Shepherd Kings? A Zooarchaeological Investigation of Elite Precincts in Middle Bronze Age Tel Hazor and Tel Kabri

Nimrod Marom, Assaf Yasur-Landau, Sharon Zuckerman, Eric H. Cline, Amnon Ben-Tor, and Guy Bar-Oz

A zooarchaeological investigation of elite precincts from two major Middle Bronze Age sites in the Galilee region of northern Israel, Tel Hazor and Tel Kabri, was conducted with the aim of revealing differences in the animal economy between them. The results indicate that the elites of the polity of Hazor were strict consumers who exerted economic demands on the surrounding hinterlands and relied on specialized sheep herding. In Tel Kabri, by contrast, there is evidence that the Middle Bronze Age palace elites were engaged in locally based pastoral production as well as extensive utilization of diverse habitats around the settlement. These differences are ascribed to micro-regional differences in the hinterlands of the ancient polities. The dyadic relations between the economic and ecological gateway roles of Middle Bronze Age Hazor and Kabri are discussed.

Introduction

The city-states of the Middle Bronze Age, with their monumental art, fortifications, and temples, mark the zenith of Canaanite culture in the southern Levant (Dever 1987: 149; Mazar 1990: 174; Ilan 1995: 297; Cohen 2002: 1–3). The Canaanite Middle Bronze Age represented the first local appearance of a truly international system of trade, showing evidence for intensive contacts with Syria, Egypt, and the Aegean (Ilan 1995: 297; Maeir 2000). Public architecture on a massive scale embodied and propagated the power of the elites who orchestrated highly hierarchical social systems. Surveys of contemporary sites point to the development of multi-tiered settlement hierarchies (Greenberg 2002: 106–7; Yasur-Landau, Cline, and Pierce 2008). This rise in complexity was part of an urbanization process that also included demographic growth, population packing, and geographic range expansion (Gophna and Portugali 1988: 17–18).

Processes of urbanization and the emergence of hierarchy—both in society and in settlement pattern—are manifest in various kinds of material remains. One of these is animal bone assemblages, which reflect the provisioning of basic commodities such as meat, milk, and fiber to ancient settlements, as well as the importation of exotic foods and wild-game hunting. Early research

Nimrod Marom: Zinman Institute of Archaeology, University of Haifa, Mount Carmel, Haifa 31905, Israel, *nmarom02@campus.haifa.ac.il*

Assaf Yasur-Landau: Department of Maritime Civilizations, The Leon Recanati Institute for Maritime Studies, University of Haifa, Mount Carmel, Haifa 31905, Israel, *assafyasur@hotmail.com*

Sharon Zuckerman: Institute of Archaeology, Hebrew University of Jerusalem, Mount Scopus, Jerusalem 91905, Israel, *mssharon@mscc.huji.ac.il*

Eric H. Cline: Department of Classical and Near Eastern Languages and Civilizations, The George Washington University, Washington, DC 20052, *ehcline@gwu.edu*

Amnon Ben-Tor: Institute of Archaeology, Hebrew University of Jerusalem, Mount Scopus, Jerusalem 91905, Israel, *bentor@mscc.huji.ac.il*

Guy Bar-Oz: Zinman Institute of Archaeology, University of Haifa, Mount Carmel, Haifa 31905, Israel, *guybar@research.haifa.ac.il*

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on fauna from Middle Bronze Age Canaanite contexts produced useful preliminary data on animal species and body parts utilized in settlements of that period—for example, in Aphek (Hellwing 2000). It also laid a foundation for later studies aiming to reconstruct economic systems, which include work done in Tell Jemmeh (Wapnish and Hesse 1988), Tell el-Hayyat (Falconer 1995), Tel Dan (Wapnish and Hesse 1991; Wapnish, Hesse, and Ogilvy 1977), Tel Haror (Klenck 2002), and Zaharat ed-Dhra (Berelov 2006). These important works, however, were conducted on animal bone assemblages from village sites and non-elite quarters of larger towns. No major study of Middle Bronze Age faunal material was devoted entirely to palatial economies, which were at the focal point and the pinnacle of urban growth and settlement hierarchy (but see Croft 2004: 2329). This aspect of south Levantine zooarchaeology is regrettably underdeveloped as compared with the scholarly treatment of Aegean and Syrian Bronze Age palace economies (e.g., Halstead 2007; Halstead and Isaakidou 2004; Stocker and Davies 2004; Vila and Gourichon 2007).

This study thus aims to present a comparative analysis of faunal assemblages from the elite precincts on the acropoleis of two major MB II settlements: Tel Hazor (Ben-Tor 2008) and Tel Kabri (Yasur-Landau et al. 2012) (**Fig. 1**). Both settlements are located in the Upper Galilee, near perennial water sources and in a favorable setting for agriculture, pastoral production, and the consumption of wild animal resources. Our goal is to point out differences in aspects of their animal economies, differences that we believe are in keeping with important features of elite society in these ancient settlements.

The polities controlled from Tel Hazor and Tel Kabri were located on the east and west sides of the Meiron Massif of the Upper Galilee, respectively, and thus neighbored each other during parts of the MB II (but see Peilstöcker [2003: 437] for the possibility that another polity was centered in Tel Rosh, between Hazor and Kabri). Hazor was unequivocally the largest polity in Canaan at the time, and Tel Kabri was the third largest contemporary settlement (Yasur-Landau, Cline, and Pierce 2008). The art, architecture, and other finds excavated in Tel Kabri (Yasur-Landau et al. 2012 and references therein) underline its importance, derived in part by its position as a gateway controlling trade routes with the Aegean (Kempinski 2002: 451; Maier 2000). Very similar ecological conditions typified the immediate terrestrial environments of both polities: bordering a mountainous region with developed Mediterranean oak and pistacia forest and wetlands (Danin 1995: 29).

What differences, then, can we expect to find between the palatial economies in the two settlements? Textual evidences unearthed in Tel Hazor (Horowitz

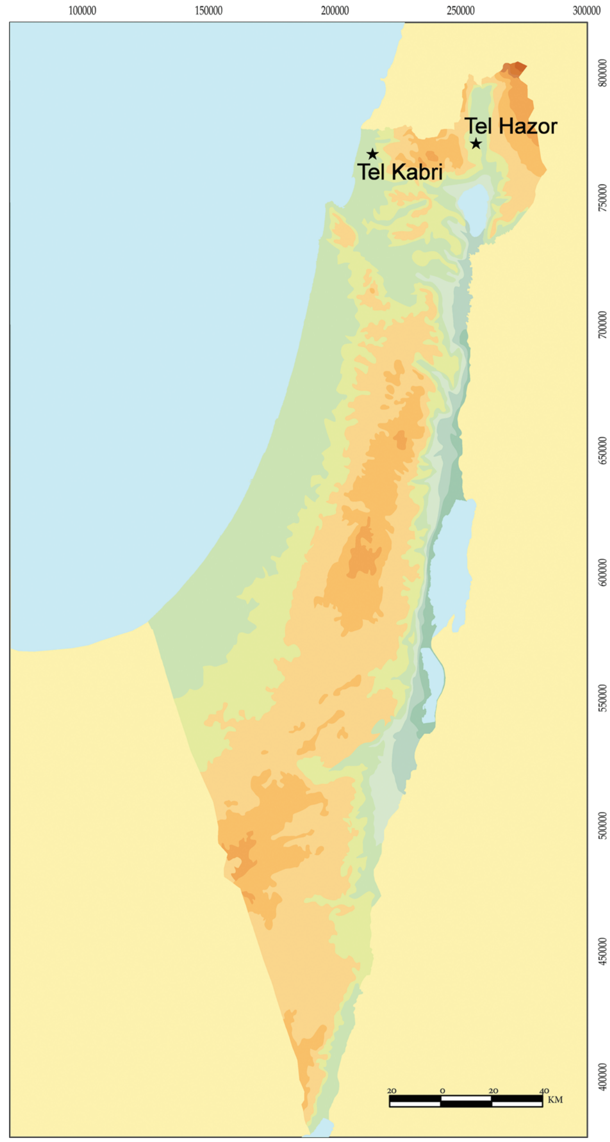

Fig. 1. Location map for Tel Hazor and Tel Kabri.

and Oshima 2006: 65–87) reveal land connections with contemporary kingdoms in Syria and large-scale textile production, which entails specialized pastoral production of wool. In Tel Kabri, on the other hand, maritime connections with the Aegean and with Egypt are indicated. No specialized production of animal goods—for example, wool—can be inferred. Furthermore, the Kabri polity was, so to speak, "sea-locked." Landlocked Hazor had a hinterland bordering on the extensive steppe of the Transjordanian highlands, which have been, into modern times, prime pastureland. Tel Kabri, in contrast, is located in a valley, confined between the mountains of the Upper Galilee and the Mediterranean Sea. Its strategic strength was maritime connectivity, while on land it may have acted as a typical Mediterranean city, mitigating resource shortages between smaller micro-regions in its territory (Horden and Purcell 2000: 121–22).

These differences in the geographical location of the two Middle Bronze Age settlements should be reflected in their animal economies, as they are inherently affected by the availability of exploitable habitats for animal husbandry. Zooarchaeological differences between Kabri and Hazor are therefore expectable, between a postulated Mediterranean economy with maritime connectivity (Kabri) and an economy of steppe and inland trade (Hazor).

Four zooarchaeological methods may be particularly relevant for the reconstruction of large-scale palatial animal economies, as explained in detail below. These take account of (1) the taxonomic diversity of the assemblages, including the number of game animals and imported taxa; (2) the sheep-to-goat ratio; (3) age-at-death analysis; and (4) the sex ratios in sheep and goat herds.

Taxonomic diversity means the number of animal taxa represented in each assemblage and the observed distribution of bones between the taxonomic categories (Magurran 2004: 8). When more taxa are present in one assemblage than in another—taking into account differences in sample size—its richness is said to be higher. Assemblages can also vary with respect to dominance, which means the extent to which more of the individual specimens fit into fewer taxonomic categories. The interpretation of observed variability in taxonomic diversity is context-dependent.

Richness values may change as the result of greater or lesser incorporation of game animals into the economic system, or even into the political one: larger game animals were often hunted by elites as a status-enhancing activity (Allsen 2006: 8; Firmage 1992; Marom and Zuckerman 2012) and not for subsistence needs. A more diverse diet with an exotic faunal component might signify a rich diet and therefore a high status (Ijzereef 1989; Ervynck et al. 2003; Schulz and Gust 1983; for an interesting historic example from the Middle Ages of elite hunting of cranes using falcons in the Acre Valley, also see Ibn Munqidh 2011: 206–7); but, on the other hand, it could also be an indicator of subsistence stress, a common interpretation in prehistoric zooarchaeology (e.g., Stiner 2001). The choice of interpretation should take into consideration the archaeological context and the less-common components of the taxonomic list in the assemblage itself—that is, the smaller animals (e.g., local fish and small fowl). In early historical urban sites, smaller wild taxa likely indicate subsistence hunting, while larger animals (e.g., bears, deer) probably indicate high-status hunting.

Lower variability in the composition of the zooarchaeological assemblage, reflected in a higher dominance of sheep and goats, together with a narrow sex and age profile, may indicate orderly provisioning. A proxy for standardization, it goes hand in hand with larger-scaled economies that seek to minimize variability in incoming goods for ease of information management and control, and it also indicates a longer distribution chain between producer and consumer (Zeder 1991: 36–37). We can see this type of control, for example, in the routinized treatment of animals in Ur III Tell Drehem, where, as was recorded in texts, certain types of animals were allocated to social functionaries, thus reflecting the distance between producers and consumers (Zeder 1994).

The sheep-to-goat ratio in a faunal assemblage is a function of the environment, the degree of market involvement, and the herd maintenance strategy used to optimize the harvesting of herd products—specifically, meat, milk, and wool (Redding 1981: 296–309; 1984). The most commonly observed optimization strategy in the pre-modern southern Levant is aimed at herd security (Redding 1981: 386, Sasson 2010: 61)—that is, it is geared toward minimizing fluctuations in herd size, because common but unpredictable population crashes can undermine a pastoral livelihood. Since goats are hardier in terms of resistance to disease and are more fecund than sheep, herders concerned primarily with herd security would keep more goats than would herders concerned mainly with marketing meat and wool. Similarly, practitioners of a mixed subsistence economy of agriculture and animal husbandry would keep more goats than would more mobile pastoral specialists (Redding 1984).

Therefore, a palatial assemblage that has a high sheep-to-goat ratio would likely reflect herders' concern with specialized production of meat and/or wool. In turn, specialized production of meat and wool means a demand strong enough to counter the tendency to maximize herd security in favor of creating surpluses of these products. Notice that we leave the demanding agent blank: it could be a purely economic motivation, such as supply-and-demand, an internal social motivation such as competition and status enhancement, but also coercion by central authorities. Even the identity of the "herder" should be left vague. The "herder" could be a pastoral-nomad, a member of the "free-sector" (Zaccagnini 1989), or a palace employee tending palatial or temple flocks.

Age-at-death analysis provides information on the number of caprines of the same age cohort that survived consecutive units of time (in our case, years). The animal mortality pattern is discerned from the archaeological record; that is, the culling schedule can be deduced, for example, by whether most of the animals were slaughtered during their first year of life, as young adults (1–2 years of age), or as mature adults. These data can then be used to determine which model of herd maintenance was being followed (Payne 1973; Redding 1981: 234). An assemblage of caprine bones that has a very high sheep-to-goat ratio may have been formed by culling from a herd geared to optimize either meat or wool production. If most of the animals are young or young adults, the model aimed at meat production would fit the data better, since wool production commonly entails retaining most animals alive until a later age (Payne 1973).

Similarly, the sex ratio in a herd is important for determining the economic context of consumption. If we find a high percentage of males—especially young and younger adult ones—in an archaeological assemblage, we can infer that we are observing the food remains of a consumer society (vs. the producing segment of society) (Marom and Zuckerman 2012; Marom et al. 2009; Zeder 1991: 40–43). This is because males in caprine herds are valuable to producers not for consumption but for economic gain. Since one male can serve more than one female (and frequently tens of females) in each rut, and the male-to-female sex ratio at birth is even, many younger males not needed as breeding stock can be sold or delivered as tax each year without hurting the reproductive core of the herds; thus, producers would not be leaving many remains of male animals consumed as meat. Conversely, when many females and few males are found in an archaeological assemblage, it may be hypothesized that the economic context of consumption was the producing segment of society that had access to the reproductive core of the herds. In an economic setting in which markets played a role or in which taxes were paid in livestock, most males—being expedient for reproduction and thus a primary allocative resource (Giddens 1981: 4)—would be removed from the original herd and sent to a central location, which may be a market, the seat of a taxing authority, or some other redistributive social institution. The portion of the herd left for consumption by the producers would be younger animals that died of natural causes, and older animals past their prime reproductive years (>5 years of age), which are mostly females. These will presumably be deposited in the producers' garbage.

With these models in mind, we examine Middle Bronze Age Hazor and Kabri, looking at zooarchaeological analyses of the faunal assemblages of their respective acropoleis, to interpret the differences between the animal economies in these two sites.

Tel Hazor

Tell el-Waqas (Tell el-Qedah), the site of the ancient Canaanite city of Hazor, is one of the largest and most intensively investigated tels in the southern Levant. It is located in the southwestern corner of the Huleh Valley, at the foothills of the Upper Galilee mountain range (**Fig. 1**). The site, comprising an upper tel of ca. 10 ha, with an appended 70 ha Lower City to its north, controls the main route of a road forming a branch of the ancient Via Maris. Hazor has one of the longest sequences of settlement in the southern Levant, with only a few short gaps, from the middle of the third millennium B.C.E. until the late first millennium B.C.E.

Hazor was first explored by John Garstang on behalf of the British Mandate Department of Antiquities. During the 1950s, an expedition led by Yigael Yadin of the Hebrew University of Jerusalem conducted large-scale excavations on the upper tel and in several areas in the Lower City (Yadin 1972). Renewed excavations, directed by Amnon Ben-Tor under the auspices of the Hebrew University of Jerusalem, began in 1990 and continue into the present. These also include investigations of the Lower City by Sharon Zuckerman.

The earliest historical references to Hazor appear in the 19th-century B.C.E. Brussels Group of the Execration Texts and in the state archive of Mari. In letters from the time of Zimri-Lim, Hazor and its king Ibni-Addu are mentioned as active participants in the thriving commercial and political network of that period. Eleven cuneiform tablets found at Hazor, dating to the Old Babylonian period, include royal correspondence, a court record and a mathematical tablet, three liver models used for extispicy, administrative tablets, and a recently found fragment of a law code (Ben-Tor 2004; Horowitz and Oshima 2006).

The earliest Middle Bronze Age settlement (Strata XVII–XVI on the upper mound) was enlarged by the addition of the vast Lower City to its urban area (**Fig. 2**). The two principal strata of this period were attributed to the MB IIB, when Hazor served as a political and economic hub. Monumental royal edifices and cultic structures were erected in both parts of the city. These include the three-piered gates of the Lower City (Areas K and P), cultic structures (the "Orthostat Temple" in Area H and the "Double Temple" in Area F), and public installations (such as the tunnels in Area F), as well as domestic structures (Areas C and S [= A/210]).

On the acropolis, the eastern part of a monumental multi-roomed structure was unearthed by the renewed excavations**.** The walls of the edifice are well built, constructed of large stones and reaching 1.5 m in width. Benches and pebble-paved floors were uncovered in some of the rooms. The structure is understood as a royal palace that originally covered a large area in the center of the acropolis. The corner of this edifice was built simultaneously with the corner of another monumental structure, the "Southern Temple," which belongs to the group of monumental symmetrical temples ("Migdol" temples)

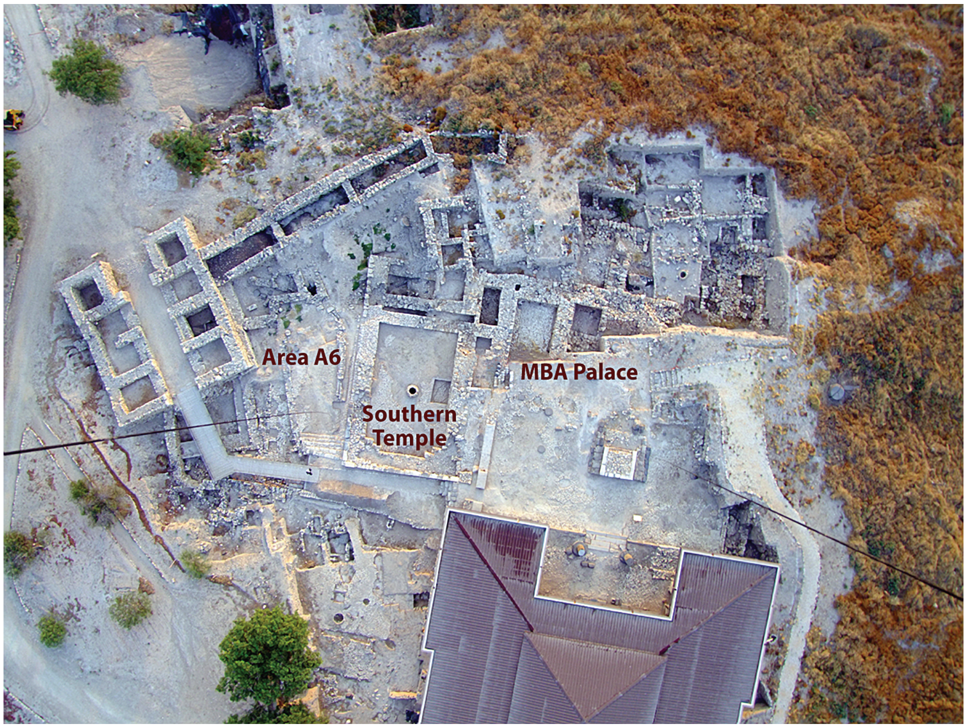

Fig. 2. Tel Hazor in the Middle Bronze Age.

originating in the Syrian cultural sphere. An extensive complex of subterranean halls, partially uncovered in the northeastern part of the Area A on the acropolis, probably served as a central storage facility for agricultural products, indicating the redistributive role of the acropolis precinct. An open-air cultic precinct, consisting of several rooms and open courtyards as well as dozens of unworked, plain, standing stones (*masseboth*) and a large round stone basin, represents the latest phase of the Middle Bronze Age in the southeastern part of the acropolis.

The portion of Area A excavated in the 2012 season (designated Area A6) is located to the north of the "Southern Temple" (**Fig. 3**). A narrow trench between the northern wall of the temple and the parallel wall to its north was opened during the 2012 field season. In this trench, two consecutive phases of a western-oriented pebble-paved street adjacent to the Middle Bronze Age temple wall were identified. Both phases are dated to the MB IIB, on the basis of the pottery assemblage and other finds connected with them. The paved street yielded a large assemblage of animal bones collected by hand, which probably originated in the adjacent temple and are therefore in secondary deposition. This assemblage is the object of the current analysis and reflects the consumption of animals in the public, and probably ritual, context on the Middle Bronze Age acropolis.

Tel Kabri

Tel Kabri is a 34 ha site located in the western Galilee, 5 km east of Nahariya (**Fig. 1**). At its peak, during the MB IIB (ca. 1720–1550/1500 B.C.E.; Bietak 2002), the site, with its vast palace complex and massive fortifications (Yasur-Landau, Cline, and Pierce 2008), was the center of a polity (**Fig. 4**). It stood at the head of a six-tier settlement hierarchy—a level of complexity associated with the state (Flannery 1998: 16–21). The site has been the focus of two large-scale expeditions. The first was led by Aaron Kempinski and Wolf-Dietrich Niemeier between 1986 and 1993 (Kempinski 2002); the second is an ongoing project that commenced in 2005 and is being led by Eric H. Cline and Assaf Yasur-Landau (see Yasur-Landau et al. 2012).

The earliest Middle Bronze Age monumental palatial structure at the site may be attributed to the middle–late MB IIA (DW Phase 6). The earlier private houses (DW Phase 7) were razed and covered by a thick constructional fill of earth and rubble. It seems that this first palatial structure at Kabri had a fort-like appearance (Yasur-Landau and Cline 2008; 2009; 2011). Not much later, during the transitional MB IIA–B, the palace underwent extensive enlargement and elaboration (DW Phase 5; **Fig. 5**). It was during this period that Kabri was first surrounded by a massive earthen rampart—as much as 25 m thick

Fig. 3. Hazor Area A6: The phases of the street attached to the wall of the monumental "Southern Temple." View to the south.

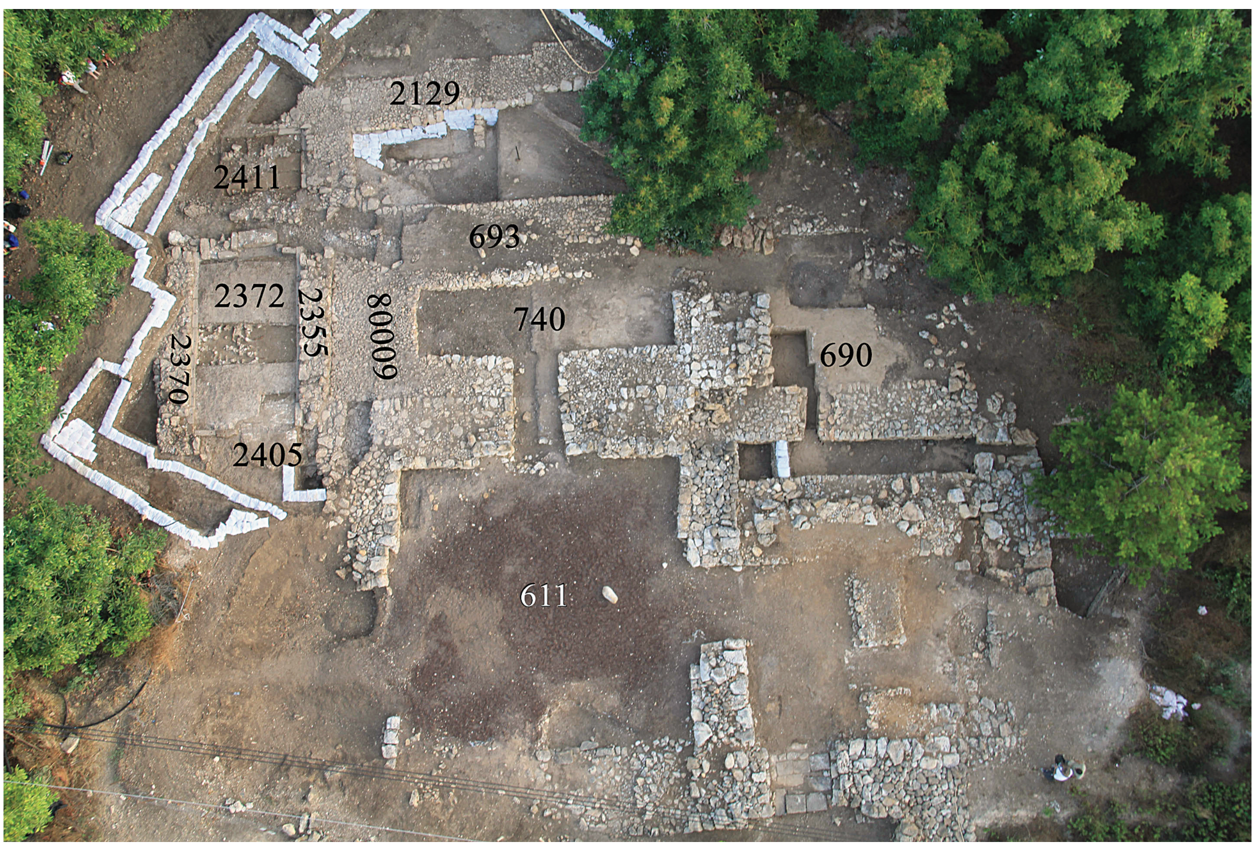

Fig. 4. Tel Kabri: Aerial view of Area DW.

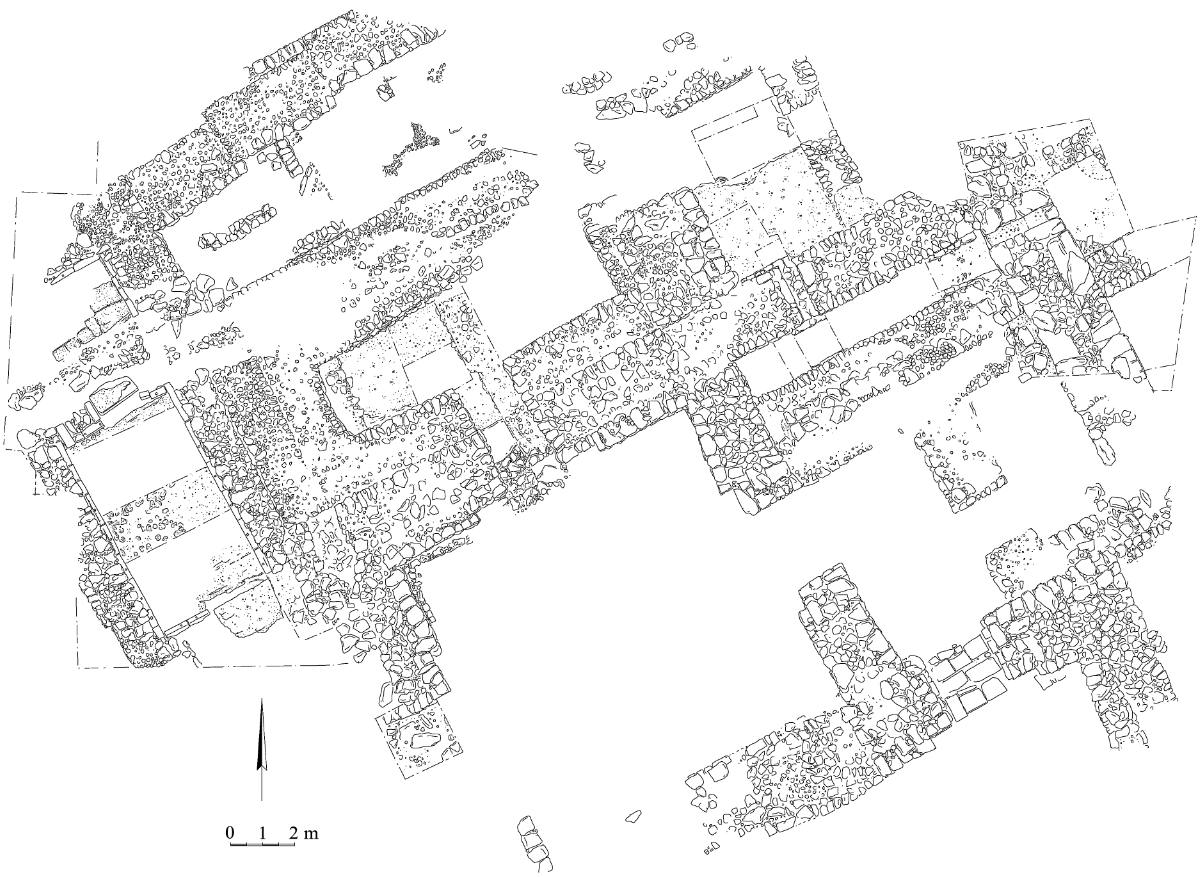

Fig. 5. Plan of the Middle Bronze Age Palace in Tel Kabri, Area DW.

in some places (Kempinski 2002: 35)—an engineering feat that consolidated the power of the rulership while improving the security of the entire community. During the next phase (DW Phase 4), in the MB IIB, the palace was enlarged once more, extending farther to the northeast and to the south and covering an estimated area of 4,000–6,000 m^2. During this period, the palace was decorated with at least two sets of Aegean-style wall paintings and two sets of Aegean-style floors. These included the miniature wall fresco and the frescoed floor previously discovered by Kempinski and Niemeier in Area DW, and the Aegean-style wall painting with a blue background, as well as possibly another painted floor, fragments of which were found in secondary deposition in Area DS during the recent excavations (Cline and Yasur-Landau 2007; Cline, Yasur-Landau, and Goshen 2011). A major renovation project separated the final two phases of the MB IIB palace. It is during the last phase (DW and DS Phase 3) that the so-called Orthostat Building was constructed (see Yasur-Landau et al. 2012). The inner faces of the stone wall foundations of this two-room building are lined with beach rock orthostats covered with white plaster. Storage jars, as well as a bone assemblage indicating the consumption of high-quality cuts of meat in the structure and in its vicinity, suggest that the structure may have been used for recurring events of feasting in connection with, but not within, the palace. This latest, post-renovation palace fell into ruins during the late MB IIB, before the beginning of the Late Bronze Age (Cline, Yasur-Landau, and Goshen 2011).

Methods of Zooarchaeological Analysis

The faunal remains presented in this study originate in the 2012 excavation season at Area A of Tel Hazor and the 2005–2011 seasons of excavation in the Middle Bronze Age palace in Tel Kabri. The bones were recovered by hand from the excavation. Although high-resolution sieving is usually considered the optimal procedure for the recovery of animal bones (e.g., Payne 1975), we believe that the resulting recovery bias was not detrimental to the present study. That is because the research questions posed compare assemblages of larger vertebrate remains only, for which a recovery bias is less severe than with smaller vertebrate remains (Davis 1987: 31). Similar recovery and analytical methods were practiced at both sites, making the faunal assemblages recovered from them comparable. The first author of this article (Marom) was present at the sites during the excavation, monitoring the completeness of recovery and practicing a wet-sieving protocol (Marom and Zuckerman 2011) when appropriate.

All the archaeological bones were identified and recorded to skeletal element. When possible, specimens were assigned to a biological taxon using the reference collections of the Laboratory of Archaeozoology at the University of Haifa. Otherwise, size-class taxa were employed (small/medium/large mammal, corresponding to cat-hare/sheep-goat-pig-dog/cattle-deer-equid sizes). Sheep and goat bones were identified to species when possible, using morphological criteria (Boessneck, Müller, and Teichert 1964) as discussed by Zeder and Lapham (2010). Fallow deer and red deer were differentiated following Lister (1996). Equid bones and teeth were identified as to species based on their morphology (summarized in Johnstone 2004). The domesticated or wild status of suids (*Sus scrofa*) was determined using body-size comparisons, pooling measurements of different skeletal elements using the log-size technique with a standard animal, a small female wild boar, serving as a benchmark (Hongo and Meadow 1998).

Measurements of unburned and sufficiently complete fused and unfused bones were taken with analogical Vernier calipers to the nearest tenth of a millimeter following the metric definitions in von den Driesch (1976). Bone surface modifications were noted when observed with the naked eye. These include carnivore gnawing (Lyman 1994: 206) and weathering (Behrensmeyer 1978).

Skeletal element abundance (SEA) profiles were constructed based on the number of identified specimens (NISP) and minimum number of elements (MNE). MNE was calculated using the fraction-summation method (Klein and Cruz-Uribe 1984: 27) for long bones and the diagnostic zone system of Dobney and Rielly (1988) for other parts of the skeleton. Standardized minimum number of animal units (%MAU) was used for the graphical presentation of SEA profiles. For the present study, SEA profiles are presented and correlated with a bone structural density index (Lyman 1984) in order to assess possible biases introduced by density-mediated attrition to demographic variables (Munson 2000).

Demographic analyses included the derivation of age-at-death data for caprines (sheep and goats) and cattle using ages of epiphyseal closure (Silver 1969, presented as survivorship curves) and tooth wear (Grant 1982). Tooth wear stages were collapsed into very young (<1 year), young-adult (1–2 years), and adult (3+ years) classes (Cribb 1987). Sex ratios in sheep and goats were determined using osteometric measurements to detect bimodality that likely reflects sexual dimorphism (Monchot et al. 2005). Sufficiently large samples for metric analysis of sex ratios could not be had from a single skeletal element in most cases, and therefore the distal breadth measurements of several limb bone elements (scapula GLP, tibia Bd, humerus BT, astragalus Bd) were scaled to a standard (an *Ovis aries* male from Iraq, measured by N. Marom at the Field Museum of Natural History, Chicago: FMNH 57255) using log ratios. A Shapiro-Wilk test was used to ascertain that the log-ratio data are normally distributed and can be subjected to further analytical procedures. The scaled measurements were then examined for bimodality using mixture analysis (Monchot et al. 2005). The morphology of the acetabular region of the pelvis was also employed to determine sex ratios, especially the depth and position of the depression attaching the rectus femoris to the illium, and the projection of the eminentia iliopectinea (Boessneck, Müller, and Teichert 1964; Edwards et al. 1982; Greenfield 2006).

Statistical analyses were carried out on PAST 2.14 (Hammer et al. 2001). These included the calculation of diversity indices (Magurran 2004), mixture analysis (Monchot et al. 2005), Shapiro-Wilk test for normality, and the calculation of Spearman's Rho correlation statistic (Sokal and Rohlf 1995: 598).

Analytical Results

Tel Hazor

The faunal assemblage from Middle Bronze Age Area A6 (**Table 1**; NISP = 730, S = 8, dominance = 0.92) is dominated by caprines (NISP = 631, 86%), of which sheep (*Ovis aries*, NISP = 88) are more numerous than goats (*Capra hircus,* NISP = 21; sheep-to-goat ratio 4.2 to 1; **Fig. 6**). Cattle (*Bos taurus*, NISP = 83, 11%) are the second, if minor, component of the assemblage. Other animals represented in very low frequencies (<1%) include dog (*Canis familiaris*, NISP = 2), donkey (*Equus* cf. *asinus*, NISP = 1), gazelle (*Gazella gazella*, NISP = 6), a suid (*Sus scrofa*, NISP = 5 [three specimens from the same locus, likely from the same individual]), and a large deer (NISP = 2, a metatarsus identified as fallow deer, *Dama mesopotamica*).

Age-at-death analysis based on epiphyseal fusion data of the sheep-dominated caprine assemblage shows most culling to have taken place between the second and the fourth years of life (**Table 2**; **Fig. 7**). Tooth eruption and wear analysis assigns most of the specimens to animals older than two years of age, in general accordance with the epiphyseal-closure-based survivorship curve (**Table 3**; **Fig. 8**).

Table 1. Taxonomic Composition of the Faunal Assemblages from Middle Bronze Age Tel Kabri and Area A6 in Tel Hazor

	Taxonomy		*Kabri*		*Hazor*	
Group	*Common name*	*Latin name*	*NISP*	*%NISP$_{taxon}$*	*NISP*	*%NISP$_{taxon}$*
Livestock	Sheep	*Ovis aries*	38		88	
	Goat	*Capra hircus*	47		21	
	Sheep or goat		245		522	
	Sheep and goats	*Caprini*	330	66	631	89
	Cattle	*Bos taurus*	112	22	11	2
	Suid	*Sus scrofa*	37	7	5	*
	TOTAL		479	95	647	91
Other domesticates	Dog	*Canis familiaris*	3	*	2	*
	Donkey	*Equus* cf. *asinus*	4	*	1	*
	TOTAL		7	1	3	*
Game animals	Aurochs	*Bos primigenius*	1	*		
	Mountain gazelle	*Gazella gazella*	8	2	6	*
	Red deer	*Cervus elaphus*	1	*		
	Fallow deer	*Dama mesopotamica*			1	*
	Roe deer	*Capreolus capreolus*	2	*		
	Deer	Cervidae	1	*	1	*
	TOTAL		13	2	8	1
Birds	Ibis	*Plegadis*	1	*		
	Heron	Ardeidae	1	*		
	Pigeon/dove	Columbidae	1	*		
	TOTAL		3	*	0	0
	TOTAL NISP$_{taxon}$		502		730	
Size-class taxa	Small mammal		2	1	10	1
	Medium mammal		193	77	699	83
	Large mammal		55	22	125	15
	TOTAL NISP$_{size\text{-}class}$		250		834	
GRAND TOTAL			752		1564	

Note: Frequencies are in NISP.

Sex ratios in the Hazor assemblage show marked dominance of male animals. This bias toward males is observed in pelvic morphology (N = 23, 62%; vs. females N = 14, 38%; **Fig. 9**) as well as in a mixture analysis of scaled measurements of the distal breadth of tibiae, scapulae, and humeri (male = 78%, female = 22%; **Tables 4, 5**; **Fig. 10**: top).

Skeletal element representation in medium-size mammals at Hazor—in effect, sheep and goats—seems even for all parts of the body save the feet, which are underrepresented (**Table 6; Fig. 11**). Feet are often discarded at the place where primary butchery (evisceration, skinning) took place, and so their relatively low representation could indicate that the deposit contains mainly the remains of consumption activities.

There is no correlation between elements' bone mineral density and levels of representation in the Area A

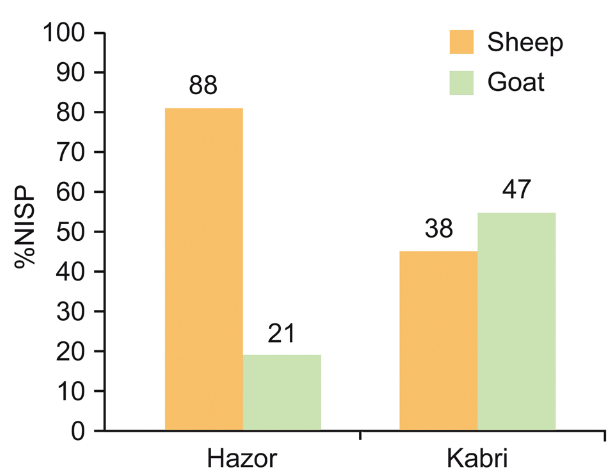

Fig. 6. Sheep-to-goat ratio in Middle Bronze Age Tel Kabri and Area A6, Hazor. Numbers above columns are NISP values.

Table 2. Epiphyseal Fusion Data for Sheep and Goats from Tel Hazor and Tel Kabri

Element	*Hazor*		*Kabri*	
	Fused	*Unfused*	*Fused*	*Unfused*
Scapula	6	5	5	1
Acetabulum	37	6	11	1
Humerus, distal	27	4	15	
Radius, proximal	22		11	
First year total:	*92*	*15*	*42*	*2*
Phalanx 1, proximal	12	10	27	6
Phalanx 2, proximal	16		10	1
Tibia, distal	15	4	6	
Metacarpal, distal	10	3	6	2
Metatarsal, distal	6	4	4	3
Metapodial, distal	5	8	7	4
Second year total:	*64*	*29*	*60*	*16*
Ulna, proximal	3	1		4
Femur, proximal	6	3	3	2
Calcaneus, proximal	22	10	2	5
Radius, distal	3	2	4	6
Third year total:	*34*	*16*	*9*	*17*
Humerus, proximal				2
Femur, distal	2	3	3	2
Tibia, proximal		3	5	3
Vertebrae	25	42	9	9
Fourth year total:	*27*	*48*	*17*	*16*

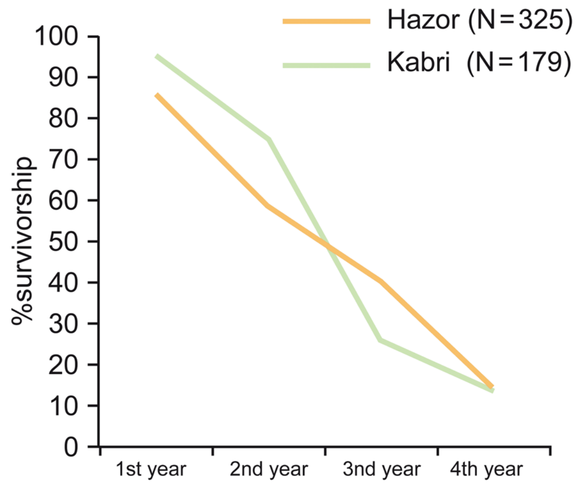

Fig. 7. Survivorship curves for caprines from Middle Bronze Age Tel Hazor and Tel Kabri.

assemblage (photon densitometry data for a sheep, Lyman 1984; Spearman's R = –0.004, P = 0.98). Low levels of weathering (above Stage 2: NISP = 75, 5%) and carnivore gnawing (NISP = 115, 7%) likewise indicate the good state of preservation of the assemblage.

Tel Kabri

The palace sample consists of 752 identified bones, of which 502 were identified as to biological taxon (S = 13; dominance = 0.49; **Table 1**). Sample-size limitations prevented us from applying a contextual analysis of different spaces within the large building, and bones from the palace were therefore amalgamated to a single sample. Caprines (NISP = 330, 66%; goat NISP = 47; sheep NISP = 38; see **Fig. 6**) dominate the assemblage, followed by cattle (NISP = 112, 22%) and pigs (NISP = 37, 7%). Pig specimens are relatively small as compared with the postcranial measurements of a small Anatolian wild boar female (mean log-size index = –0.04). The single complete lower third molar (L = 34.8) is also smaller than the mean of similar measurements of recent wild boar from northern Israel (mean L = 38.7; Marom 2012), making it very likely that the suids in Middle Bronze Age Kabri represent a domesticated population. The presence of dog (*Canis familiaris*, NISP = 3) and donkey (*Equus asinus*, NISP = 4) is also recorded in the palace. Overall, ~95% of the assemblage is composed of domesticated animals, mainly livestock. The few wild animals include mountain gazelles (*Gazella gazella*, NISP = 8), roe deer (*Capreolus capreolus*, NISP = 2), and two specimens of a larger deer, one of which is a metatarsus that was identified as red deer (*Cervus elaphus*). A third phalanx of an aurochs was also present (*Bos primigenius*, NISP = 1; measurements in mm are DLS = 92.9; MBS = 34.7; Ld = 74), and was identified by its size. For comparison, the length of the plantar plane of the phalanx (DLS) is within the range of aurochs from the Kebaran site of Ein-Gev I (Marom and Bar-Oz 2008; N = 5, mean = 91.4, standard deviation = 2.95, range = 89.9 to 94.4). The measurements also match those of a mid-Holocene Ukrainian adult male individual, measured by Guy Bar-Oz (Zoological Museum of Berlin, specimen M29426). Three identified bird specimens record the presence of ibis (*Plegadis* sp.), heron (Ardeidae), and a pigeon or dove (Columbidae).

Age at death for sheep and goats, estimated from epiphyseal fusion data (**Table 2**; **Fig. 7**) and presented as a survivorship curve, allows for a fairly confident reconstruction of this aspect of archaeological herd demography. Mortality peaks in the second and third years of life, while very few animals are culled earlier. This picture is supported by tooth wear analysis, which shows that caprine culling was carried out in post-juvenile ages (**Table 3**; **Fig. 8**).

The meat-rich appendicular and axis parts of female skeletons seem to dominate the assemblage. This is suggested by pelvic morphology (male = 44%, female = 56%;

Table 3. Tooth Eruption and Wear Data for Caprines in Tel Hazor and Tel Kabri

Tooth	Young (0–1 year)	Young Adult (1–2 years)	Adult (3+ years)
Hazor A6			
dp4		4	
P4	1	1	5
M1/2	2	12	23
M/3	1	1	8
Total	4	18	36
Kabri			
dp4		1	-
P4			2
M1/2	4	1	21
M/3	1	1	10
Total	5	3	33

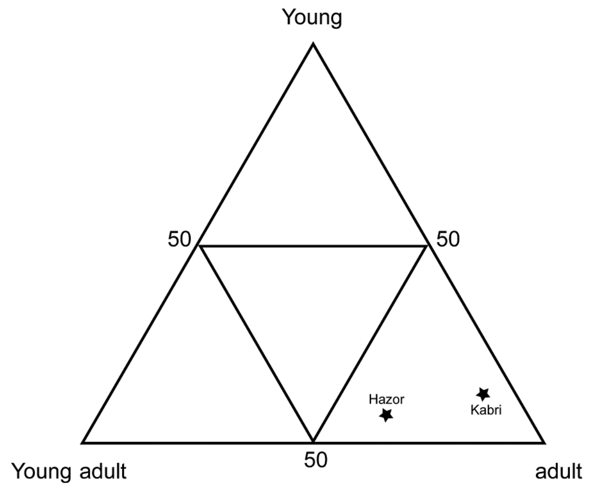

Fig. 8. Sheep and goat age-at-death (Greenfield et al. 1988) based on tooth wear data for Middle Bronze Age Kabri (N = 41) and Hazor (N = 58).

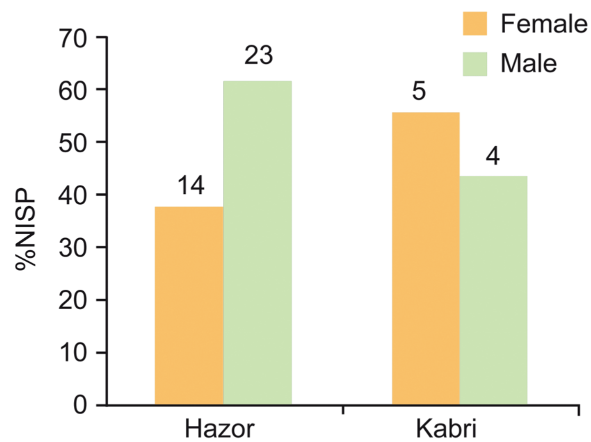

Fig. 9. Sheep and goat sex ratios at Middle Bronze Age Hazor and Kabri based on pubic morphology. Numbers above columns are NISP values.

note that the sample size is very small, N = 9; **Fig. 9**), and also by mixture analysis of scaled measurements, which indicates a bimodal distribution of measurements, with most specimens falling into the lower modus (male = 21%, female = 79%; see **Fig. 10**; **Tables 4, 5**). Unlike the situation in Hazor, at Kabri we had enough first phalanx distal breadth measurements of sheep and goats to perform mixture analysis (N = 32, mean = 12.16, standard deviation = 0.99; **Fig. 12**). Interestingly, these results also show clear bimodality, with the higher frequency of specimens in the larger modus, meaning that males outnumbered females according to this datum (male = 74%, female = 26%). This suggests that while most of the animals consumed at the palace were female, many of the caprines actually *slaughtered* there were males (cf. Dabney, Halstead, and Thomas 2004), based on the presence at the palace of predominantly male feet as butchery waste, a body part usually removed and discarded where primary evisceration, skinning, and disarticulation of carcasses occurred.

Skeletal element abundance analysis (**Table 6**; **Fig. 11**) shows that all skeletal elements are represented in the assemblage, but limb bones are more common. There is a significant correlation between the bones' structural density and their representation in the assemblage (photon densitometry data for sheep: Lyman 1984; Spearman's R = 0.52, P = 0.02).

Very few bones in the Middle Bronze Age palace assemblage are burned or gnawed to a significant extent. Significant weathering (Stage 2 and above) is observed on 7%–9% of the specimens. High frequency of weathered specimens indicates lengthy exposure to sub-aerial conditions before burial.

Discussion

Differences between the Assemblages from Middle Bronze Age Kabri and Hazor

The faunal remains from Middle Bronze Age Tel Hazor and Tel Kabri differ substantially in most of the

Table 4. Selected Measurements of Sheep and Goat Bones from Tel Kabri and Tel Hazor

Element	*Measurement*	*Reference**	*Specimen measurement*	*Fused/unfused***	*LSI*
Kabri (W = 0.95, P = 0.18)					
Astragalus	Bd	21.2	18.3	F	–0.06
			15.4		–0.14
			18		–0.07
			20.8	F	–0.01
			20.3	U	–0.02
			19.2	F	–0.04
			18		–0.07
			19	F	–0.05
			20.1		–0.02
Humerus	BT	33.6	28.4	F	–0.07
			26.8	F	–0.10
			27	F	–0.09
			29.2	F	–0.06
			28.9	F	–0.07
			31	F	–0.03
			32.9	F	–0.01
			28.9	F	–0.07
			28.6	F	–0.07
			32.3	F	–0.02
			32.9	F	–0.01
			26	F	–0.11
			25.4	F	–0.12
			26	F	–0.11
Tibia	Bd	31.4	23.9	F	–0.12
			25.1	F	–0.10
			25.6	F	–0.09
Hazor (W = 0.98, P = 0.92)					
Scapula	GLP	38.8	37.2	F	–0.02
			32.7	F	–0.07
			37.6		–0.01
			33.9	F	–0.06
Humerus	BT	33.6	30.5	F	–0.04
			25.9	F	–0.11
			36.7	F	0.04
			30.7	F	–0.04
			32.7	F	–0.01
			30.7	F	–0.04
			30.4	F	–0.04
			32.7	F	–0.01
			29.7	F	–0.05
			27.7	F	–0.08
			34.8		0.02
			32.2	F	–0.02
			31.8	F	–0.02
			29	F	–0.06
			34.4		0.01
Tibia	Bd	31.4	30	F	–0.02
			26	F	–0.08
			28.7	U	–0.04
			28.5	F	–0.04
			30.8	F	–0.01
			31	F	–0.01
			28	F	–0.05
			32.1	F	0.01
			28.2	U	–0.05
			29.1	F	–0.03
			26.9	U	–0.07

*This column lists the standard animal measurements used in the log-ratio transformation (see Methods of Zooarchaeological Analysis section).

**U = unfused specimen, or a porous specimen if an astragalus.

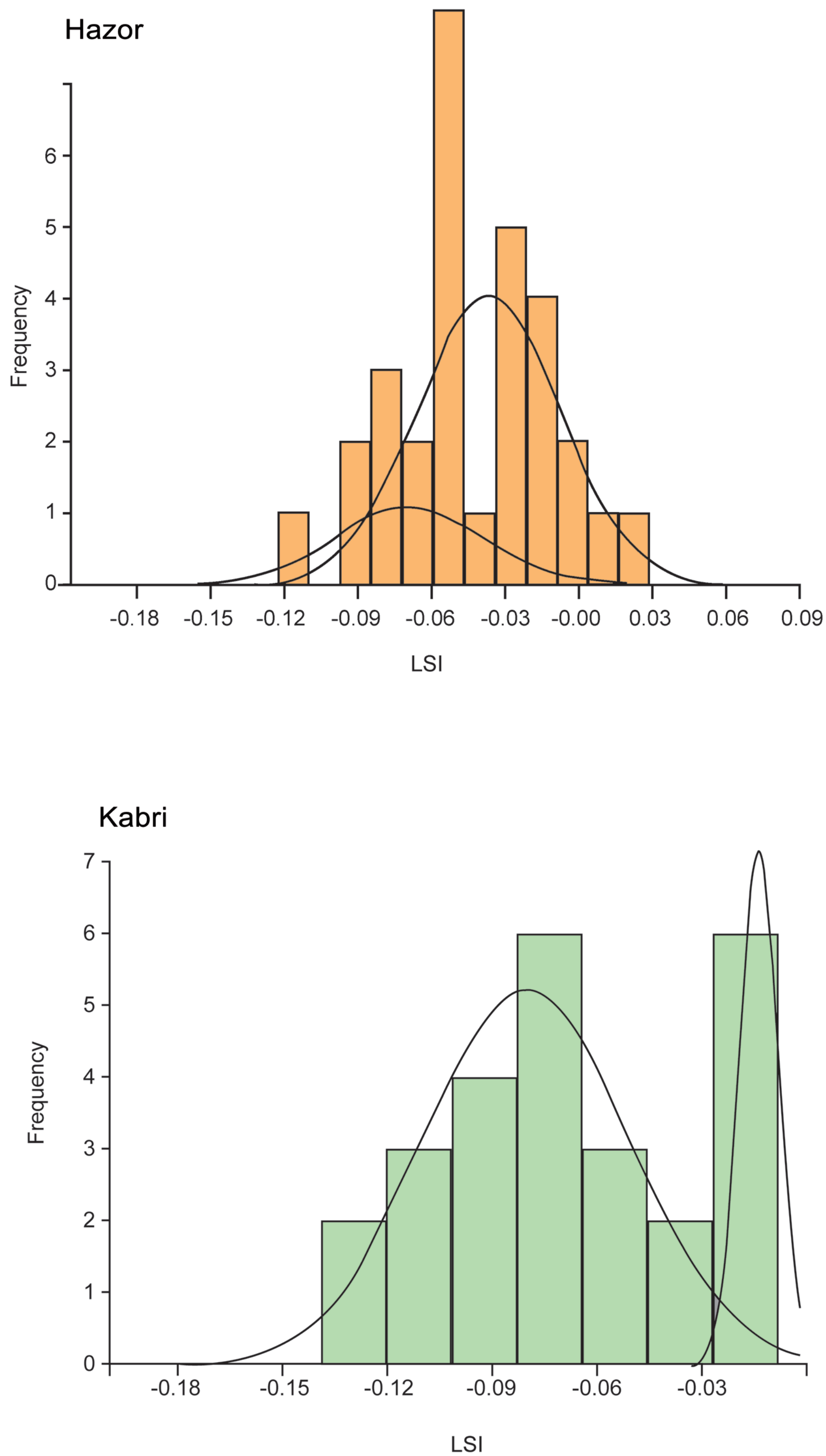

Fig. 10. Sheep and goat sex ratios at Middle Bronze Age Hazor (top) and Kabri (bottom), based on mixture analysis carried out on LSI-transformed breadth measurements of limb bones. See **Table 4** for values and **Table 5** for summary statistics.

Table 5. Summary of Sex Ratio Data for Middle Bronze Age Hazor and Kabri Sheep and Goats

Sample	*Element**	*Method*	*N*	*Male*			*Female*		
				Mean	*StDev*	*%*	*Mean*	*StDev*	*%*
Hazor	Tibia Bd, Scapula Bd, Humerus BT	Mixture analysis	30	−0.027	0.02	78	−0.059	0.03	22
	Pelves	Morphology	37			62			38
	Phalanx 1 Bd	Descriptive	8	Mean = 12.00, StDev = 1.04					
Kabri	Humerus BT, Astragalus Bd, Tibia Bd	Mixture analysis	26	−0.01	0.005	21	−0.08	0.029	79
	Pelves	Morphology	9			44			56
	Phalanx 1 Bd	Mixture analysis	32	12.63	0.62	74	10.81	0.31	26

* Measurements that were scaled using log-ratio for use in mixture analysis.

Table 6. Skeletal Element Counts for Sheep- and Goat-Sized Taxa in Middle Bronze Age Hazor and Kabri

Portion and element		*Density*	*Hazor*			*Kabri*		
			NISP	MNE	MAU	NISP	MNE	MAU
Head	Occipital condyle		1	1	1			
	Petrosum		5	5	3	1	1	1
	Mandible (w/o teeth)		82	32	16	19	9	5
	Total		*88*	*38*	*16*	*20*	*9*	*5*
Axis	Pelvis	0.26	89	29	15	23	8	4
	Vertebra - atlas	0.07	9	6	6	1	1	1
	Vertebra - axis	0.13	11	11	11	6	6	6
	Vertebra - cervical	0.12	22	21	5	5	5	1
	Vertebra - thoracic	0.24	47	46	4	13	12	1
	Vertebra - lumbar	0.22	35	33	5	11	11	2
	Total		*213*	*146*	*15*	*59*	*43*	*6*
Upper forelimb	Scapula	0.25	46	17	9	17	8	4
	Humerus	0.37	118	37	19	58	24	12
	Total		*164*	*54*	*19*	*75*	*32*	*12*
Lower forelimb	Radius	0.36	98	26	13	53	18	9
	Metacarpus	0.40	65	20	10	33	12	6
	Total		*163*	*46*	*13*	*86*	*30*	*9*
Upper hindlimb	Femur	0.36	130	28	14	36	9	5
	Total		*130*	*28*	*14*	*36*	*9*	*5*
Lower hindlimb	Tibia	0.28	101	22	11	49	11	6
	Astragalus	0.63	6	6	3	12	12	6
	Calcaneum	0.56	44	40	20	10	10	5
	Metatarsus	0.43	41	14	7	31	14	7
	Total		*192*	*82*	*20*	*102*	*47*	*7*
Feet	Phalanx I	0.55	36	33	5	42	38	5
	Phalanx II	0.39	19	19	3	12	12	2
	Phalanx III	0.30	11	11	2	10	9	2
	Total		*66*	*63*	*5*	*64*	*59*	*5*

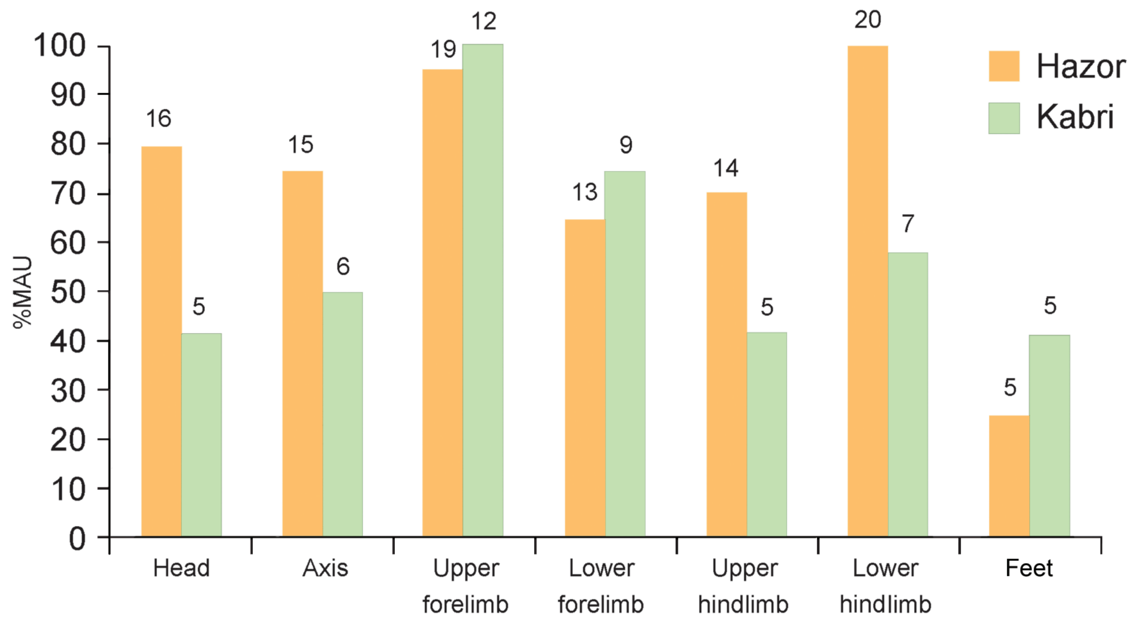

Fig. 11. Skeletal element abundance profiles for medium-size mammals in Middle Bronze Age Hazor and Kabri. Data presented as normalized MAU values; numbers above columns are absolute MAU values.

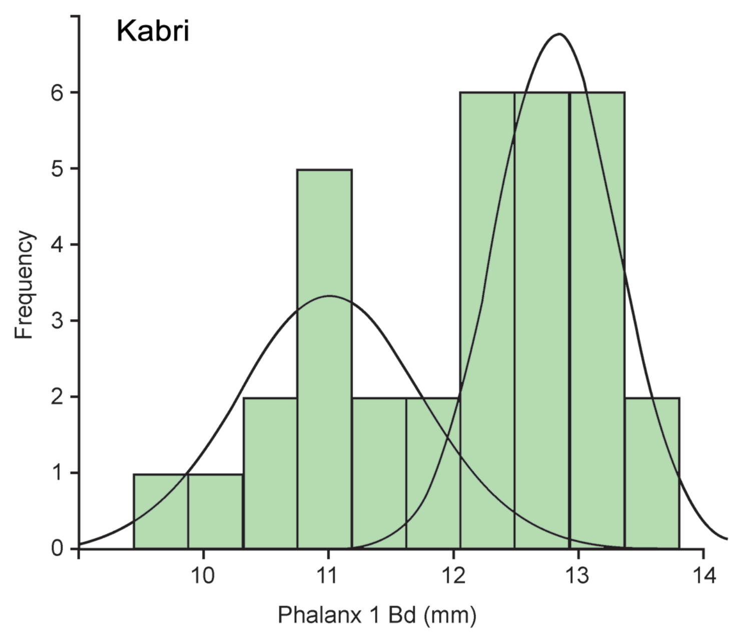

Fig. 12. Mixture analysis results for first phalanx distal breadth (Bd) measurements (in mm) of sheep and goats from Middle Bronze Age Kabri.

Table 7. Comparison of Taxonomic Diversity and Sheep and Goat Herd Demography in Middle Bronze Age Hazor and Kabri

Parameters		*Hazor*	*Kabri*
Diversity	Richness	Low: mainly sheep and some goats	High: marine foods, pigs, game animals, and wetland birds
	Dominance	High	Low
Sheep-to-goat ratio		4.2:1	0.8:1
Age-at-death		Younger adult	Younger adult
Sex ratios	Consumption waste	Male	Female
	Butchery waste	Unknown	Male
Imported foods		None	Nilotic fish

categories of comparison (see **Table 7** for a summary). First, the assemblage from Tel Kabri is much more diverse than that of Hazor. It consists of a significant portion of game animals and of a major livestock taxon—domestic pig—which is nearly absent at Hazor, where very few suid bones occur (NISP = 5) and most are from a single locus (NISP = 3). Tel Hazor not only shows a more taxonomically impoverished animal bone assemblage, but it is also very much dominated by sheep and goat, which constitute more than 80% of the total number of specimens, making the other species' appearance almost episodic and lowering their overall diversity.

Second, the caprine remains from Tel Hazor are, by and large, sheep bones (sheep-to-goat ratio 4.2 to 1). The caprine assemblage from Tel Kabri, by contrast, is relatively balanced in this respect, with goats outnumbering sheep (sheep-to-goat ratio 1 to 1.23). In terms of age at death, the caprine assemblages from both sites are similar, with observed kill-off rates peaking at younger adulthood, between 2 and 4 years of age.

Third, sex ratios in the caprine assemblage differ between the two Middle Bronze Age sites. It appears that at Tel Hazor, most of the consumption waste, which includes the upper limbs and the axis skeleton, consists of the remains of male animals. The opposite pattern appears at Tel Kabri, where the consumption waste consists mainly of female bones. In Kabri, there is also evidence that the butchery waste—comprising meat-poor feet discarded at the beginning of the butchery sequence (Rixson 1989)—belonged to males. The result on the male-biased butchery waste in Tel Kabri should be treated with care, however, since it was not possible to distinguish forelimb from hindlimb phalanges in the sample, which may have contributed to the observed variability in distal breadth measurements.

Fourth, marine foods are present in the Kabri assemblage (Lernau 2002; Mienis 2002). These include freshwater and marine mollusks, with a probable imported taxon from the Nile (*Chambardia rubens arcuata*; though its association with the Middle Bronze Age is tentative; Mienis 2002). These aquatic remains provide additional support for the results presented in the current study, which indicate the broader spectrum of environments used for subsistence in the palatial economy at Kabri.

The faunal assemblages from Middle Bronze Age Kabri and Hazor have different taphonomic histories. This is apparent in the higher weathering and rate of density-mediated attrition of bones in Tel Kabri as opposed to Hazor. These differing histories may have resulted in a bias toward the adult-dominated age-at-death profile of the Kabri caprines, since the bones of younger animals are more sensitive to density-mediated attrition. However, the different taphonomic histories are not expected to bias other aspects of the comparative analysis, such as the sheep-to-goat ratio, sex ratio, or taxonomic diversity, which is higher in the less-preserved assemblage.

Playing devil's advocate, one might note that the assemblage from Middle Bronze Age Hazor is less diverse because the archaeological context from which it was excavated was more limited—a large open space between monumental buildings, which may reflect ritual activities from the Southern Temple. In contrast, the samples from Middle Bronze Age Kabri accumulated in more varied architectural contexts of the palace precinct, and arguably during a longer period of time.

While there is certainly truth to this critical reasoning, diachronic partitioning of the Kabri data (Marom forthcoming) shows that all phases of the settlement and especially the final, larger palatial phase produced a more diverse assemblage than that from Hazor. In regard to the spatial aspect of contextual variability, we hold that livestock animals were usually shared within social units of consumption (e.g., priests, guests at the king's table, families, or social groups that regularly dine together on specified occasions), unconstrained by borders between single buildings (Hayden and Cannon 1983). Under such conditions, meaningful intra-site heterogeneity would be observable between larger contextual aggregates, such as upper vs. lower cities, or elite vs. non-elite dwellings. Incoming animals would not enter a city and be entirely consumed and discarded within a single building—what we might call the "pizza delivery model" approach. Even when assigned to an addressee (e.g., a temple), the remains of animals would usually be consumed and discarded in various architectural contexts around it. Therefore, we believe that the Kabri palace and the large open space on the Hazor acropolis are comparable and represent fairly the acropolis-dwelling elites' animal consumption (and compare the case of the similarity of the faunal assemblages between the cult precinct and the Middle Bronze Age palace in Lachish: Croft 2004: 2313, 2326).

The Animal Economy of the Middle Bronze Age Kabri Elite Precinct

The diverse assemblage from Tel Kabri includes several taxa that may have had different emic value to the residents of that site. Caprines were the main exploited taxa, probably for meat, milk, and wool in the modest but sufficient quantities expectable from nonspecialized production (Redding 1981: 48). The higher frequency of goats and the younger-adult age at death indicate a herd-security-oriented economy (Redding 1981: 386), of a type common in Canaan from the Neolithic onward (Marom 2012; Sasson 2010: 61). The consumption waste belonged mainly to female animals, suggesting access to the reproductive core of the herd and therefore some level of localized pastoral production. The curious discovery that most of the butchery waste in the Kabri palace belonged to male caprines indicates, in our opinion, that the male animals culled as part of the ordinary, likely seasonal, maintenance of the herd were slaughtered at the palace and their meat distributed to other parts of the site. A similar pattern was observed in the Pottery Neolithic (late seventh to early sixth millennium B.C.E.) settlement at Shaʿar Hagolan (Marom 2012).

Cattle frequencies are rather high in Kabri and may indicate the involvement of the palace residents in agricultural production. This is based on the assumption that the main use for cattle was for plowing; animals were consumed only when they were no longer useful for work, presumably by their immediate owners. Domestic pig remains indicate a level of household autonomy in meat supplies (Zeder 1998), which is not uncommon in contemporary sites (e.g., Falconer 1995; Hellwing, Sade, and Kishon 1993; Horwitz et al. 2005; Raban-Gerstel and Bar-Oz 2012; Wapnish and Hesse 1988).

Game animals include aurochs, red and roe deer, gazelles, and three bird taxa. Whereas the birds were likely part of the basic subsistence diet, which indicates the economic use made of nearby wetland micro-regions, the larger game animals may point to hunting by status-seeking elites. The presence of wild cattle is notable in this context, since it is very likely that collective effort and skill were required to bring down an individual of this ferocious species, and the specimen recovered in Kabri is exceedingly large. The presence of a foot element may suggest that the big carcass was dressed and dismembered in the palace itself, since the removal of the feet is one of the first stages of the butchery process (Rixson 1989). In this case, the meat could have been used to feed many people. A very conservative estimate, following Goring-Morris and Horwitz (2007), would be that such an animal yielded more than 250 kg of fresh meat. Again, if the carcass was consumed on a single occasion and an average person could stomach 500 g of meat, the carcass could have served up to 500 persons. An alternative reading of the find is that only the hide was brought back and displayed, complete with the feet. Even under this latter interpretation of the zooarchaeological evidence, the conspicuous display of elite status in the palace would be retained.

The 1986–1993 excavations at Tel Kabri (Kempinski 2002) yielded an assemblage rich in fish remains (Lernau 2002). These include imported species (Nile perch, *Lates niloticus*), deeper-water species (*Seriola dumerili*, jack; and *Elasmobranchii*, shark and ray), shallow-water species (Serranidae, basses; and Sparidae, porgies), and freshwater fish (Cichlidae). It is noteworthy that seven of the eight deep-water fish bones were found in the palace. More specialized fishing of deep-water species may have marked them as exclusive luxury foods (Lernau 2002: 410–11). The probable presence of exotic shells from Egypt (Mienis 2002) further reinforces the role of imported and luxury food items among the elite consumers.

Two faunal clues point to the way by which the palatial elite of Middle Bronze Age Kabri maintained its power. Both have to do with animal feet—elements discarded where primary butchery takes place. The first is the aurochs toe, indicating a skilled effort to bring down an animal that was probably carved to pieces in the palace precinct and parceled out to many people (cf. Dabney, Halstead, and Thomas 2004) in what would have been an impressive feast; and the second is the male caprine phalanges that dominate that class of butchery waste in the Middle Bronze Age palace. While the females were consumed at the palace, the males were apparently slaughtered there but consumed elsewhere. In our opinion, this is related to a mechanism of redistribution through feasting: when males were culled, they were shared, probably in a ritual feast, as political investment on the side of the elites. The scene of slaughter, in the palace proper, demonstrated the patronage of the palace elites in that feast (and see Yasur-Landau et al. 2012).

The Animal Economy of the Middle Bronze Age Hazor Elite Precinct

The assemblage from Hazor is much less diverse, lacking many of the wild and imported taxa present in Kabri. Most notable is the very high dominance of caprines, which are mostly sheep. Large-game animals are present, indicating the practice of elite hunting. The very high proportion of sheep has few parallels in the Bronze or Iron Ages of Israel (Sasson 2010: table 2.1), with the exception of Tell Jemmeh (Wapnish and Hesse 1988) and MB IIA Lachish (Croft 2004: 2312), where similarly high sheep-to-goat ratios were observed. The ability to divert the traditional, herd-security-oriented economic strategy that emphasizes goat rearing in a direction optimizing the production of meat, fatter milk, and wool indicates the exertions of a strong central authority. In fact, the only economic text from the Middle Bronze Age in Canaan, recovered in Hebron (Anbar and Naʾaman 1986–1987), lists animals received by an establishment in that city—and sheep in the lists outnumber goats.

Demographic analysis of the caprine component of the Hazor assemblage indicates that most animals were younger adult males (**Tables 2, 5**). This observation has two inferences. First, the female component of the herd is underrepresented, indicating the consumer status of the upper-city residents. This is because males are the allocative resource of a caprine herd, which can be mobilized by taxation in a sustainable way (cf. Marom and Zuckerman 2012; Reid 1996). Second, the caprines at Hazor were not derived from a herd maintained to optimize wool production—otherwise we would expect the animals to have been older than we can infer from the data (5–7 years), and we would also expect an even ratio of males to females (Payne 1973). The age and sex profile seems to represent a mixed strategy: on the one hand, retaining the delayed kill-off age of the traditional herd-security strategy, which is meant to ascertain that fully mature males are present before slaughtering the old male breeding stock (Redding 1981: 305); on the other hand, they are able to keep a very large number of slow-breeding, less-durable sheep that can supply wool, meat, and fatty milk. Wool may have been especially important due to the historical role of Middle Bronze Age Hazor as a textile producer, based on an economic text from that site and period (Horowitz and Oshima 2006: 82–83). However, intensification of wool production is evidenced by the presence of many more sheep than goats, as opposed to the even ratio in the classical age-at-death pattern (Payne 1973) which emphasizes mature animals of both sexes. The difference may stem from the attempt to optimize both meat and wool production.

Interestingly, an MB IIA–B village was excavated in recent years near Qiryat Shemona, in an area that was inside the well-watered lowland hinterland of Middle Bronze Age Hazor (Gadot and Yasur-Landau 2012). In that village, sheep and goats are represented in equal ratios (1 to 1) in the MB IIA, whereas the relative number of sheep rises in the MB IIB–C (to a ratio of 5 to 3; Raban-Gerstel and Bar-Oz 2012: 141), *in tandem* with the rise of Hazor as a dominating urban center. Albeit based on a very small sample (NISP = 180 for the entire Middle Bronze Age assemblage), the suggestive trend toward higher sheep ratios in the rural hinterland of Hazor fits well the observed pattern at the city itself. Similar to Middle Bronze Age Kabri, the economy of Qiryat Shemona also included some birds, fish, and domestic pigs, indicating the utilization of nearby forest and wetland for pig-rearing and fowling. Somewhat farther away, in Tel Yoqneʿam, the sheep-to-goat ratio also changes in favor of sheep with the transition from the MB IIA to the MB IIB–C (Horwitz et al. 2005), while the number of pigs decreases. It may be that this is the result of an analogous demand from the nearby polity of Megiddo, where the sheep-to-goat ratio is high at that time (Wapnish and Hesse 2000: 430).

It may be that the growth of the large kingdom of Hazor exerted a demand on nearby rural settlements for wool and meat. This demand had to be met by raising the relative frequency of sheep in the herds, the male animals of which were consumed in the city. However, the herders did not specialize to the point of slaughtering male animals at the young age optimal for meat off-take (Payne 1973) or in a late age for wool production. Rather, they carried on with the herd-security-oriented strategy of relatively late culling, thus answering the demand from Hazor within the confines of the even-then-ancient herd maintenance practices (Marom 2012).

Middle Bronze Age Kabri had more in common with the rural settlement of Qiryat Shemona than with Hazor. Both show diverse assemblages, with domestic pigs—the hallmarks of autarkic economy (and cf. Tell el-Hayyat: Falconer et al. 1995; Zeder 1998)—and a higher frequency of cattle, indicating ownership of draft animals. Large-game hunting appears to have been practiced as well. At Kabri, a security-minded herd maintenance strategy in its classical form can be observed in the goat-dominated assemblage and adult culling age. The observation that most of the consumption in the Middle Bronze Age palace in Kabri was of female animals may indicate direct access to the reproductive core of the herd and therefore closer involvement of the palace in herd keeping and ownership.

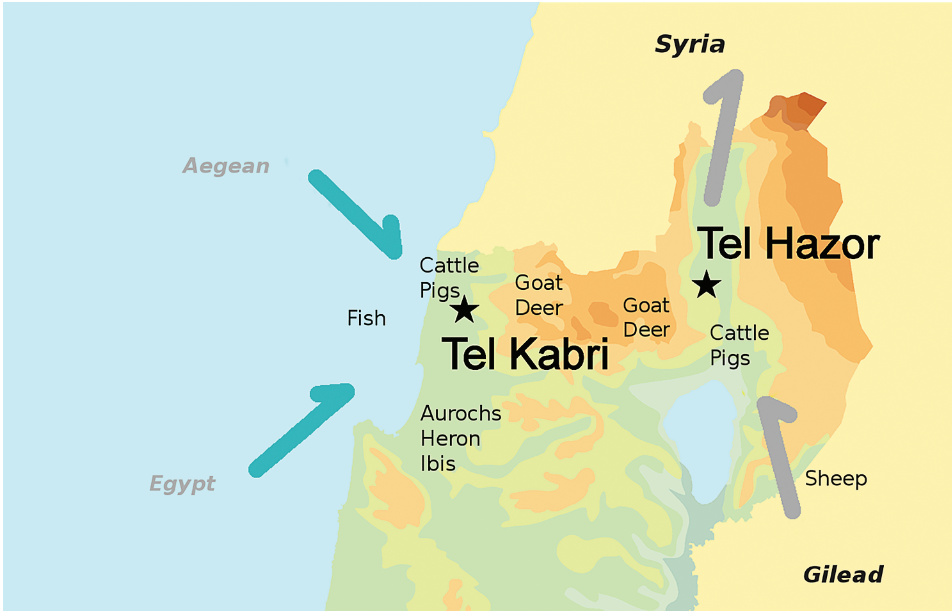

Fig. 13. A landlocked and a Mediterranean economy: Hazor, with its cultural and trade connections to Syria and large hinterland suitable for pastoralism; Kabri, with a limited hinterland and connectivity to the West through maritime trade.

Mountains and Sea, Valley and Steppe

The comparison of the faunal assemblages from the upper cities of Middle Bronze Age Kabri and Hazor therefore reveals major differences between them. The Kabri assemblage is a more diverse animal economy. Caprine production seems to have been local, optimizing herd security, and household-level production of pork was practiced. Wetland mammals and birds were hunted, and species of fish and mollusks from diverse habitats—freshwater, marine, and Nilotic—were consumed. The palace elites seem to have been more closely involved in the management of caprine herds. Large-scale conspicuous consumption and the redistribution of seasonally available male caprines from palatially managed herds may be suggested by the presence of aurochs and male caprine butchery waste at the palace.

In contemporary and neighboring Hazor, the assemblage is comprised mainly of sheep, with some goats and cattle. Butchery waste is uncommon, and imported and exotic taxa are missing. Pigs are extremely rare and do not seem to have played any major role in the acropolis economy at that time. Birds and fish were not found.

Kabri is located in a Mediterranean micro-region consisting of wetland and alluvial fans, which is confined by substantial geographical (the sea, Sulam Tsor, the Meiron Massif) and political (the Hazor and Acre polities) barriers. The polity did not have a large adjacent territory that could support a large population specializing in horizontal transhumance (*sensu* Horden and Purcell 2000: 85; Marx 1992). Instead, smaller-scale vertical transhumance could have been practiced in the browse-rich Meiron Massif, which would ideally support the herding of goats in terms of feed and organization of production (less mobility). Not so in Hazor. Hazor appears to have controlled territories in the Transjordan highlands of Gilead, as evidenced in a legal text from the site (Horowitz and Oshima 2006: 70–71). That fertile area is located on the desert's edge and could have served as a platform for interaction with large nomadic populations. Could it be that Hazor was a major gateway, not only for trade between inland Syria and Canaan but also between ecological regions—the Transjordan highlands, suitable for sheep rearing both ecologically (graze; Redding 1984) and socially (nomadic population; Redding 1984), and the Mediterranean farming zone (see Horden and Purcell 2000: 393; **Fig. 13**)? The present data set cannot be used to test whether the specialized sheep production in Middle Bronze Age Hazor took place in the immediate rural hinterland of the large city or in adjacent territories. Stable isotope analysis may hold the key to this interesting question.

The differences between the palatial economies of Middle Bronze Age Tel Kabri and Tel Hazor could stem from the first being a Mediterranean economy, relying on the redistribution of animal goods from wetland, forest, and marine habitats as well as on imports, whereas the second is a valley-and-steppe, landlocked economy. This notion is certainly a venue for future research, which we hope will broaden our scope by incorporating a richer spectrum of archaeological contexts and evidence in analyses aiming toward a clearer understanding of the sociopolitical order at these two important sites.

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