportion of equid and cattle remains. The number of pig remains is negligible and the frequency of sheep/goats is markedly lower than in the first pattern. A third, *pig dominated pattern* is restricted to material from House 3. Based on the high number of redeposited Hellenistic and Roman ceramics it is highly probable that a high percentage of the faunal material is also residual and was redeposited from an original context of Hellenistic or Roman date. This assumption is corroborated by the fact that patterns clearly dominated by domestic pigs are extremely rare for Sicilian sites of prehistoric date (Cruz-Uribe 1990; Tagliacozzo 1993; Villari 1995; Leighton 1999; Bartosiewicz 2012; Öhlinger et al. 2021; Dauth et al. 2023; Martín et al. 2023; Speciale et al. 2024). Instead, most prehistoric and indeed historic communities relied on sheep/goats, as exemplified by the material from Hellenistic/Roman Campanaio (Wilson 2000) and from medieval assemblages compared to Monte Iato below (Fig. 9). On the other hand, high frequencies of pigs are attested for some assemblages formed by specific Greek ritual practices, for example from the sanctuary of S. Anna in Agrigento (Miccichè 2020), and from a 2nd c. BC *bothros* excavated at Piazza della Vittoria in Syracuse (Villari 1989). However, pork was also preferred at Roman Republican and Imperial sites in Central and Northern Italy (MacKinnon 2004). However, for Southern Italy the pattern is again rarely observed and for Sicily not enough assemblages from this period have been published to draw any firm conclusions.

A pig dominated pattern in Hellenistic/Roman Sicily might therefore be an indicator for a Greek/Hellenistic style sacrifice or for *haut cuisine* emulating the fashion of the Roman heartland. Both scenarios, either individually or combined, can easily be accommodated, when an origin of the faunal material is assumed in Peristyle House 1. Not only was this lavish architectural complex constructed in the 3rd c. BC directly northeast and upslope of the location of the substantially younger House 3. It also housed multiple dining rooms and had its main entrance directly oriented toward the altar in front of the refurbished temple of Aphrodite (cf. Dalcher 1994; Hedinger 1999; Brem 2000; Russenberger 2014; Kistler et al. 2018).

Age and sex

Because the sample size of individual assemblages is too small to provide robust kill-off patterns, data from all assemblages with exception of House 3 were combined. House 3, in turn, is the only assemblage that yields robust data on the age and sex of pigs.

The few tooth wear data available for cattle indicate a focus on adult and elderly animals (Fig. 4). The presence of juvenile individuals is only evidenced by a singular deciduous tooth with light wear. Bone fusion data complements this picture and emphasises the focus on young adults (Table 3). All recovered elements fusing below the age of two years exhibit full fusion indicating that these animals lived beyond this age. Simultaneously only late fusing elements show incomplete fusion. The ambivalent result indicates a focus on meat (young adults) and secondary products (elderly animals). The fragmented state of most cattle *Pelves* and *Metapodia* prevents drawing any firm conclusions on the sex of the animals based on morphological criteria.

Due to small sample size and sheep outnumbering goats by approximately 6:1, the reconstruction of kill-off patterns is based on the summed observations of sheep and

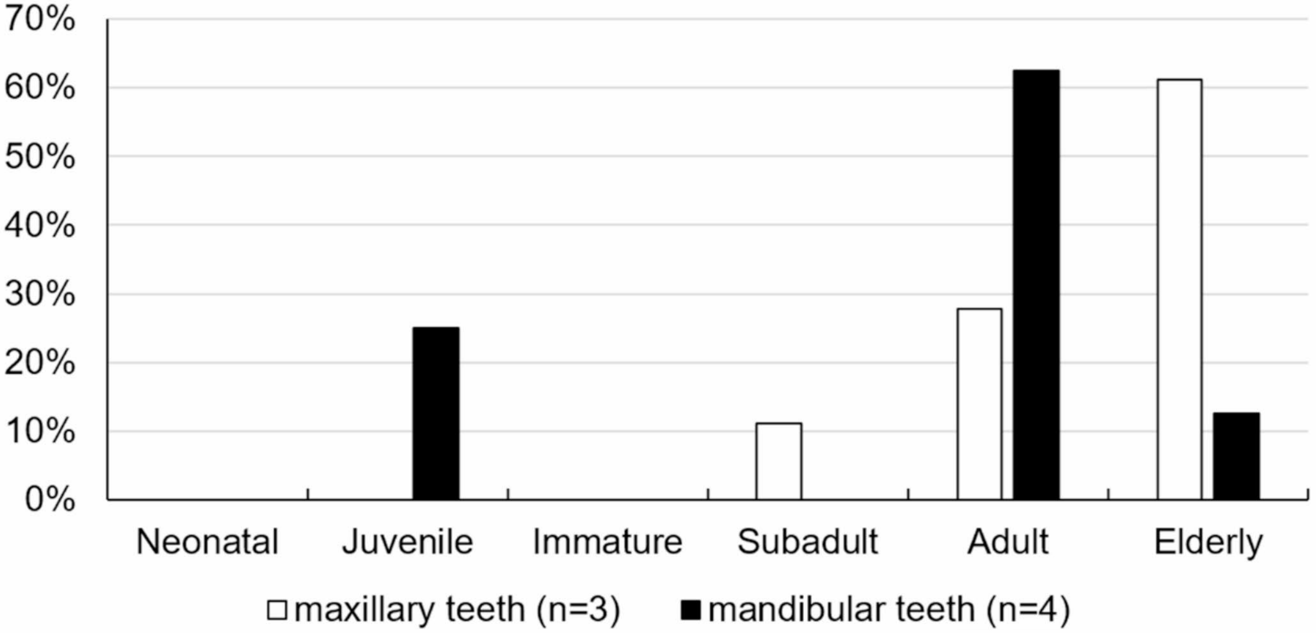


Fig. 4 Cattle – age at death according to tooth-wear (Assemblages Pit, House 1, 2 and 4). Age classes after O'Connor (1988)

Table 3 Cattle – fusion status (Assemblages Pit, House 1, 2 and 4)

	fusion time	unfused	fusing	fully fused	fused%
Scapula dist.	7–10 months	-	-	4	100%
Pelvis Acetabulum	7–10 months	-	-	2	100%
Phalanx 2 prox.	15–18 months	-	-	4	100%
Humerus dist.	15–20 months	-	-	4	100%
Phalanx 1 prox.	20–24 months	-	-	3	100%
Metapodium dist.	2-2.5 years	-	2	1	33%
Calcaneus Tuber	3 years	1	-	1	50%
Femur prox.	3.5 years	1	1	-	0%
Humerus prox.	3.5-4 years	-	1	-	0%
Ulna Tuber	3.5-4 years	1	-	-	0%
Radius dist.	3.5-4 years	1	-	-	0%
Femur dist.	3.5-4 years	-	-	2	100%

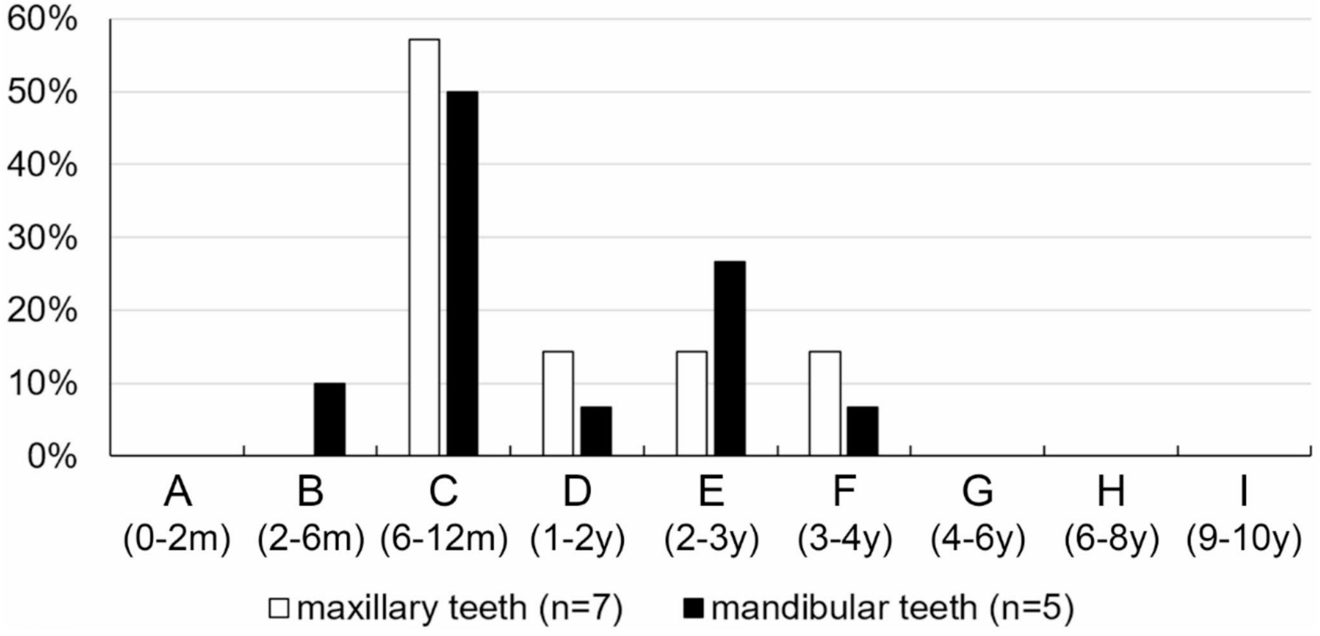


Fig. 5 Sheep (O and O/C) – age at death according to tooth-wear (Assemblages Pit, House 1, 2 and 4). Age classes after Payne (1973)

Table 4 Sheep (O and O/C) – fusion status (Assemblages Pit, House 1, 2 and 4)

	fusion time	unfused	fusing	fully fused	fused%
Humerus dist.	3–4 months	2	-	10	83%
Scapula dist.	5 months	-	-	3	100%
Pelvis Acetabulum	5 months	-	-	4	100%
Phalanx 2 prox.	5–7 months	-	-	3	100%
Phalanx 1 prox.	7–10 months	-	-	3	100%
Tibia dist.	15–20 months	1	-	1	50%
Metapodium dist.	20–24 months	1	-	2	67%
Calcaneus Tuber	3 years	1	-	2	67%
Femur prox.	3-3.5 years	1	1	2	50%
Radius dist.	3.5 years	1	-	-	0%
Tibia prox.	3.5 years	1	-	-	0%

sheep/goat (thus excluding one goat mandible and one goat *Humerus*). Tooth wear indicates a focus on sheep between 0.5 and 4 years, with an emphasis on animals below the age of one year (Fig. 5). This picture is corroborated and extended by bone fusion data (Table 4). The high percentages of fully fused early fusing elements and unfused late fusing elements implies a focus on killing individuals at the age of one to three years. A few older animals, as well as at least two very young, probably neonatal individuals are also attested. This kill-off pattern corresponds to the culling for prime meat, while some animals are kept for a few years longer, possibly for their wool. Although nine fragmentary *Pelves* are preserved, only in one case preservation and morphological features allowed an identification as a female.

In the combined material from assemblages of Pit, Houses 1, 2 and 4 only a singular loose M_3 of a young adult pig was

Table 5 Pig – fusion status (Assemblages Pit, House 1, 2 and 4)

	fusion time	unfused	fusing	fully fused	fused%
Scapula dist.	1 year	-	-	1	100%
Radius prox.	1 year	1	-	-	0%
Pelvis Acetabulum	1 year	-	-	1	100%
Metapodium dist.	2 years	1	-	1	50%
Phalanx 1 prox.	2 years	1	-	1	50%
Calcaneus Tuber	2-2.5 years	1	-	-	0%
Radius dist.	3.5 years	1	-	-	0%

Table 6 Pig – fusion status (House 3)

	fusion time	unfused	fusing	fully fused	fused%
Scapula dist.	1 year	2	-	-	0%
Humerus dist.	1 year	4	-	-	0%
Radius prox.	1 year	3	-	-	0%
Pelvis Acetabulum	1 year	2	-	-	0%
Phalanx 2 prox.	1 year	-	-	2	100%
Tibia dist.	2 years	2	1	-	0%
Metapodium dist.	2 years	4	-	2	33%
Ulna Tuber	3 years	1	-	-	0%
Radius dist.	3.5 years	2	-	-	0%
Ulna dist.	3.5 years	2	-	-	0%
Femur prox.	3.5 years	2	-	-	0%
Tibia prox.	3.5 years	1	-	-	0%

found. With observations from only eight specimens, fusion data is also scarce (Table 5). Nevertheless, the favoured age for killing pigs seems to have been around two years. The dimensions of a *Radius* diaphysis (ID347) indicate a neonatal or very young juvenile animal (cf. Galik et al. 2022; Fig. 95). These data can be tentatively interpreted as rearing pigs on site for meat consumption when the animals were approximately fully grown.

* Note that observations from prox. and dist. *Radius* are from the same specimen (ID347).

More data are available from House 3. However, they are probably reflecting a pre-medieval kill-off pattern at best, and an indistinguishable chronological palimpsest at worst. Tooth wear suggests a high variability for the age at which pigs were slaughtered, ranging from immature to adult/elderly (Fig. 6). While the unfused state of late fusing elements may still be aligned with this picture, the predominantly unfused early fusing elements suggest that young pigs below the age of one year were also consumed (Table 6). In fact, the diaphysis dimensions of multiple long bones indicate that a considerable amount of these young animals could have been neonatal to juvenile (cf. Galik et al. 2022; Figs. 95 and 96). These age classes are not evidenced by teeth which probably have fallen victim to recovery bias. According to their canine teeth most of the pigs were male (Table 7). However, this might also be a consequence of recovery bias.

All postcranial equid remains are from fully grown animals (Table 8). Evidence for at least one young animal comes in the form of a deciduous tooth (dP_4) which has been found together with a M_1 and fragments of the mandibular bone (ID49) in House 1. The approximate crown height of 9 cm measured on the not yet fully developed molar and the already clearly worn dP_4 indicate an age of 2-3.5 years (cf. Habermehl 1975; Levine 1982; Fig. 13).

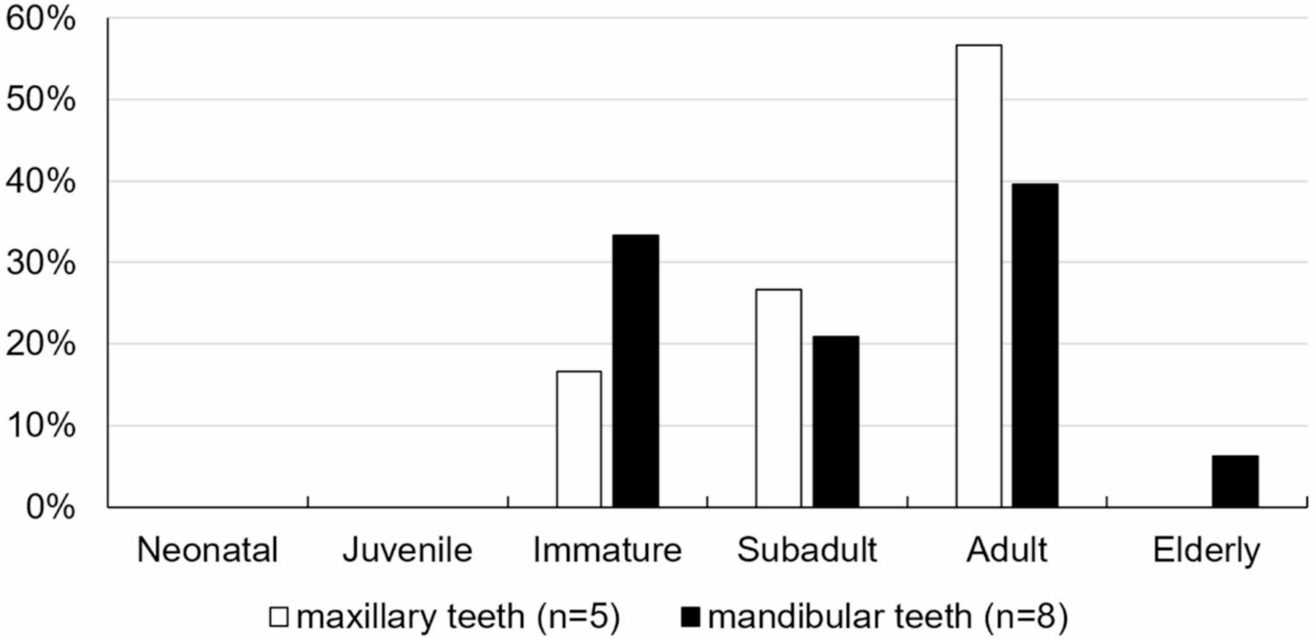


Fig. 6 Pig – age at death according to tooth-wear (House 3). Age classes after O'Connor (1988)

Table 7 Pig – sex based on canine teeth

	female	male
Maxilla	-	0 (1)
Mandibula	1	3 + 1 (1)

* Number of loose canine teeth from House 3. Two additional observations from House 2 are displayed in brackets. The '+1' signifies an empty *alveolus* from House 3

Table 8 Horse and donkey – fusion status (Assemblages Pit, House 1, 2 and 4)

	fusion time	unfused	fusing	fully fused	fused%
Scapula dist.	10–12 months	-	-	1	100%
Metapodium dist.	12–15 months	-	-	3	100%
Phalanx 1 prox.	12–15 months	-	-	1	100%
Humerus dist.	15–18 months	-	-	2	100%
Humerus prox.	3.5 years	-	-	1	100%
Radius dist.	3.5 years	-	-	1	100%

Table 9 Deer – fusion status (Assemblages Pit, House 1, 2 and 4)

	fusion time	unfused	fusing	fully fused	fused%
Roe deer					
Pelvis Acetabulum	5–7 months	-	-	1	100%
Femur dist.	14–15 months	-	-	1	100%
Tibia prox.	15 months	-	1	-	0%
Red deer					
Scapula dist.	<20 months	-	-	1	100%
Tibia dist.	>36 months	-	-	2	100%
Fallow deer					
Humerus dist.	4–14 months	-	-	2	100%
Scapula dist.	13–17 months	-	-	1	100%
Metatarsus dist.	17–20 months	-	-	2	100%
Radius dist.	20–45 months	-	-	1	100%
Femur prox.	18.5–40.5 months	-	-	1	100%

Fusion of postcranial deer bones indicates that the game animals mainly were adult (Table 9). In addition, the fusing *Tibia* of a roe deer can serve as a cautious indicator for the season of roe deer hunting. Based on a birth in May/June (cf. Raganella-Pelliccioni et al. 2007) and an age of approximately 15 months the animal most likely was killed in late Summer.

Skeletal element frequencies and butchery

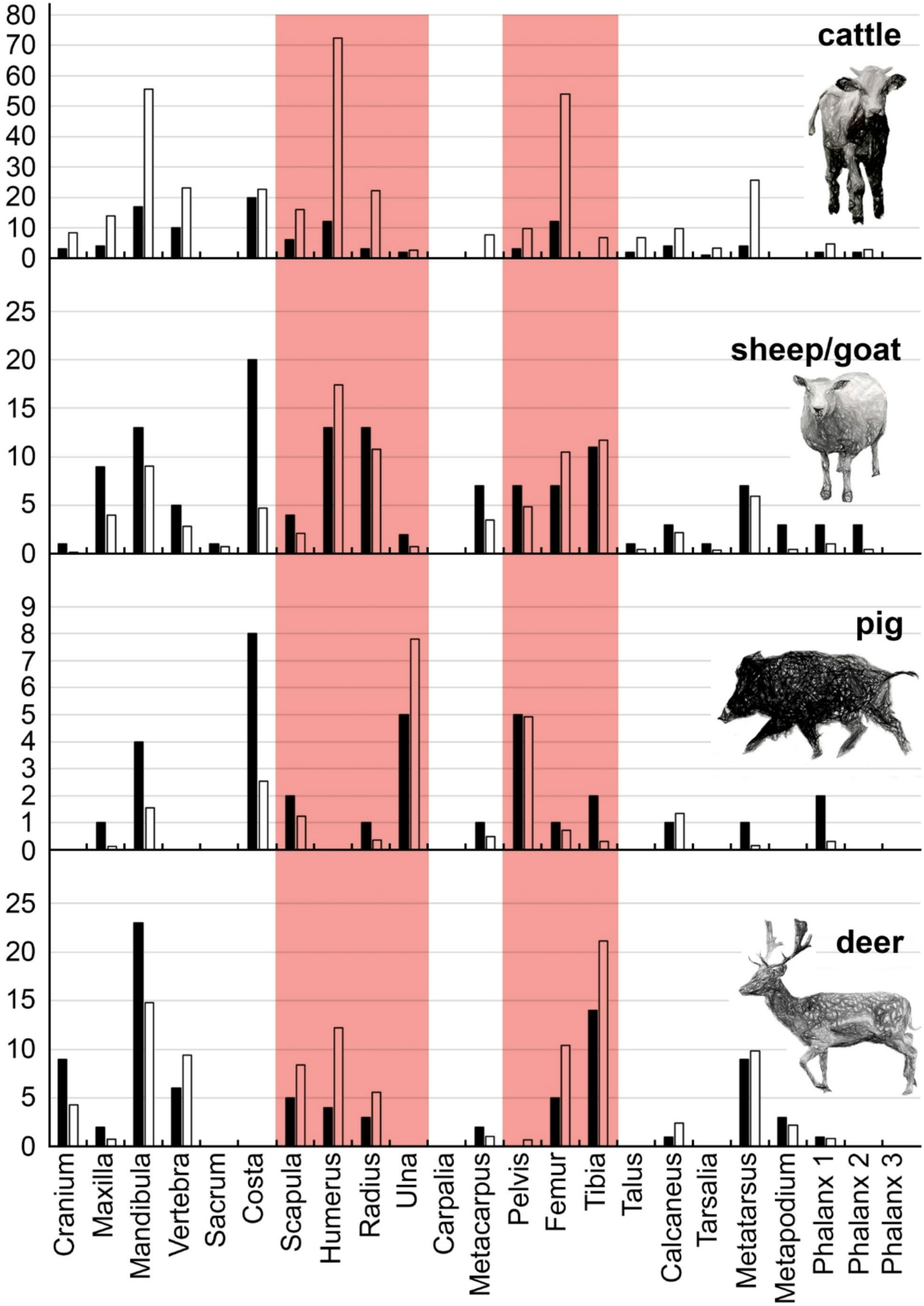
Although based on limited evidence, skeletal frequencies highlight an underrepresentation of cranial elements and *Autopodia*, which are normally considered as primary butchery waste (Fig. 7). Meat bearing portions are well represented. However, deer remains show a contrasting frequency with good representation of cranial portions and *Metatarsi*, but reduced numbers of forelimb elements. The frequency of butchery marks varies by assemblage, probably reflecting diverse taphonomic pathways (Fig. 2). The high percentage of bones with butchery marks in the Pit (36.1%) might indicate that this assemblage is the result of "ordinary" disposal after butchery and consumption, potentially mixing material from different locations. Processing of cattle bones resulted in comparatively more chop marks (35.3%) than cut marks (9.6%). Similarly, pig bones were usually chopped (11.4%; 3.3% with cut marks), while sheep/goat bones were approximately equally often chopped and cut (14.2 & 13.2%). Deer bones generally follow the same pattern as cattle bones with 16.0% of specimens evidencing chopping and only 5.0% showing signs of cutting. Interestingly, all butchered roe deer specimens, a *Pelvis* from the Pit and a *Tibia* from House 1, were cut and probably ended up in these contexts as kitchen refuse. In contrast, the comparably few modified specimens from House 4 (13.5%) indicate that the *chaîne opératoire* of processing, consuming and disposing of animal bodies was cut short by the sudden destruction of the structure by fire, leading to rapid and final interment. This also may have led to the peculiar distribution of equid remains in House 4 (cf. Supplement 3). While at least three animals are accounted for, only nine out of 25 specimens are postcranial elements. Among these only three fragments are from elements to which abundant meat is attached, among which only one, a *Humerus*, exhibits a chop mark. Interpretations on whether the remains are to be seen in the context of carcass disposal or meat consumption therefore rest on a very slim basis.

Fig. 7 Skeletal element frequencies for cattle, sheep/goat, pig and deer (total of assemblages Pit, House 1, 2 and 4). Black bars indicate NISP, white bars weight in decagram. Meat rich portions are highlighted in red ▶

Biometry

The few (21) measurable cattle specimens securely dated to the medieval period on Monte Iato do not provide a sound foundation for metrical comparisons. In addition, the lack of sufficiently large and published comparative Sicilian cattle osteometric data still obscures detailed regional and diachronic patterns for the medieval period. However, based on individual measurements the animals seem to be compatible in size to their contemporaries from nearby Entella (Bedini 1999) or slightly later Brucato (Bossard-Beck and Maccari-Poisson 1984, p. 622).

For sheep and goat size the medieval Sicilian dataset is more exhaustive. Although regional data is not summarised


cattle
sheep/goat
pig
deer
80
70
60
50
40
30
20
10
0
25
20
15
10
5
0
9
8
7
6
5
4
3
2
1
0
25
20
15
10
5
0
Cranium
Maxilla
Mandibula
Vertebra
Sacrum
Costa
Scapula
Humerus
Radius
Ulna
Carpalia
Metacarpus
Pelvis
Femur
Tibia
Talus
Calcaneus
Tarsalia
Metatarsus
Metapodium
Phalanx 1
Phalanx 2
Phalanx 3

here, the robustness of sheep from 13th c. AD Monte Iato (Fig. 8) falls in line with the high LSI-width values from the West Sicilian urban sites of the Norman period reported by Aniceti and Albarella (2022b; Fig. 7) and is markedly higher than for the Byzantine or Arab period. This increased robustness is in line with a general increase in size from the Arab to Norman period (cf. Aniceti and Albarella 2022b). Alternatively, it may reflect the preponderance of larger male, most likely castrated, animals over smaller females.

Due to the disputable dating of most of the pig bones and their often unfused state no metrical summary is attempted here.

Discussion

The faunal remains from 13th c. AD Monte Iato show a consumptionscape (cf. Kistler and Mohr 2015) dominated by young robust sheep, followed by a high portion of mainly adult cattle. While this pattern is not unexpected in rural settlements, the focus on young sheep can be interpreted as a high-status culinary choice, selecting for prime meat quality, a pattern also observable from the Norman Palace in Palermo (Aniceti and Albarella 2022b; Fig. 6). Less exclusive Sicilian assemblages, on the other hand, tend to have more variability of age at death and overall focus on older animals (Aniceti and Albarella 2022b). Strikingly though, this culinary choice seems to be at odds with the rather humble architecture on Monte Iato. However, some exquisite artifacts indicate that an elite was dwelling in these houses. Such an elite presence is confirmed by an Arabic inscription on a gravestone reused as a building block in the mid-13th century, which provides an emic perspective. By designating a certain Abū Bakr as ‘*al walī al ṣā*[*liḥ*]’, roughly translatable as ‘righteous saint’, it establishes Monte Iato as the resting place of a member of the (religious) elite (Alliata 1999). It is unsurprising that such self-proclaimed elites would signal their elevated status by *conspicuous consumption* (Veblen 1899). This scenario does not only fit the already mentioned artifacts but also the selection of meat rich portions, and the high number of equids and deer remains. It needs to be emphasised that such a strategy is not restricted to the consumption of meat but also incorporates the use of live animals (e.g. equids) and the symbolically charged act of hunting and killing wild animals (e.g. deer).

No close equivalents to the basic (meat) consumptionscape of medieval Monte Iato have yet been found in urban assemblages of the 11th -14th century in the region (Fig. 9). However, the rural settlement from the preceding Islamic period at Colmitella shows a remarkably similar pattern. On the other hand, the most diametrical patterns are provided by the assemblages from 13th century, post-Islamic Segesta and from the Norman Palace in Palermo, with very high percentages of pigs and only small portions of cattle. These distinctive, but at times contrasting similarities and dissimilarities to the Monte

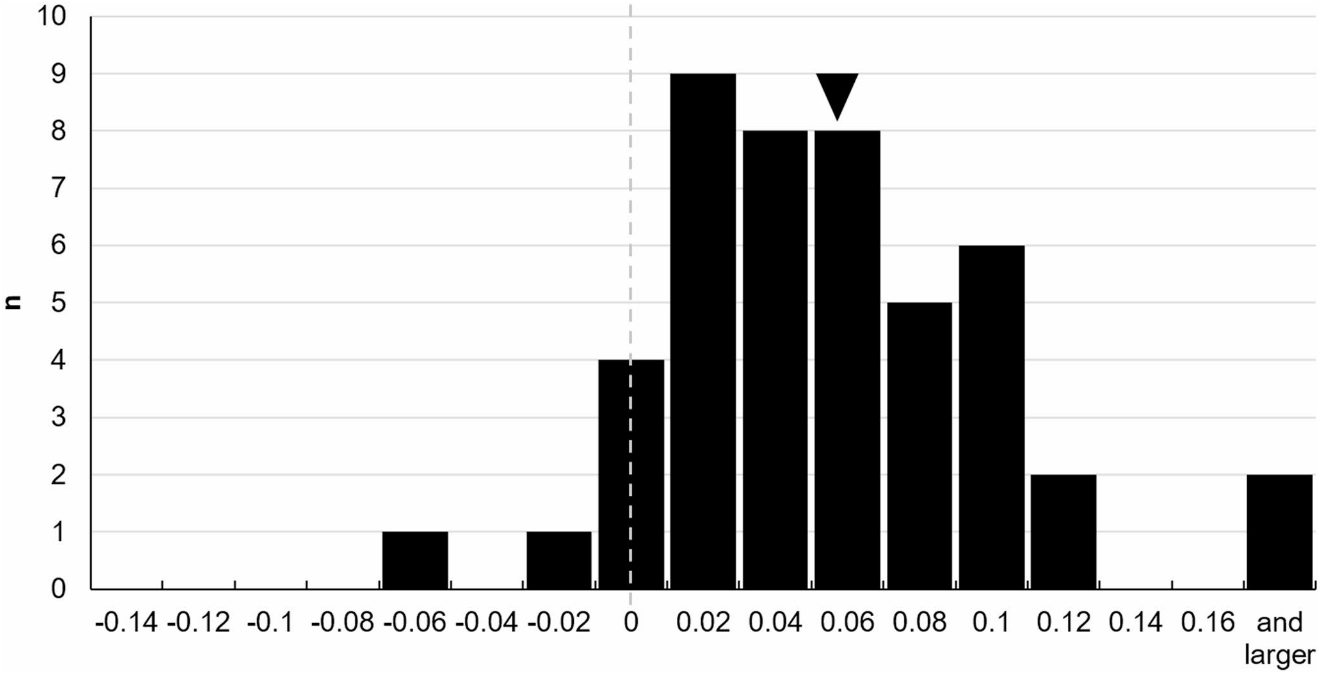


Fig. 8 Sheep (O and O/C) – robustness as measured by LSI-width values (total of assemblages Pit, House 1, 2 and 4). $n=46$, the arrow indicates the logarithmic mean = 0.055. The mean values of measurements on Shetland sheep published by Davis (1996) are used as standard

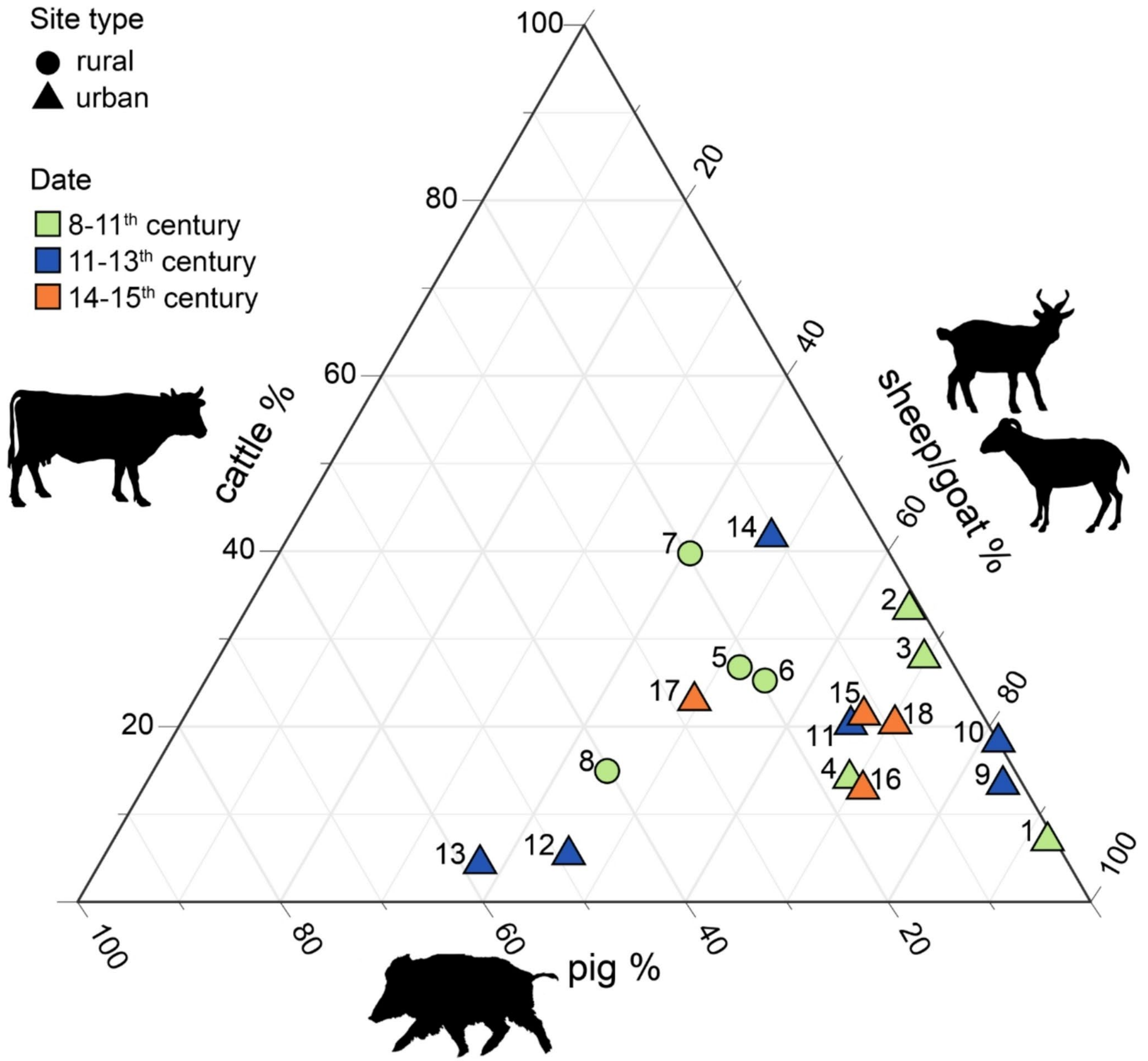


Fig. 9 The regional consumptionscape at site level
1: Sant' Antonino (*n*=388), 2: Corso dei Mille (9-11th c.) (*n*=162), 3: Mazara del Vallo (9-11th c.) (*n*=435), 4: Castello San Pietro (*n*=334), 5: Contrada Castro – period A (*n*=127), 6: Contrada Castro – period B (*n*=594), 7: Colmitella (*n*=239), 8: Casale San Pietro (*n*=154), 9: Corso dei Mille (11-13th c.) (*n*=202), 10: Entella (*n*=269), 11: Mazara del Vallo (11-13th c.) (*n*=302), 12: Segesta (*n*=1118), 13: Palermo – The Norman Palace (*n*=253), 14: Monte Iato (*n*=346), 15: Brucato (*n*=2607), 16: Palermo – Palazzo Steri (14th c.) (*n*=1090), 17: Fiumedinisi (*n*=597), 18: Palermo – Palazzo Steri (15th c.) (*n*=1069)
Data for 1, 2, 3, 4, 7, 8, 9, 11, 13 from Aniceti and Albarella (2022a); 5, 6 from Castrorao Barba et al. (2023); 10 from Bedini (1999), 13 form Di Martino (1997); 14 from this paper, assemblages Pit, House 1, 2, and 4; 15 from Bossard-Beck and Maccari-Poisson (1984); 16, 18 from Di Patti and Lupo (2012); 17 from Villari (1988)

Iato assemblages already indicate conflicting priorities in the regional discourse on (meat) consumption in Western Sicily at the transition from the Arab to Norman period. In fact, cultural change, as indicated by the chronological terminology employed, is only one of several intertwined aspects that shaped regional but also site-, and even context-specific consumption patterns. Besides the stereotypical religio-cultural divide best not uncritically assumed a priori, economic considerations and social aspects certainly played major roles in their shaping.

While in the Islamic period in most urban sites the number of pig remains is negligible, rural sites surprisingly exhibit higher proportions of pig (Aniceti and Albarella 2022a). Low percentages of pigs have been explained in line with assumptions of a strict religio-cultural dichotomy as the result of "well-established Islamisation of communities in these urban areas" (Aniceti and Albarella 2022a, p. 8). From this perspective it is only consequent to interpret high proportions of pig remains as either "an indicator of the presence of Christian communities" (Aniceti and Albarella 2022a, p. 8) or of subversive or nearly starving Muslims (Aniceti and Albarella 2022a, pp. 8–10; cf. García García 2019; Fig. 5.27). Following this argumentation, in Norman times high percentages of pig remains are attributable to new religio-cultural norms and choices. However, a comparison with 11th – 14th century contexts reveals that pig numbers remain low in post-Islamic Sicily and exceed the percentage of pig remains in rural Islamic period sites only exceptionally.

A socio-economic lens provides an alternative interpretation of these phenomena. While the detailed socio-economic situation of individual households largely eludes us, the distinction between rural and urban sites can serve as a convenient mid-range proxy for very different economic possibilities and constraints, impacting the potential of shaping individual consumption patterns. Social actors at urban high-status sites like the Castle in Segesta and the Norman Palace in Palermo were apparently capable of providing and serving conspicuously high proportions of pork. However, this is no universal feature as other urban contexts highlight. In fact, another high-status site, Palazzo Steri in Palermo, shows a remarkably low proportion of pigs more in line with the average proportion of pigs from urban sites. On the flipside, the few rural contexts show more balanced proportions of domestic animals, with higher pig frequencies than the average urban context. An assemblage from an Islamic period courtyard house at Casale San Pietro showcases that even exceptionally high pig frequencies are possible in rural contexts of the Islamic period (Carver et al. 2018; Aniceti 2022). Disregarding for the moment the often-postulated religio-cultural division, contrasting rural and urban contexts permits the construction of a more nuanced socio-economic perspective. While rural, presumably low-status households (and sites) show a roughly homogenous pattern of domestic animal frequencies, urban high-status assemblages are more varied. Unsurprisingly, solid economic foundations seem to be a prerequisite for social actors to adjust their consumption patterns according to idealised consumptionscapes prefigured by their religio-cultural backgrounds and aspirations.

The pattern at medieval Monte Iato in terms of taxonomic composition of cattle, sheep/goats and pigs most closely resembles a rural consumptionscape exemplified by the material from Contrada Castro. However, is also features some aspects of less high-status urban patterns. The two roe deer bones with cut marks from the Pit and House 1, for example, indicate status aspirations. Hitherto, zooarchaeological evidence for the presence of this species in Norman Sicily was restricted to medieval Brucato (Bossard-Beck and Maccari-Poisson 1984; Masseti 2011), but literary sources inform us that its meat was sold at markets in Palermo and Catania (Bresc 1980; Masseti 2009). Moreover, all four recovered specimens are from the hindlimb, the most prestigious portion, at least when the distribution of red and fallow deer is employed as a guideline (cf. Sykes 2007). While the actors responsible for the accumulations of faunal material in the Pit, House 1 and House 2 thus fall short of "true" high status indicated by the consumption of large deer, feasting on the hindquarters of roe deer might have been a feasible alternative. In this respect it is necessary to reiterate that the economic foundations of Monte Iato in the 13th century were crumbling, due to prolonged confrontations with the Norman aristocracy. Nevertheless, it would be too simplistic to subsume the people on Monte Iato in one singular socio-economic category. On the contrary, based on artefactual evidence it seems that the insurrectionists encompassed diverse segments of the Sicilian society (Mölk 2021). This might explain why the frequencies of domestic animals are approximating the trend for rural consumptionscapes, while some aspects are pointing towards a strategy of signalling elevated status – a phenomenon also encountered in the partially rich artefactual assemblage of House 2 (cf. Kistler et al. 2014).

Besides the young age of consumed sheep, which is paralleled by the demographic from the Norman Palace, and the predominance of meat-rich elements, the exceptional preservation conditions of House 4 shed light on another aspect of symbolically charged consumption strategies on Monte Iato. The assemblage provides a rare glimpse into meat consumption strategies, because its taphonomic history was cut short by sudden embedding and sealing of the inventory by the collapsing roof. This prevented the material from passing through potentially different taphonomic trajectories and resulted in heightened frequencies of equid and deer remains. However, more than half of the equid remains are teeth or toothrows, and from the few meat-bearing elements only one exhibits a butchery mark. Because both the Koran (Morales-Muñiz et al. 2011) as well as Christian-Norman culinary traditions (Simoons 1978) advised against the consumption of horse meat, it seems unlikely that this was the case in House 4, especially when apparently abundant meat was available from deer. While deer bones could represent a hunting trip intended to supplement the potentially compromised subsistence mechanisms during a time of crisis, their heightened number is perhaps better interpreted through a social lens. The procurement of at least five fallow deer was a significant, and probably symbolically highly charged addition to the basic consumption pattern. By the time House 4 collapsed, the Norman aristocracy had already established designated hunting areas and, at least in some areas, deer was subject to a royal hunting privilege (Masseti 2009). Consequently, hunting deer and distributing venison, by a process termed 'unmaking', was highly ritualised and symbolically charged. Certain meat cuts were assigned to different social status and roles, resulting in a hierarchy of portions with hindlimbs outranking forelimbs and both being more prestigious than meat from other parts (Sykes 2007). A summary of zooarchaeological evidence for the practice of 'unmaking' deer in England, France and Italy highlights the uneven occurrence of hind- and forelimbs, with most high-status sites evidencing an abundance of hindlimb remains (Albarella and Aniceti 2024). Although the high number of deer jaw fragments from House 4 is more in line with rural low-status sites (Sykes 2007), hindlimb NISP outnumbers forelimb NISP 20:8. The high percentage of deer and the conspicuous distribution of elements indicate the elevated status of the social actors frequenting House 4. Thus, the maintenance of high-status elements in the consumptionscape of economically strained 13th century AD Monte Iato is highlighted. The resulting ambivalent trends in the consumptionscape fit the scenario conveyed by literary sources. While confrontations with the Norman aristocracy increased the importance of Monte Iato as a hub of insurrectionists, this development also led to crisis and repeated, at least partial, destruction of the settlement. Of course, the emerging view of the consumptionscape on Monte Iato, interpreted in the light of the outlined scenario, is based on limited zooarchaeological data from a restricted area. To scrutinise the validity of the patterns observed, it is paramount to analyse further assemblages from the settlement on the mountain plateau on a contextual basis.

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Data availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The author declares no competing interests.

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