

CHALCOLITHIC AND EARLY BRONZE AGE IB FAUNA FROM BEQO‘A

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INTRODUCTION

Zooarchaeological finds from the Chalcolithic and Early Bronze IB were exposed from a rescue excavation at Beqo‘a, a site in the Judean Hills (see Golani, Storch and Eirikh-Rose, this volume). Investigating the fauna provides an opportunity to tentatively consider the nature of the animal-based economy at Beqo‘a. The following article details the zooarchaeological analysis of the small hand-collected archaeofaunal assemblage, spatially limited to Areas A, C, D and F122. The excavations in Areas B, E and F did not produce faunal remains. The faunal assemblage dates to the Chalcolithic period (Stratum III) and EB IB (Strata II–I). The faunal analysis revealed an assemblage consisting of 207 animal bones and tooth fragments originating from 36 loci, of which 51 bones/teeth (24.6%) were identified from six different species.

Methods

Species identification in this study was assisted by Boessneck 1969, Schmid 1972, Payne 1985, and Prummel and Frisch 1986. Identification was further verified by consulting modern comparative vertebrate samples stored in the National Natural History Collections of the Hebrew University, Jerusalem. Due to the similar morphology and metrics between sheep and goats, many of their remains were combined into a caprine category, as precise taxonomic distinction between the two could not be determined. A size-based taxonomy was used for the remains that could not be identified to a species level: small, medium and large mammals. Fauna in an advanced state of

fragmentation, which could not be matched to an appropriate size-based division, was classified as unidentifiable.

Mortality profiles and modifications were documented for each area. Determining the age at death was estimated using post-cranial epiphyseal fusion rates and dental eruption sequences (Silver 1969). Dental attrition scores (Payne 1973; Zeder 1991:93) provided an estimation of cull rate for sheep and goats. The fauna was also quantified by using NISP (number of identifiable specimens) values, which represents the number of fragments per taxon. In order to determine cultural modifications, the colors of the bones were documented. It has been experimentally demonstrated that the color of burned bone can reflect firing temperatures (Shipman, Foster and Schoeninger 1984; Nicholson 1993). Brown and black bones are associated with low temperatures, while white or blue-gray bones point to higher temperatures. To reduce subjectivity, the color of each burnt bone was coded using the *Munsell Soil Color Charts* (1994) because it offers a standardized, replicable method of description.

Unlike pottery or lithics, animal remains are not typologically sensitive as there have been no significant morphological changes in animal skeletons for tens of thousands of years (Davis 1987:31). For this reason, the fauna from non-secure stratigraphic levels, such as topsoil and fill loci, were excluded from the study. Such selection strategies reduce—although do not completely eliminate—the effects of stratigraphic mixing and subsequent temporal contamination. The remaining assemblage therefore represents, as much

as methodologically possible, the authentic ancient subsistence patterns at Beqo'a.

THE FAUNA

Areas A and D

Only one bone was found in each of Areas A and D; therefore, they are presented together. Area A produced a single bone from the EB IB strata—the proximal end of a goat metacarpal (lower forelimb). Area D yielded a caprine humerus shaft of a sub- or mature adult from a debris layer (L131) dating from the Chalcolithic period. The bones from both areas show no evidence of cultural modification related to pathological development, meal preparation (butchery and cooking) or alterations caused by the feeding habits of carnivores or raptors.

Area C

Area C yielded the largest sample of the study, totaling 176 animal bones, 47 of which (26.7%) could be identified. The fauna from Area C represents the most varied temporal contexts of the site, including both the Chalcolithic and EB IB occupations. There is no evidence for pathological developments or modifications associated with feeding carnivores or raptors on the bones.

The faunal record of the Chalcolithic period, found mainly in debris (n = 110; L142, L150) and habitational surfaces (n = 15; L156) in Area C, is represented by an assemblage of 125 bones, of which 30 (24.0%) were identified. The assemblage consists of caprines, cattle, a small equid and a pig. Of the caprine assemblage, two bones were identified as sheep and one, as goat. Remains of cattle are mainly represented by teeth, as well as lower leg bones (metapodials) and a pelvic fragment (acetabulum). The only pig bone was from the lower hind leg (third metatarsal).

The EB IB assemblage from Area C consists of 51 bones/teeth, of which 18 (35.3%) were identified to the species level. The EB IB fauna is derived from debris (n = 30; Loci

118, 123, 126, 153, 155, 182, 184, 185, 189, 190) and habitational surfaces (n = 21; Loci 139, 144, 166, 186, 191). Like the Chalcolithic phase, the EB IB sample consists mainly of domesticates: caprines, cattle, small equids and pigs. Two phalanges were identified as sheep, and one twisted horn core fragment was from a domestic goat. Cattle are represented only by tooth fragments (incisor and molar); postcranial remains were not recovered. Pigs, represented by cranial, dental, and postcranial remains, may reflect local environmental conditions from which the villagers of Beqo'a benefited (see below). Since the data gleaned from the pig bones is limited, pigs may have been domesticated, but it is possible (although perhaps unlikely, see below) that wild boar were also hunted. Remains of gazelle, whose presence is demonstrated by a horn core fragment, may be the only evidence that the inhabitants of Beqo'a occasionally hunted wild game. Although gazelle species can be determined based on horn core morphology (Tchernov, Dayan and Yom-Tov 1986–1987), the precise taxonomic identification of the sample from Beqo'a was not possible due to its state of preservation. One limb bone from a medium-sized mammal was burned to a bluish gray color (GLEY2 5/1).

Feature 122

Feature 122 is a burial cave located c. 60 m east of Area D. The animal bones were stratigraphically associated within debris layers of the Chalcolithic period. The burial feature produced a total of 29 animal bones and teeth, of which only 3 (10.3%) were taxonomically identified. A sheep or goat mandible with an associated molar fragment was found; the other identifiable bone is a lower hind limb (proximal fourth metatarsal) of a pig. There is no bias in symmetry as bones from the left and right sides of the body are not markedly different. Most of the faunal sample consists of unidentified limb fragments, some of which were from medium-sized mammals. There is no evidence for cultural or natural modification on any bones or teeth from F122.

DISCUSSION

While Chalcolithic fauna is known from Areas C, D and F122, Area C produced fauna from both the Chalcolithic and EB I periods. Combining the data from the Chalcolithic faunal samples from each area allows the investigation of contemporary animal-based economic strategies. The EB I bones are too limited to discuss at length.

The Chalcolithic animal remains from Beqo‘a consist of 155 bones and teeth, of which 33 (21.3%) were taxonomically identifiable (Tables 1, 2). The remains come from two main loci including debris (NISP = 140) and habitational surfaces (NISP = 15). The species exploited at Beqo‘a are dominated by domestic animals, mostly sheep and goats. Although the sample is too small to comprehensively discuss caprine herd structure at Beqo‘a, the available data show that sheep remains outnumber goats at a ratio of 2:1. The general faunal composition from the site illustrates a primary reliance on domestic species, and wild game in low numbers, which has been reported at other Chalcolithic settlements (e.g., Grigson 1987; 1995; Davis and Grigson 1998).

A small collection of animal remains from the Chalcolithic assemblage were suitable for estimating mortality rate. The fused distal end of a sheep humerus indicates a specimen older than 10 months. A lower deciduous third molar of a juvenile sheep demonstrates attrition consistent with an animal aged 1–2 years. A goat phalange with a fused proximal end indicates it was older than 13–16 months at death.

Mortality data for the EB IB assemblage is also limited. Two sheep phalanges (consecutive 1st and 2nd phalanx) had unfused proximal epiphyses from an animal(s) older than 13–16 months. A fused distal tibia came from a caprine aged at least 1.5–2 years. Unerupted lower first and second swine molars indicate a juvenile pig aged 4–6 months at death. The presence of dead juveniles likely reflects culling practices associated with managing domestic animal herds rather than strategies that targeted wild

Table 1. Species Abundance (NISP) according to Period

Species	Chalcolithic	EB I	Total
Cattle (<i>Bos taurus</i>)	8	2	10
Donkey (<i>Equus asinus</i>)	1	-	1
Gazelle (<i>Gazella sp.</i>)	-	1	1
Pig (<i>Sus scrofa</i>)	2 ⁱ	5	7
Sheep/Goat (<i>Ovis/ Capra</i>)	22 ⁱⁱ	10 ⁱⁱⁱ	32
<i>Total identified</i>	33	18	51
Small mammals	1	-	1
Medium mammals	84	30	114
Large mammals	17	3	20
Unidentified	20	1	21
<i>Total assemblage</i>	155	52	207

ⁱ One from F122.

ⁱⁱ Two from F122 and one from Area D.

ⁱⁱⁱ One from Area A.

game (Horwitz 2007:3). A fused proximal pig tibia came from a specimen older than 3.5 years. The varying slaughter schedules for both occupation phases likely aimed at exploiting primary (meat, blood) and secondary (dairy, hides, wool, hair, bone, traction, and dung for fertilizing agricultural fields) animal products.

Although the proportion of cattle to caprines can estimate the contribution of cattle toward plow-based agricultural endeavors (Rosen 1986), the cattle sample from either period at Beqo‘a is inadequate to critically assess. However, if the community kept very few cattle, as the data suggest, alternative evidence may indicate local farming. Rainfall in quantities essential for crop growth is probable, based on the presence of pigs in both occupation phases, as pigs require wet conditions. Furthermore, since even small-scale agricultural operations require land clearance, this would have resulted in reduced natural habitats, leading to the inevitable displacement of the wild species. The lithic tool repertoire lacks projectile points (see Khalaily, this volume), which supports the hypothesis of infrequent hunting, indicating a reliance on crops and domesticated livestock.

Table 2. Skeletal Parts by Species and Period

Species	Skeletal Part	Chalcolithic	Early Bronze I	Total
<i>Cattle</i>	Incisor		1	1
	1st lower molar		1	1
	2nd upper molar	1		1
	3rd lower deciduous molar	1		1
	3rd upper molar	1		1
	Unidentified molar	2		2
	Metapodial	1		1
	Metatarsal	1		1
	Pelvis	1		1
<i>Subtotal cattle</i>		8	2	10
Donkey	1st phalanx	1		1
<i>Subtotal donkey</i>		1		1
Gazelle	Horn core		1	1
<i>Subtotal gazelle</i>			1	1
<i>Sheep/goat</i>	Astragalus		1	1
	Femur		1	1
	Horn core		1	1
	Humerus	2 ⁱ	1	3
	1st lower molar	1	1	2
	1st upper molar	1		1
	2nd lower molar	1		1
	2nd upper molar	1	1	2
	3rd lower deciduous molar	1		1
	Mandible	2 ⁱⁱ		2
	Maxilla	1		1
	Molar lower	1		1
	Molar upper	2		2
	Metacarpal		1 ^{iv}	1
	Metapodial	2		2
	1st phalanx	1	1	2
	2nd phalanx		1	1
	Premolar lower	2 ⁱⁱⁱ		2
	Tibia	2	1	3
	Tooth	1		1
Ulna	1		1	
<i>Subtotal sheep/goat</i>		22	10	32
<i>Pig</i>	1st lower molar		1	1
	2nd lower molar		1	1
	Mandible		1	1

ⁱ One from Area D.ⁱⁱ One from F122.ⁱⁱⁱ One from F122.^{iv} From Area A.

Table 2. (cont.)

Species	Skeletal Part	Chalcolithic	Early Bronze I	Total
	Metacarpal III		1	1
	Metatarsal III	1		1
	Metatarsal IV	1 ^v		1
	Tibia		1	1
<i>Subtotal pig</i>		2	5	7
<i>Total</i>		33	18	51

^v From F122.

The spatial distribution of a faunal assemblage can sometimes help identify activity in specific areas. This approach was attempted, with varied results, for the Chalcolithic-period burial (F122), as well as for Building 1 and surrounding areas of EB IB.

The distance between Burial Cave F122 and the occupation areas of Beqo‘a demonstrates a common cultural practice emphasizing a spatial separation between the dead and the living (Parker-Pearson 2003:25). Although F122 had very few animal remains, animal and human remains were found together within the same loci (L138, B1085; L164, B1195; L165, B1116), illustrating clear and definite contemporary connections between the interred humans and their animals. In the Southern Levant, carnivores such as foxes and hyenas are well-known faunal accumulators, and typically leave evidence of their feeding (Horwitz 1996:189). However, none of the fauna at Beqo‘a was damaged from carnivorous gnawing or partial digestion. This suggests their deposition and subsequent burial had limited or perhaps no exposure to carnivorous disturbance, resembling an archaeological context rather than a carnivore den.

Since the undisturbed animal remains were not introduced to the burial cave via natural agency, they appear to have been purposely placed in the tomb as animal offerings to or for the deceased. The mandibular and dental remains from a sheep or goat indicate it was 2–3 years old at death (based on the scored attrition of the lower fourth premolar). The

identifiable mortuary sacrificial faunal remains, or ‘sacrifauna,’ in F122 were from domestic species (sheep/goat and pig), and were likely selected from the domestic stock that supported the economic strategies at nearby Beqo‘a.

Research of Chalcolithic and Early Bronze I burials at Sha‘ar Efrayim reported that Caves 1, 3 and 5 (Horwitz 2011) are similar to Beqo‘a in that they also featured burial offerings of domestic animals that included caprines and pigs. A goat from Sha‘ar Efrayim died at 2–3 years of age, the same age class as the caprine from F122 at Beqo‘a. However, Sha‘ar Efrayim’s anthropogenically introduced mortuary sample differs from Beqo‘a: it has greater species diversity, which included fresh-water turtle, donkey, dog, gazelle, deer and ostrich egg shells. Evidently, there were both similarities and variations in the contemporary mortuary customs that included animal offerings.

Most of the EB I fauna were found within Building 1 (n = 23), while the rest was associated with the circular structure (n = 9) and areas outside of Building 1 (Table 3). Building 1 yielded only caprines and medium-sized animals, and cattle were found only in areas north of Building 1. Gazelle remains were associated with the circular structure, and pigs were found mainly west of Building 1. The only burnt bone was found west of Building 1. Although there may have been activity-specific areas, the small size of the EB I sample is inadequate to interpret the cultural significance of its spatial distribution.

Table 3. Spatial Distribution of EB I Fauna near Building 1, Area C

Species	Building 1 (L118, L123, L126, L144, L189, L190)	Circular Structure (L166, L185)	North of Building 1 (L153)	East of Building 1 (L139)	West of Building 1 (L182, L184, L186, L191)	Total
Cattle			2			2
Gazelle		1				1
Pig		1			4	5
Sheep/goat	5	1		1	2	9
Medium mammal	16	6	1		7	30
Large mammal	1				2	3
Unidentified	1					1
<i>Total</i>	23	9	3	1	15	51

CONCLUSIONS

The fauna from Beqo'a dates from the Chalcolithic and Early Bronze Age I, with the larger assemblage dating from the Chalcolithic. Fauna was recovered from Areas A, C, D and F122, the majority of the remains coming from Area C. The fauna from both phases of occupation is dominated by domestic stock, including cattle, sheep, goats, pigs and small equids. Overall, wild species were rarely exploited, which may be due to mixed sedentary-agricultural practices that cleared land. This would have resulted in the reduction or outright removal of the natural habitats of wild species, making exploitation of wild species considerably more difficult and time-consuming. The limited mortality data suggest that animals were culled at varying stages, and therefore, utilized for both primary and secondary animal products. Found in a

secure archaeological context, the Chalcolithic remains from F122 appear to represent the sacrificial remains of animals offered during a mortuary ceremony. The non-exotic nature of the mortuary fauna suggests that the animals selected as offerings were chosen from herds managed by the nearby inhabitants of Beqo'a. Although problematic to critically assess due to the small sample size, the EB I fauna from Area C may also suggest area-specific activities.

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