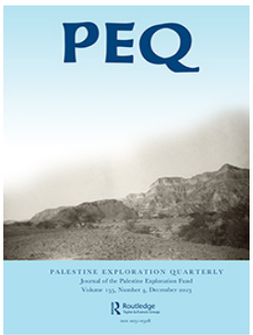

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Investigating changing socio-economic landscapes from the Early Bronze I–III in the Levant through Zooarchaeology

Gwendoline Maurer and Mariana Albuquerque

UCL Institute of Archaeology

2022 Report

Introduction

The aim of our project is to investigate the degree of socio-economic changes tied to 'urbanisation' processes in the Levant between the Early Bronze Age I–III, through the lens of thus far poorly understood livestock, land-use and subsistence practices. We aim to achieve this through the zooarchaeological analysis of three Levantine sites; Tel Qedesh, Tel Yaqush and Tel Bet Yerah which show stratigraphic sequences from the EBI–III (Figure 1).

In the Levant, the Early Bronze Age (EBA) is traditionally considered the period in which the shift to urbanism occurred. The EB I is marked by small village societies while the EB I–II transition sees significant changes in settlement sizes, organisation, architecture, and distribution which have been coined 'urban'. The origins and nature of EBA 'urbanism' and whether this period really presents true features of urbanism is still widely debated (Esse 1991, Philip 2001, Greenberg 2002, Chesson 2003; 2015, Chesson and Phillip 2003).

These so-called 'trajectories' to urbanism seem to differ between sites in the region. We have a patchy understanding of the site-specific social order and economic systems in place, as well as how these relate to wider dynamics in the region and how these might explain the abandonment or adhesion to the village system as opposed to an urban one. In fact, EBA Levantine debates make great assumptions about urbanisation process and socio-economic systems in place between the EB I–II. This is done without considering how EBA people fed, provisioned their villages or urban centres, and used and negotiated their landscapes associated with the management of animal husbandry. The exploitation of domestic livestock, the pastures, and resources required, as well the products they provide, the way their remains were processed and prepared, exchanged, consumed, and disposed of, are all embedded in social and economic relations and thereby present an effective way to detangle the socio-economic systems and processes at play in the evolution of centralised economies in the EBA Levant (Arbuckle 2014).

Thus far EBA Levantine debates are largely based on architectural, site settlement patterns, mortuary practices and material markers (Chesson and Phillip 2003,

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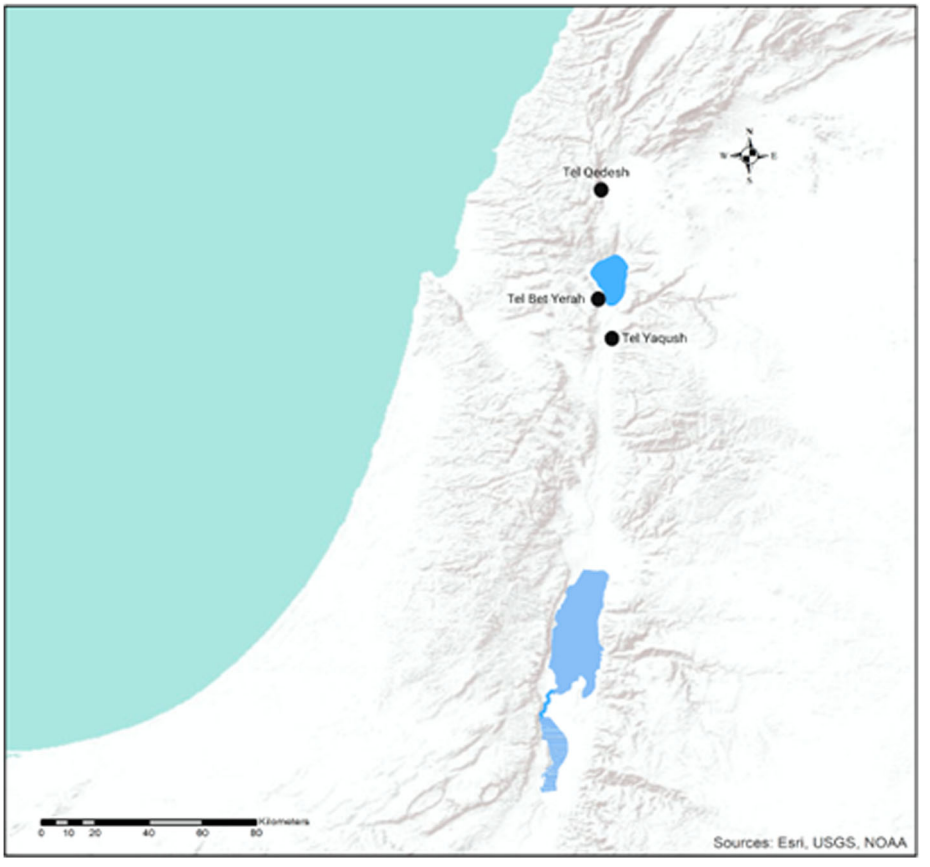

Figure 1. Research area and the location Tel Qedesh, Tel Yaqush and Tel Bet Yerah in the Levant.

Chesson 2015, Greenberg 2002; 2019). Few of these discussions have considered environmental studies such as zooarchaeology or stable isotope analysis (Gaastra et al. 2020).

These 'trajectories' to urbanism seem to differ between sites in the region (Greenberg 2019). Some, in fact, argue against an urban EBA in the Levant based on the lack of regional economic and social coherence (Chesson 2015). However, we lack sufficient data on site specific economic systems to understand whether for example the livelihood in the form of livestock herds of sites were managed on an individual or more regional basis.

Tel Bet Yerah, Tel Yaqush and Tel Qedesh, are not only located within distinct 'ecozones', the Sea of Galilee, the Upper Galilea, and the Central Jordan Valley, but are also distinct in site type and site trajectories, thereby present ideal sites for fruitful inter and intra-site comparisons. While Tel Bet Yerah experiences so called 'urbanism', Tel Yaqush avoids this shift and remains an unwalled village in the EBI–II (Greenberg 2019, Rotem et al. 2019). Tel Qedesh, on the other hand, unusually large for its regional position, is thought to have developed into a regional centre (Wachtel and Davidovich 2021). The dynamics and reasons of these varying site trajectories are poorly understood.

Our research questions:

1. What is the nature of the animal economies between the EBI–III at Tel Qedesh, Tel Bet Yerah and Tel Yaqush?
2. Do these animal economies reflect or reject 'trajectories' to urbanism such as the regional or the individual management of resources?
3. Are there similarities or differences in animal economies between the three sites and how can these inform the trajectories of the three sites in the Early Bronze Age Levant?

Research Stay at the University of Haifa

The zooarchaeological analysis of faunal remains from Tel Bet Yerah (2015 season), Tel Yaqush (2018 and 2019 seasons) and Tel Qedesh (2018, 2019 and 2021 seasons), was carried out by the authors between May 2022 and July 2022 at the Zooarchaeology Research Laboratory at the University of Haifa, Israel. We decided to carry out our analysis at the University of Haifa, as the materials are stored in the Levant. Most importantly to our research aims, Haifa University holds an excellent and broad comparative collection of Levantine species (Figure 3). We are therefore grateful to the funding of PEF which allowed us to travel to Haifa from the United Kingdom and spend six weeks there allowing us to intensively analyse these faunal materials (Figure 2).

During our 6-week stay at the University of Haifa, we recorded 1860 animal bone fragments; 710 from Tel Qedesh, 288 from Tel Yaqush and 862 from Tel Bet Yerah (Table 1). We thereby, focused on recording the early Early Bronze Age layers dating to the EBIb–II from the three sites. However, we also focused on the analysis and recording of some EBII materials from Tel Bet Yerah and Tel Yaqush. Interesting to note here, is that during our stay we also analysed a complete and articulated cow leg, that was probably intentionally buried under a floor at Tel Bet Yerah in the EBII (Figure 4).

Methods

Our analysis at the University of Haifa, involved the identification of animal bone fragments to taxa to the most specific taxonomic classification, species, group or family and where this was not possible specimens were identified to body size category. This was achieved using the comparative reference collection at the University of Haifa as well as published osteological and photographic manuals i.e., Zeder and Lapham (2010), Boessneck 1969 and Prummel and Frisch (1986), Halstead and Collins 2002 (for differences between sheep and goats).

Number of identified specimens (NISP) were calculated for all identified taxa and body-size categories. Species comparisons were made using NISP percentage. Taphonomic indicators such as burning, gnawing, butchery and bone fracture were studied and recorded according to Behrensmeyer 1979 and Outram 2001.

To study herding management practices and goals dental tooth wear stages were recorded using Grant 1982 (for dentition). Epiphyseal fusion of bones was recorded according to Grigson's (1982) for cattle, Zeder (2006) for sheep and goats and Zeder et al. (2015) for pigs/wild boar. Survivorship was calculated with the following formula: (number of fused bones + number of fusing bones) / (unfused + fused + fusing bones).

Figure 2. Gwendoline Maurer is recording the animal bones from Tel Qedesh at the Zooarchaeology Laboratory at the University of Haifa. Photograph taken by Mariana Albuquerque in May 2022.

Table 1. Quantity of animal bone fragments studied by Gwendoline Maurer and Mariana Albuquerque during their 6-week research trip at the Zooarchaeology Laboratory at the University of Haifa.

Site	Animal bones studied (NISP)	Period
Tel Qedesh	710	EBIb–II
Tel Yaqush	288	EBIb–II & EBII
Tel Bet Yerah	862	EBIb–II & EBII
Total	**1860**	**EBIb–II & EBII**

Figure 3. A selection of the animal remains in the comparative faunal collection at the Zooarchaeology Laboratory at the University of Haifa. Depicted here is an example of an otter (*Lutra lutra).* Photograph taken by Mariana Albuquerque in May 2022.

To study the representation of animal body part distribution at sites we calculated the minimum number of elements (MNE). For this, we recorded the presence of bone zones (1–8) according to Serjeantson 1996 and the symmetry of each bone. The minimum animal units (MAU) were then derived from the MNE divided by the number of each skeleton element in a skeleton (MAU = MNEobserved/MNEskeleton). These values were normed (%MAU) by dividing the MAU value for a given skeletal element by the greatest MAU value in the assemblage (Binford 1978; 1984).

Figure 4. Complete cow leg that was recovered underneath an EBII floor at Tel Bet Yerah. Photograph taken by Gwendoline Maurer in June 2022.

Preliminary results

The presented results are preliminary findings and are not intended to give the full picture of the assemblages in question but rather demonstrate the future potential of the zooarchaeological assemblages of Tel Qedesh, Tel Yaqush and Tel Bet Yerah.

Relative taxonomic abundance

The species diversity and prevalence varied greatly between all three sites in the EBIb–II (Figure 5). Tel Yaqush and especially Tel Qedesh shows a wide range of wild taxa. Especially striking is the high number of suidae at Tel Qedesh compared to the Tel Bet Yerah and Tel Yaqush. These might represent domestic pig or the extensive

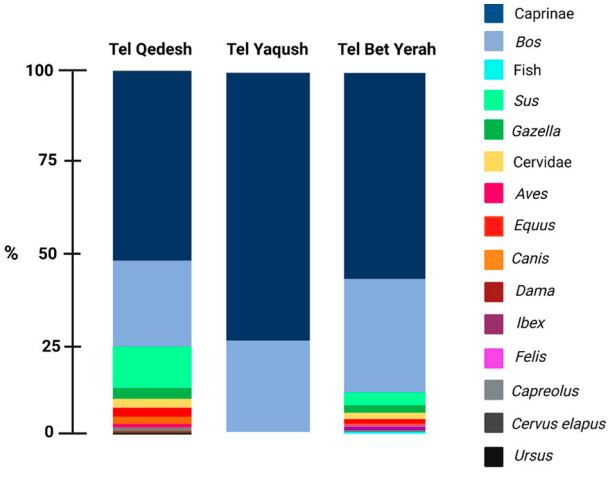

Figure 5. NISP percentage of taxa represented in the EBIb-II layers at Tel Qedesh (NISP = 710), Tel Yaqush (NISP = 59) and Tel Bet Yerah (NISP = 862).

hunting of wild boar and needs further investigation weather this is the result of the environmental or social context of Tel Qedesh. Interestingly also, Tel Qedesh contains remains of bears (*Ursus*) probably representing Syrian brown bear.

Striking also, is the limited taxa represented at contemporary Tel Yaqush, which entirely consists of herd animals; caprines and cattle. This suggests a narrow focus on specific species for a specific purpose yet to be confirmed.

Age-at-death

Caprine survivorship from Tel Bet Yerah for the EBIb–II sharply declines by 30% from birth to stage A (0–6 months). Survivorship then slightly declines by 10% between stage A (6months) and stage E (30–48 months) (Figure 6). However, most of the herd survive past the last fusion stage E. This profile could represent a specific on caprine milk production.

Caprine survivorship from Tel Qedesh declines by around 10% between stage A (0–6 months) and stage C (12–16 months) and by around 40% between stage C (12–16 months) and stage E (30–48 months). Again, most of the herd survive past the last fusion stage E (Figure 6). The steady kill-off of caprines between 1 year and 4 years of age, is an ideal strategy for meat production. However, the sustaining of older herds suggests mixed production goals of exploiting caprines for meat as well as wool or milk.

Caprine survivorship from Tel Yaqush, shows no kill-off of the herd between stages A–E (Figure 6). Whether this is related to small sample sizes or the nature of economic practices at the site needs to be clarified. This profile suggests a very narrow focus on one age class of caprines, older animals, at the site for single specialised product. This needs to be further investigated.

Body part representation

The representation of caprine body parts from EBIb–II Tel Yaqush (Figure 7) is as follows; the head and shoulder area are well represented. The rest of the skeletons are

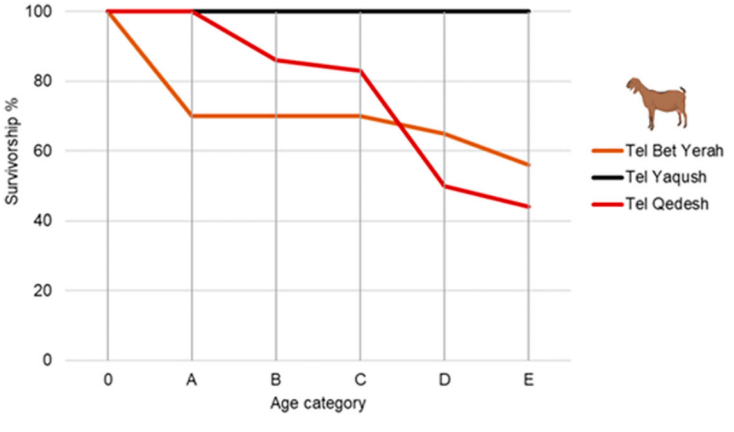

Figure 6. Survivorship curve for caprines (*Ovis* and *Capra*) for the EBIb-II, A = 0-6 months, B = 6-12 months, C = 12-16months, D = 18-30months, E = 30-48months, F = 48 + months according to Zeder 2006. Not sufficient data for stage F. Tel Bet Yerah n = 122, Tel Yaqush n = 7, Tel Qedesh n = 30.

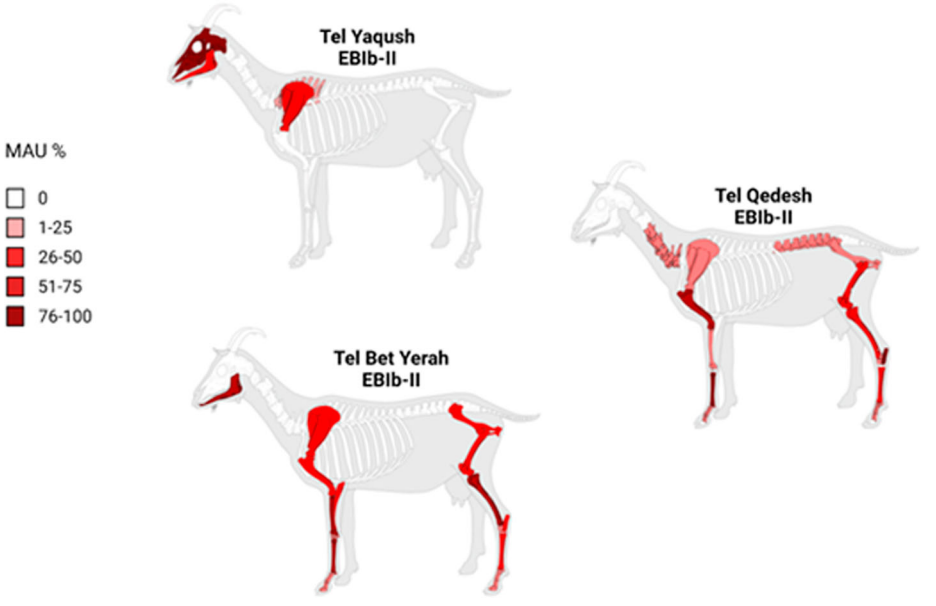

Figure 7. MAU% of caprines (Ovis and Capra) at EBIb-II Tel Yaqush, Tel Bet Yerah and Tel Qedesh.

absent from the site. This in fact suggests caprines were not butchered and processed at the site. The representation of caprine body parts from EBIb–II Tel Bet Yerah (Figure 7) are as follows; the upper and lower fore and hind-limbs are well represented as well as the head, in form of mandibles. The feet are represented to a lesser extent. The representation of caprine body parts from EBI–II Tel Qedesh (Figure 7) is as follows; the lower fore and hind limbs are well represented and the upper fore and hind limb to a lesser extent as well as part of the axial skeleton. These representations unlike at Tel Yaqush demonstrate the partial butchery, processing, and consumption on the site.

Future directions

The above preliminary observations make an introductory case for what can be achieved by studying these zooarchaeological assemblages and how these can inform larger EBA Levantine debates. Future work on the zooarchaeology of Tel Qedesh, Tel Yaqush and Tel Bet Yerah includes the full data analysis of all three sites as well their full comparison. We aim to publish these findings in 2024. For this we aim to compare EBI, EBIb–II, EBII–III and EBIII animal economies within all three sites.

We are also collaborating with the University of Durham on a multi-period and multi-site project which will involve the stable isotopic analysis of animal bones and teeth from EBI–III Tel Qedesh and Tel Yaqush. The isotopic analysis of Tel Bet Yerah EBI–III is currently being carried out at the UCL Institute of Archaeology.

Acknowledgements

We acknowledge, once again, that this data is preliminary and a part of a bigger picture still to be fully published, in the case of the sites of Tel Qedesh and Tel Yaqush. Thus, adjustments to certain

aspects, i.e. context descriptions and overall assemblage numbers, are to be expected. We thank the directors and respective teams for not only allowing us access to the zooarchaeological assemblages, but also sharing their own work in other areas, and thus putting ours into a broader context. Thank you all who allowed us to tirelessly work alongside you for several seasons on all three sites. We would like to specifically thank the excavation directors of Tel Qedesh: Dr Uri Davidovitch and Dr. Ido Wachtel. We also thank the Tel Yaqush excavation directors: Dr. Yael Rotem and Dr. Mark Iserlis. Further, we thank Prof. Rafi Greenberg for allowing us to work on the zooarchaeological assemblages from Tel Bet Yerah. And finally, we thank the Laboratory for Mediterranean Archaeozoology (MAR) in Haifa University and Dr. Nimrod Marom for allowing us the use of the space and comparative collection to conduct our research. This research was supported by the Palestine Exploration Fund (Research Grant), the London Arts & Humanities Partnership (LAHP) and the Israeli Science Foundation Grant No 681/19. Tel Bet Yerah zooarchaeological research was also supported by the Israel Science Foundation, Grant No. 681/19.

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