Chiara A. Corbino
Department of Historical and Geographical Studies
University of Florence
Via San Gallo 10
Florence, Italy

Paul Mazza
Department of Earth Sciences
University of Florence
Via G. La Pira 4
Florence, Italy.

Chiara A. Corbino and Paul Mazza

Faunal Remains from the Castles of Al-Wu'ayra, Petra and Shawbak (Crusader Period)

Abstract
The zooarchaeological assemblages analyzed here were recovered from Crusader occupation levels at the castles of al-Wu'ayra and Shawbak in Jordan. Both sites yielded the remains of both wild and domestic animals. The presence of pig is particularly noteworthy; in contrast to Israel, this taxon seems to have persisted through time, indicating the continued presence of Christian communities. Equally noteworthy is the large amount of fish recovered from both sites, particularly parrotfish. Age profiles indicate that domestic animals were bred primarily for consumption. Abundant chukar (*Alectoris chukar*) remains at al-Wu'ayra likely belong to domestic birds. The two assemblages provide insights into the daily life of Crusaders in Transjordan. The garrisons seem to have procured their food from local sources, as well as by means of a network of wider connections.

Introduction

This report describes the results of a zooarchaeological analysis of Crusader-period faunal remains from the castles of Shawbak and al-Wu'ayra, which have been investigated by the University of Florence. The animal bones analyzed here were recovered during the 1993 excavations at al-Wu'ayra Area 83 and the 2006 excavations at Shawbak Area 10000.

Both castles were part of a network of fortified sites extending from Syria to southern Jordan, which controlled the major caravan routes. This area connected both the desert with the sea, by means of trading settlements along the Mediterranean littoral (Vannini 2007). More specifically, al-Wu'ayra controlled the entrance to the valley of Petra, whereas Shawbak controlled the wider surrounding area. The al-Wu'ayra assemblage was recovered from a military garrison (Tonghini and Vanni Desideri 2001), while the Shawbak assemblage was recovered from the building site of the castle's church.

Methodology

The first stage of the analysis was identification of the specimens. The skeletal elements were identified both anatomically and taxonomically. Side of body, bone portion (e.g. proximal or distal epiphysis, shaft) and part of each portion (e.g. medial, lateral) were all carefully recorded. To assess relative taxonomic abundance, the number of identified specimens (NISP) and minimum number of individuals (MNI) were both calculated. Because both assemblages were derived from single depositional units in relatively confined areas, archaeological context had no impact on MNI counts. Moreover, to avoid the effects of aggregation on MNI counts, the entire assemblages were analyzed (Brewer 1992; Grayson 1978, 1984). Minimum number of elements (MNE) and Binford's (1984) minimum number of animal units (MAU) counts were also calculated. Where possible, Binford's (1978) normalized MAU values, indicated as % MAU, were calculated by dividing each MAU value by the maximum MAU value. Similarly, where possible, % MAU frequencies were plotted against Binford's (1978) normalized modified general utility index (MGUI) values (indicated as % MGUI and calculated by dividing each MGUI value by the maximum MGUI value) to see if the selection of different anatomical parts had been influenced by bone utility. Potential density-related attrition was investiagted by plotting % MAU against Lyman's (1994) density indexes. MNI and MNE counts were also used to compare observed bone frequencies with MNI-based, anticipated bone frequencies.

Recorded paleobiological information included

ontogenetic age assessment and pathological alteration. Ontogenetic age was calculated on the basis of long bone epiphyseal fusion, degree of ossification, and tooth eruption and wear. Unfortunately no speciments could be sexed with any degree of confidence. Pathological data were analyzed on the basis of anatomical distribution and type.

The specimens were also examined for evidence of pre- and post-depositional alteration. Behrensmeyer's (1978) weathering stages (where bones are assigned to one of six stages of progressive alteration, from Stage 0 (non-altered) to Stage 5 (heavily altered)), trampling, root / humic-acid etching, abrasion / polishing, carnivore activity (e.g. biting, punctures, scoring, gnawing, gastric corrosion) and modification by humans were all recorded. The degree of bone fragmentation was analyzed for isolated diaphysis fragments as well as for shaft fragments with attached epiphyses. All statistical significance was tested using Spearman's rank order two-tailed correlation coefficient (rs).

Results

A total of 1,044 specimens were analyzed. The majority of bones from both sites were fragmented. The results are presented in TABLE 1. On the basis of NISP and MNI counts, domestic animals, i.e. cattle, sheep and goats, outnumber wild animals. Sheep and goats are predominant at both sites. Unfortunately, it was impossible to determine whether or not the pig remains came from wild boar or domestic pig, nor do they bear evidence showing that they come from hunted individuals. We cannot exclude the possibility that butchered joints were imported from nearby villages.

Although scarce, the presence of pig remains is worth mentioning for their cultural and historical implications, as well as for ecological reasons. Pigs are present in virtually all Christian strongholds in the Near East. Indeed, they can be said to be a indicator of the presence and size of Christian communities. At Belmont Castle, for example, consumption of this animal seems to have been proportional to the size of the local Christian community (Croft 2000). The scarcity of pig bones in Jordan remained an enduring feature over the centuries, in contrast to what happened on Israeli sites (Croft 2000; Cartledge 1986).

Wild boar indicates the presence of shrubland, moist forest and reedy areas. Pigs, both wild and domestic, dislike highly variable temperatures, especially when these drop below 0° C. A camel features in the Shawbak faunal assemblage, but was likely domestic. Camels are sensitive to cold and humidity, and are indicative of desert conditions with long dry and short rainy seasons.

Table 1. Quantitative units of the al-Wu'ayra (PW) and Shawbak (SH) mammalian species. NISP = number of identified specimens; MNI = minimum number of individuals.

Taxa	NISP		MNI	
	PW	SH	PW	SH
Camelus dromedarius		1		1
Sus scrofa/domesticus	19	23	2	2
Bos taurus	16	17	1	2
Sheep/goats (total)	276	56	5	4
Capra hircus	17			
Ovis aries	1	1		1
Gallus domesticus	13		2	
Phasianus colchicus	4		1	
Alectoris chukar	5		1	
Columba livia	1		1	
Aves	25			
Scarus sp.	49	3		1
Sparus aurata		1		1
Pisces	17	1		
Terebra maculata		1		1
Primates	1			
Indeterminated	461	35		
Total	**905**	**139**		

Shawbak yielded no bird remains. In contrast, a relatively high frequency of both wild and domestic bird remains were recovered from al-Wu'ayra. Domestic chicken and chukar dominate the avian assemblage from this site. Because chukar has also been reported from the castles of Belmont (Croft 2000) and Karak (Brown and Reilly, pers. comm. 2010), we cannot exclude that it might have been domestic; it is in fact an easily domesticated bird.

Fishes are present at both sites, in particular parrotfish (*Scarus* sp.). Shawbak, however, yielded a proportionally higher frequency of marine animals than al-Wu'ayra. Quite unexpectedly, the bone of a primate was recovered from al-Wu'ayra. Primates may have been kept as pets, but how this particular animal reached the site remains a mystery.

Ages at death (TABLES 2 and 3) indicate that most animals were slaughtered shortly after reaching maturity. Only one older-aged sheep / goat

is present at each site. Skeletally, the axial bones of the sheep and goats are proportionally under-represented compared to other elements (FIGS. 1 and 2), as confirmed by a significant positive correlation between the observed and expected bone frequencies: PW (al-Wu'ayra): rs = 0.772 P > 0.01; SH (Shawbak): rs = 0.771 P > 0.01.

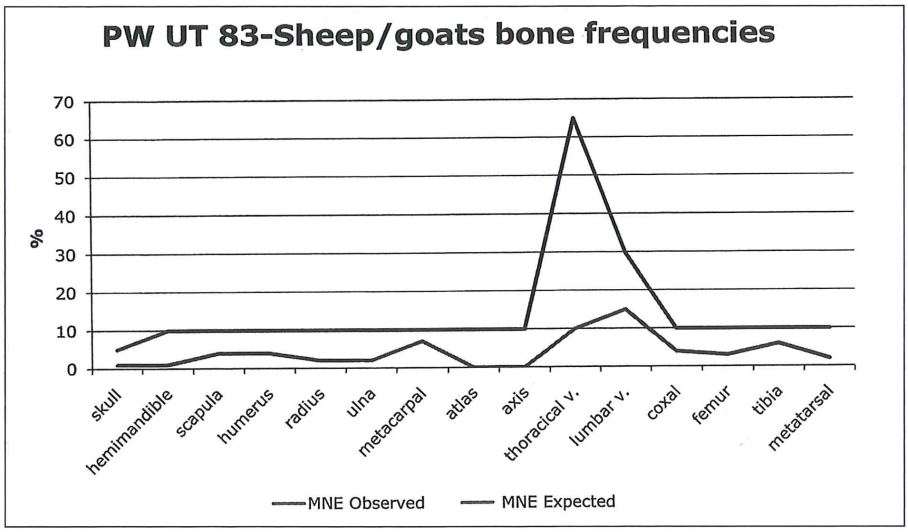
Pathologies are rare, but include coral-like tooth

Table 2. Age at death of pigs and sheep/ goats from al-Wu'ayra (PW).

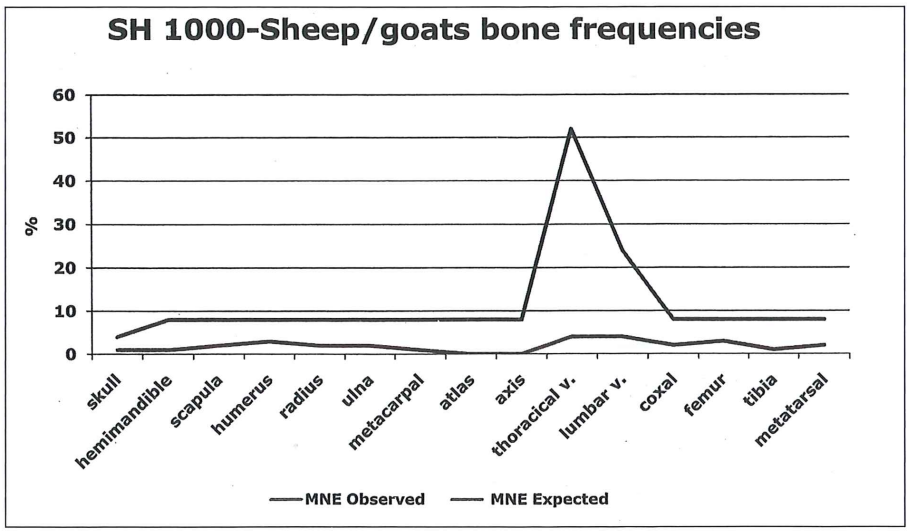
PW UT83-Age at death (months)							
Swine	**< 12**	**12 - 24**					
	1	1					
Sheep/goats	**< 6**	**6 - 12**	**12 - 36**	**36 - 48**	**48 - 72**	**72-96**	**96-144**
	1		2				1

Table 3. Age at death of pigs, cattle and sheep/ goats from Shawbak (SH).

SH 1000-Age at death (months)					
Swine	**< 12**	**12 - 24**			
	1	1			
Cattle	**12 - 36**	**> 36**			
	1	1			
Sheep/goats	**< 6**	**6 - 12**	**12 - 36**	**36 - 48**	**48 - 60**
	1		2		1



1. Bone frequencies of sheep / goats from al-Wu'ayra (PW).



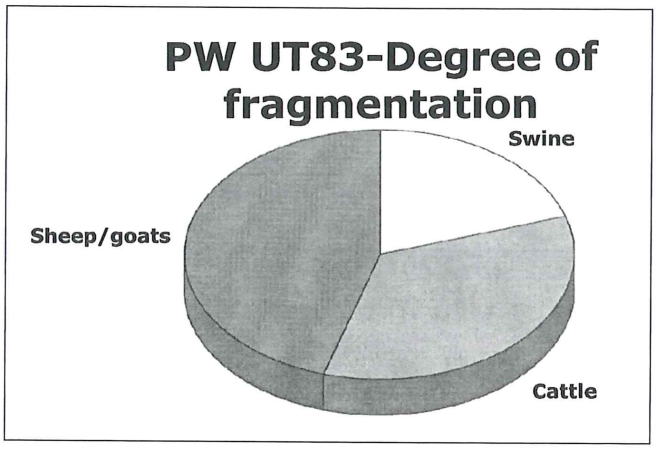
2. Bone frequencies of sheep / goats from Shawbak (SH).

roots and cribrated articular margins; exostoses are extremely infrequent. Fragmentation is the commonest alteration at both sites, with sheep / goat bones being the most severely fragmented (FIGS. 3 and 4). Other kinds of alterations are rare (FIGS. 5 and 6). The al-Wu'ayra bones show a relatively wider range of modifications, which include root etching, post-depositional corrosion, weathering, butchery marks, burning, gnawing and gastric corrosion. The Shawbak bones were also affected by trampling. Evidence for butchery recorded at both sites includes chop marks, cut marks and striations.

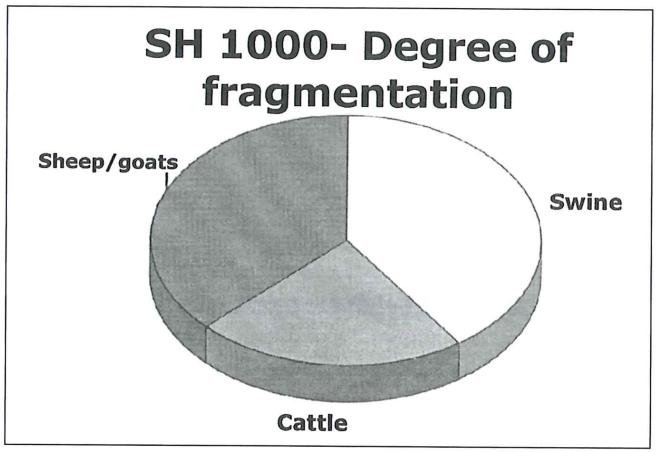
Whereas analyses rule out density-mediated attrition, scatterplots indicate significant positive correlations (PW (al-Wu'ayra): rs = 0.664 P > 0.05; SH (Shawbak): rs = 0.707 P > 0.05) between bone frequency and economic utility (FIGS. 7 and 8). This indicates that there is an abundance of high quality meat-bearing skeletal elements at both sites.

Conclusions

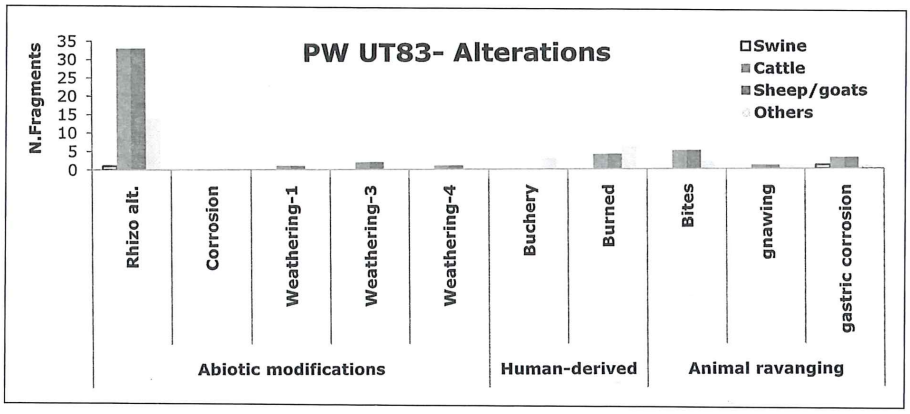
The zooarchaeological studies reported here de-



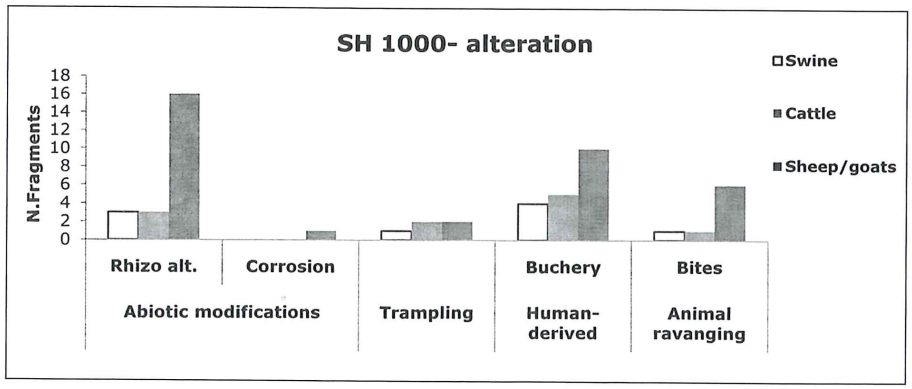
3. Degree of fragmentation of pig, sheep / goat and cattle remains from al-Wu'ayra (PW).



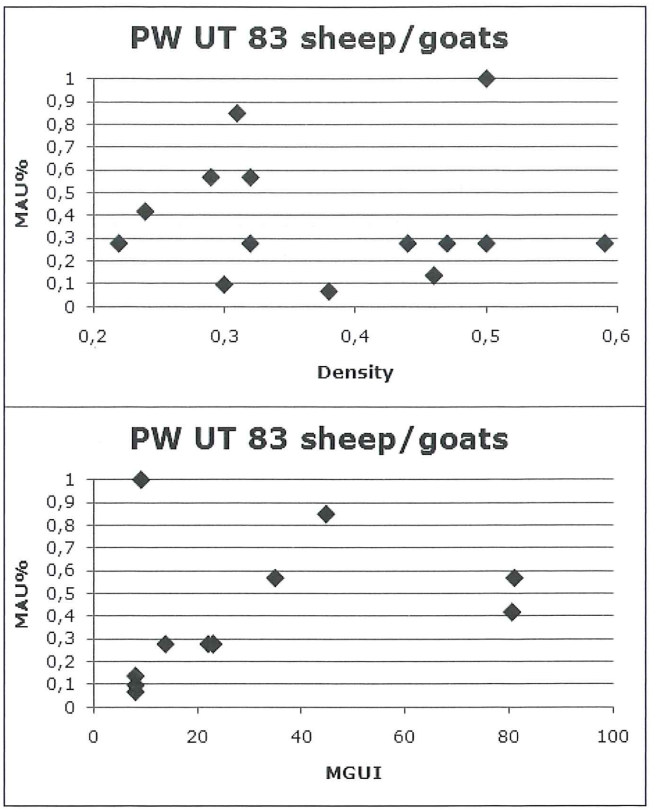
4. Degree of fragmentation of pig, sheep / goat and cattle remains from Shawbak (SH).



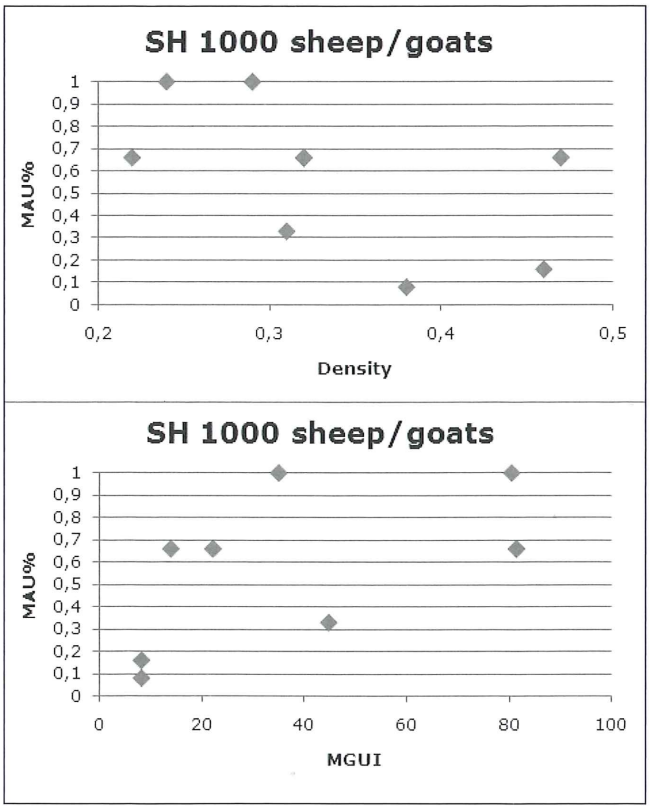
5. Incidence of bone surface modification in animal remains from al-Wu'ayra (PW).



6. Incidence of bone surface modification in animal remains from Shawbak (SH).



7. % MAU / density and % MAU / MGUI correlations in the al-Wu'ayra (PW) assemblage (see text for acronyms).



8. % MAU / density and % MAU / MGUI correlations in the Shawbak (SH) assemblage (see text for acronyms).

monstrate that the inhabitants of Shawbak and al-Wu'ayra primarily consumed domestic animals; wild animals were represented as occasional addenda to everyday meals. Though scarce, pigs confirm their role as indicators of the presence of Christian communities.

Parrotfish were evidently consumed in large quantities, presumably whenever Catholic edicts prohibited meat consumption. This rapidly decaying food item, which was brought in from the Red Sea, was likely transported dried, salted or smoked. Parrotfish was widely consumed in many other Crusader contexts, not only in Transjordan. Although the inhabitants of Shawbak seem to have had a taste for marine animals, and those of al-Wu'ayra consumed birds, domestic animals — mostly sheep and goats — were evidently the main resource at both castles. These animals are represented by their most nutritious skeletal parts, or best cuts. This suggests that both castles were inhabited by high-status individuals, that animals were not bred in the castles but were butchered and processed elsewhere, and that high quality, butchered joints were brought in. Investigation of the food-supply chains of both castles would be an interesting topic to address in future research. Although large fish were evidently traded from the Red Sea, mammals and chickens were likely brought to the castles from the immediately surrounding area. Future research aimed at identifying the castles' supply routes should include investigations of domestic fauna from the surrounding area, in order to shed light on the connections both castles had with local populations.

Further excavations are expected to improve faunal samples, adding substantial archaeo-environmental information to the body of data already recovered. The presence of wild animals with restricted ecological tolerances, the health or otherwise of domestic animals, rates of tooth wear etc. can all be valuable sources of archaeo-environmental data.

Bibliography

Behrensmeyer, A.K. 1978. Taphonomic and ecological information from bone weathering. *Paleobiology* 4 (2): 150-162.

Binford, L.R. 1978. *Nunamiut Ethnoarchaeology*. San Diego: Academic Press.

___ 1984. *Faunal remains from Klasies River Mouth*. Orlando: Academic Press.

Brewer, D. 1992. Zooarchaeology: method, theory and goals.

Archaeological Method and Theory 4: 195-244.

Cartledge, J. 1986. Faunal remains. Pp 176-185 in D. Pringle (ed.), *The Red Tower (al-Burj al-A'mar): settlement in the Plain of Sharon at the time of the Crusaders and Mamluks AD 1099-1516*. London: British School of Archaeology in Jerusalem.

Corbino, C.A. and Mazza, P. 2007. How and where did the Inhabitates of Shawbak Castle live? The faunal remains. *SHAJ* 10: 679-690.

Croft, P. 2000. The faunal remains. Pp 173-194 in R. Harper and D. Pringle (eds.), *Belmont Castle. The excavation of a Crusader stronghold in the Kingdon of Jerusalem*. Oxford: Oxford University Press.

Grayson, D.K. 1978. Minimum numbers and sample size in vertebrate faunal analysis. *American Antiquity* 43: 53-65.

Grayson, D.K. 1984. *Quantitative zooarchaeology: topics in the analysis of archaeological faunas*. Orlando: Academic Press.

Lyman, R.L. 1994. *Vertebrate taphonomy*. Cambridge: Cambridge University Press.

Tonghini, C. and Vanni D.A. 1998. The material evidence from al-Wu'ayra: a sample of pottery. *SHAJ* 7: 707-719.

Vannini, G. 2007. *Archeologia dell'insediamento Crociato-Ayyubide in Transgiordania. Il progetto Shawbak*. Florence: Biblioteca di Archeologia Medievale 21.