Resource Exploitation at Late Neolithic Domuztepe

Faunal and Botanical Evidence

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Domuztepe, in southeastern Turkey, is one of the largest known Late Neolithic sites in the Near East. Ecofactual remains recovered at Domuztepe indicate that the site's inhabitants relied on a well-established mixed economy of domestic plants and animals to sustain the settlement's large population, which may have peaked at more than 1,500 people. Evidence of a long and continuous occupation of this site attests to a successful agropastoral economy, even though Domuztepe was situated at the intersection of uplands, an alluvial plain, and marshy zones, an environment not traditionally considered ideal for agriculture. Integrated faunal and botanical analyses explore the diversity of domestic and wild resources used by the site's inhabitants. The typical suite of Near Eastern domesticates dominates the excavated assemblage, with sheep, goats, cattle, pigs, and cereals prominent. In addition to a nutritional role, these food products were used for clothing, storage, and construction and had symbolic importance in ritual and prestige. Combined archaeobiological data point to a seasonal cycle of activities.

Specialists who analyze and interpret archaeological plant and animal remains tend to present results that are of interest to their immediate community but draw little on other disciplines. However, collaborations across subdisciplines provide a much more informed picture of resource exploitation at a site (as demonstrated by Hodder [2005] and Zeder [1994]), one that extends beyond basic subsistence. Simple economic choices pertaining to such concerns as resource availability and risk management helped shape ancient agropastoral systems. However, social factors also played a decisive role: animals and plants were chosen not only for the practicality of the food or products they offered but also for the symbolic weight they carried. Their value would be based on factors such as their availability, the effort of producing them, and a wide set of socially created meanings. The social and symbolic factors around animals and plants as food items, even as resources in isolation, cannot easily be disentwined from consumption of the other products (shelter, storage, clothing, decoration), and herein lies one of the promises of integrating paleoethnobotanical and zooarchaeological analyses.

This paper reports on paleoethnobotanical and zooarchaeological analyses undertaken during the first six years of research at Domuztepe, a Late Neolithic site in southeastern Turkey (fig. 1). Excavations at this large site, which may have had an ancient population in excess of 1,500, have recovered sufficient samples of plant and animal remains to permit exploration not only of plants and animals as food items but also of the role they played in other aspects of daily and ritual life. The research presented here is thus central to our understanding of how a large Late Neolithic site operated over the long term.

Domuztepe in Time and Space

The date of the initial occupation at Domuztepe is unknown, although residual artifacts show occupation during the Ceramic Neolithic (by ca. 6400 cal. BC). By the end of the 2006 season, the excavated deposits at Domuztepe could be dated to approximately 5800–5450 cal. BC, from the later stages of the Early Halaf into the Late Halaf (Campbell 2007). The phasing used at the site is under regular revision as more material is excavated. In this article, the chronology is organized into three main phases, A-1 to A-3 (fig. 2). All of these phases correspond to the traditional terms Middle and Late Halaf (cf. Cruells and Nieuwenhuyse 2004; table 1); the underlying Early Halaf strata are not discussed here. Operation I is the major exposure at the site and, in the current analysis, has produced material from phases A-2 and A-3. Operation II exploits an agricultural cut at the southeast edge of the site and has produced material from Phase A-1. Operations III and IV are exposures in the northwest of the site and have produced material dating to Phase A-2.

The studies used here represent only a small portion of the site, although more than 2,000 m^2 have been excavated (fig. 3). In addition to the plant and animal remains discussed here, a wide range of architecture and environmental and cultural remains has been excavated (Campbell et al. 1999; Carter, Campbell, and Gauld 2003). The analyses reported here do not yet represent the entire excavated chronology from the site; significant numbers of samples, especially from the earliest phases excavated to date, will be analyzed in the near future. In the current phasing (fig. 2), Phase A-1, dating

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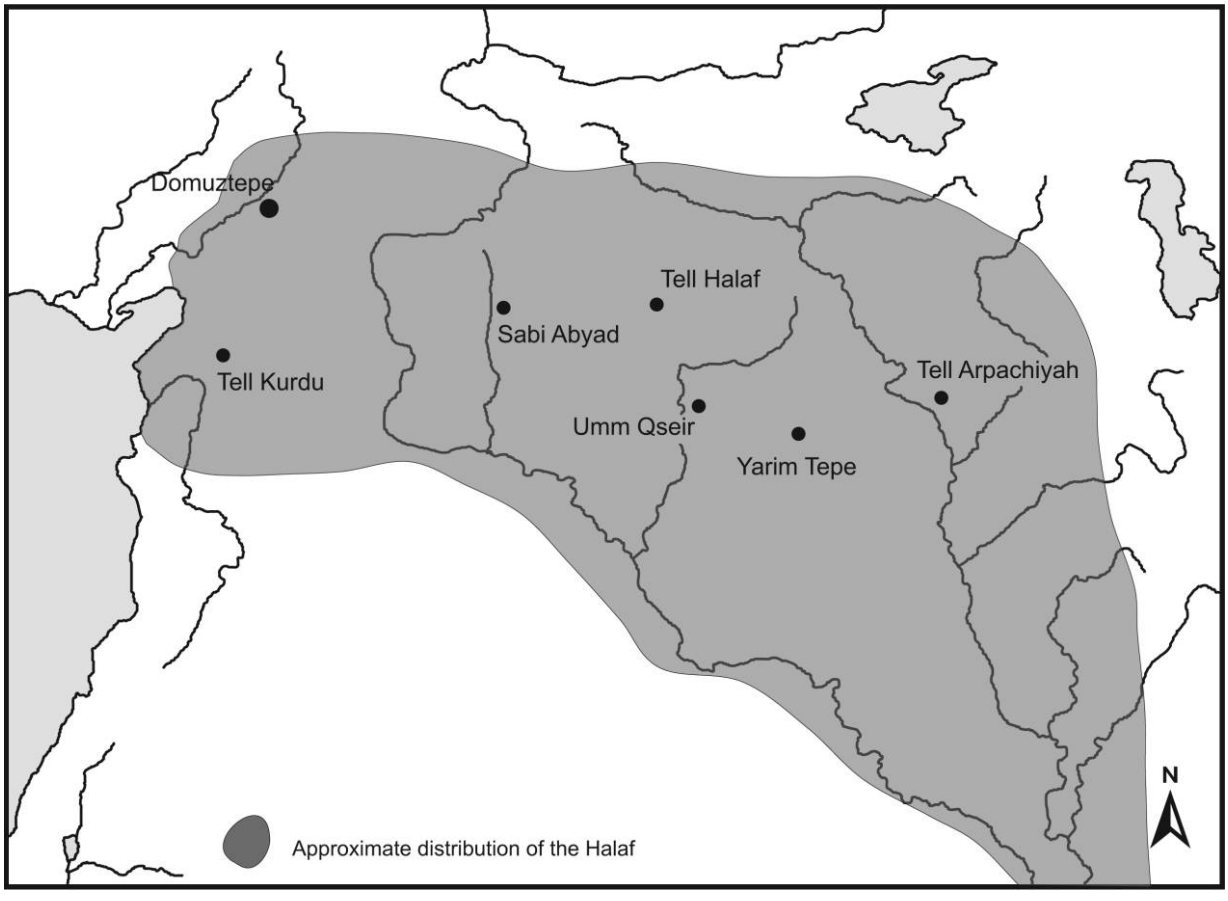

Figure 1. Location of Domuztepe in the greater Halaf region.

to ca. 5700–5625 BCE, is the earliest with analyzed faunal and botanical samples. The last phase, A-3, is the most extensively excavated, has the largest sample sizes, and dates to ca. 5575–5450 BCE.

The majority of the data referenced in this study come from Operation I and Phase A-3, where excavations to date have concentrated. As the primary aim of bioarchaeological analyses at Domuztepe was to establish an impression of animal and plant exploitation at Domuztepe temporally and spatially, the data are aggregated by phase where possible. However, at the time of this analysis, the limited amount of material from the other phases shows little variance from the Operation I Phase A-3 results (see tables 1, 3). On a finer level, distinct deposits have been identified within the animal bone assemblage, but these appear to reflect specific activities, including repeated ritual behaviors, in specific locations, rather than aggregated daily activities (see Campbell and Kansa 2008). Clearly, as the excavations extend the chronological sample, we might expect greater temporal distinctions in the animal bone assemblage; this is supported by the initial analysis of more recently excavated material.

The Environmental Setting

The Halaf tradition has typically been defined as practicing dry farming and dependent on domestic-animal husbandry (e.g., Watson 1982). Indeed, it has been argued that its distribution closely mirrors that of the easily plowed soils of northern Mesopotamia, which would have been attractive to early farmers (Davidson 1977). More recent work has emphasized that the Halaf culture is composed of many regional variations (Akkermans 1993; Campbell 1992), and this is as true of the plant and animal resources as of any other aspect (see tables A1, A2 in CA+ online supplement A). Sites are located in very different environments, are of significantly different scales, and contain different architectural and cultural attributes. Although Domuztepe is much larger than the average settlement, it is typical of one category: substantial, relatively long-lived sites that are located in zones with adequate rainfall. They are primarily dependent on domesticated plants and animals. Less extensively excavated, but perhaps equally significant, are smaller, shorter-lived settlement sites. Although the distribution of these settlements may extend

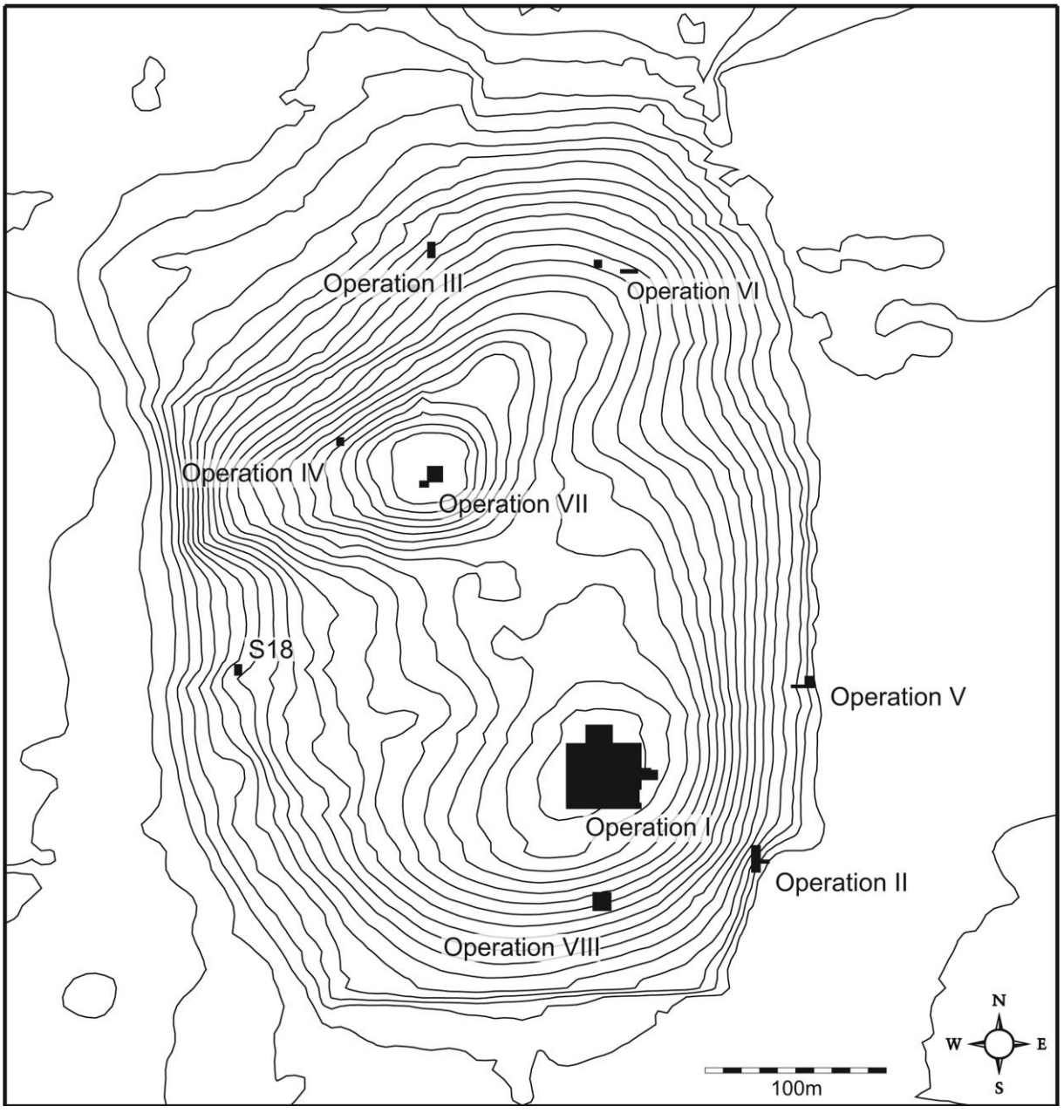

Figure 2. Chronology of the excavated areas at Domuztepe. A color version of this figure is available in the online edition.

into more arid zones, they are probably present throughout the Halaf area (e.g., Hole and Johnson 1986; McCorriston 1992; Tsuneki and Miyake 1998; Zeder 1994).

Domuztepe is located to the south of the modern city of Kahramanmaraş in southeastern Turkey. The settlement covers some 20 ha. While there is evidence of localized shifts in occupation, surface ceramics suggest that in the mid-sixth millennium cal. BC almost the entire site was occupied; this need not have been the case in earlier phases. Although there is a scattering of other Halaf settlements in the Kahramanmaraş Valley, those sites are much smaller, typically only 1–2 ha in size. In terms of larger-scale subsistence and routine resource acquisition at least, these are likely independent sites rather than part of a hierarchical settlement system with Domuztepe at its peak, because they are separated from Domuztepe by natural boundaries that would have inhibited regular movement (Eissenstat 2004). In the modern landscape, Domuztepe lies on the intersection between the plain and a range of low hills to the west of the site. The steep slopes and stony soils of the hills can only have been utilized

Table 1. Plant taxa by chronological phase at Domuztepe

			Phase A-1 (ca. 5700–5625 BCE)			Phase A-2 (ca. 5625–5575 BCE)			Phase A-3, Death Pit (ca. 5575 BCE)			Phase A-3, other (ca. 5575–5450 BCE)		
Taxon	Common name	Part	Count	Ubiq.	Freq. (%)	Count	Ubiq.	Freq. (%)	Count	Ubiq.	Freq. (%)	Count	Ubiq.	Freq. (%)
Hordeum vulgare subsp. *hexastichum*	Twisted/6-row hulled barley	Grain	0	0	0.0	1	1	7.7	0	0	0.0	3	2	3.4
H. vulgare subspp. *distichum/hexastichum*	Straight/twisted 2-/6-row hulled barley	Grain	5	3	5.7	4	4	30.8	20	17	17.9	31	18	30.5
H. vulgare subsp. *hexastichum*	6-row hulled barley	Rachis node	0	0	0.0	0	0	0.0	1	1	1.1	0	0	0.0
H. vulgare subspp. *distichum/hexastichum*	2-/6-row hulled barley	Rachis node	4	1	1.9	0	0	0.0	13	10	10.5	12	6	10.2
H. vulgare subspp. *distichum/hexastichum*	2-/6-row hulled barley	Basal rachis	0	0	0.0	0	0	0.0	1	1	1.1	0	0	0.0
Triticum monococcum	Einkorn	Grain	45	27	50.9	17	5	38.5	113	40	42.1	49	24	40.7
T. monococcum	2-seeded einkorn type	Grain	0	0	0.0	1	1	7.7	6	5	5.3	1	1	1.7
T. monococcum, Triticum boeoticum	Domestic einkorn, wild einkorn	Grain	2	1	1.9	1	1	7.7	29	19	20.0	4	2	3.4
Triticum dicoccum	Emmer	Grain	30	19	35.8	6	4	30.8	96	43	45.3	64	23	39.0
T. dicoccum	Terminal emmer	Grain	0	0	0.0	0	0	0.0	1	1	1.1	1	1	1.7
T. monococcum, T. dicoccum	Glume wheat	Grain	9	4	7.5	4	4	30.8	35	21	22.1	15	8	13.6
Triticum spp.	Emmer/free-threshing wheat	Grain	24	19	35.8	15	5	38.5	127	46	48.4	93	38	64.4
Triticum durum, Triticum aestivum	Macaroni/bread wheat	Grain	3	3	5.7	2	2	15.4	18	11	11.6	19	12	20.3
T. monococcum	Einkorn	Spikelet forks	30	17	32.1	17	3	23.1	885	71	74.7	28	10	17.0
T. dicoccum	Emmer	Spikelet forks	200	37	69.8	28	6	46.2	320	58	61.1	538	42	71.2
T. dicoccum	Emmer	Terminal fork	1	1	1.9	5	3	23.1	342	68	71.6	14	5	8.5
T. monococcum, T. dicoccum	Glume wheat	Spikelet forks	114	19	35.8	315	7	53.8	13,912	91	95.8	550	20	33.9
T. aestivum	Bread wheat	Rachis nodes	0	0	0.0	1	1	7.7	1	1	1.1	5	1	1.7
T. durum, T. aestivum	Macaroni/bread wheat	Rachis nodes	2	1	1.9	1	1	7.7	3	3	3.2	4	2	3.4
Hordeum/Triticum sp.	Indeterminate barley/wheat cereal	Grain	47	16	30.2	45	10	76.9	528	95	100.0	173	32	54.2

Cerealia type	Cereal type	Bottom of spikelet fork/ rachis node	7	3	5.7	4	2	15.4	154	50	52.6	7	4	6.8
Cerealia	Cereal	Culm nodes	0	0	0.0	1	1	7.7	3	3	3.2	0	0	0.0
Lathyrus sp.	Grass pea	Pulse	0	0	0.0	0	0	0.0	3	3	3.2	4	1	1.7
Lens sp.	Lentil	Pulse	1	1	1.9	0	0	0.0	47	27	28.4	175	9	15.3
Pisum sp. type	Pea type	Pulse	1	1	1.9	0	0	0.0	7	7	7.4	3	2	3.4
Vicia ervilia	Vetch	Pulse	0	0	0.0	1	1	7.7	3	2	2.1	2	1	1.7
Vicia sp.	Vetch	Pulse	0	0	0.0	0	0	0.0	2	2	2.1	0	0	0.0
Vicieae	Indeterminate pulses	Pulse	4	4	7.5	14	4	30.8	60	40	42.1	15	9	15.3
Linum sp.	Linseed	Seed	1	1	1.9	2	1	7.7	7	6	6.3	1	1	1.7
Amygdalus sp.	Almond	Endocarp fragments	0	0	0.0	10	5	38.5	15	15	15.8	1	1	1.7
Ficus carica	Fig	Achene	0	0	0.0	9	1	7.7	12	10	10.5	4	4	6.8
Pistacia sp.	Pistachio	Shell fragment	0	0	0.0	2	2	15.4	22	22	23.2	2	2	3.4
Cf. *Prunus* sp.	Indeterminate fruit	Shell fragment	1	1	1.9	2	2	15.4	5	5	5.3	4	4	6.8
Buglossoides arvense	Types 1 and 2	Nutlet	0	0	0.0	17	2	15.4	25	6	6.3	2	2	3.4
Brassicaceae	Cabbage family	Seed	0	0	0.0	0	0	0.0	52	20	21.1	3	2	3.4
Gypsophilia sp.		Seed	0	0	0.0	1	1	7.7	1	1	1.1	6	2	3.4
Silene sp. type			1	1	1.9	0	0	0.0	7	6	6.3	3	2	3.4
Chenopodium sp.			0	0	0.0	1	1	7.7	5	5	5.3	0	0	0.0
Cladium mariscus			3	2	3.8	0	0	0.0	74	44	46.3	4	3	5.1
Schoenus nigricans			0	0	0.0	0	0	0.0	5	4	4.2	5	3	5.1
Scirpus maritimus			1	1	1.9	1	1	7.7	11	7	7.4	9	8	13.6
Trigonella/Astragalus sp. type		Small-seeded legumes	0	0	0.0	1	1	7.7	10	9	9.5	6	5	8.5
Trifolieae type		Small-seeded legumes	0	0	0.0	2	1	7.7	9	9	9.5	1	1	1.7
Aegilops sp.	Goat-face grass, second type	Caryopsis	2	2	3.8	0	0	0.0	75	41	43.2	4	3	5.1
Aegilops sp.	Goat-face grass	Spikelet fork	1	1	1.9	0	0	0.0	25	15	15.8	1	1	1.7
Hordeum sp.	Wild barley	Grain	4	4	7.5	3	2	15.4	2	2	2.1	3	3	5.1
Lolium sp.	Rye grass	Caryopsis	13	10	18.9	5	3	23.1	342	66	69.5	33	17	28.8
Triticum boeoticum	Wild einkorn	Grain	7	5	9.4	0	0	0.0	33	20	21.1	12	7	11.9
Poaceae	Indeterminate wild grass	Caryopsis	18	12	22.6	4	4	30.8	158	55	57.9	28	15	25.4
Gallium sp.	96/97 type		3	2	3.8	0	0	0.0	10	5	5.3	14	12	20.3
Thymelaea sp.			0	0	0.0	0	0	0.0	8	8	8.4	2	2	3.4
Indeterminate seeds			12	7	13.2	7	4	30.8	67	33	34.7	49	22	37.3

Note. Count = the total number of specific taxa in the samples; ubiq. = ubiquity, how many samples the taxa occurs in; and freq. = frequency, ubiquity as a percentage of the total number of samples. NB: only samples with 50 or more seeds were analyzed.

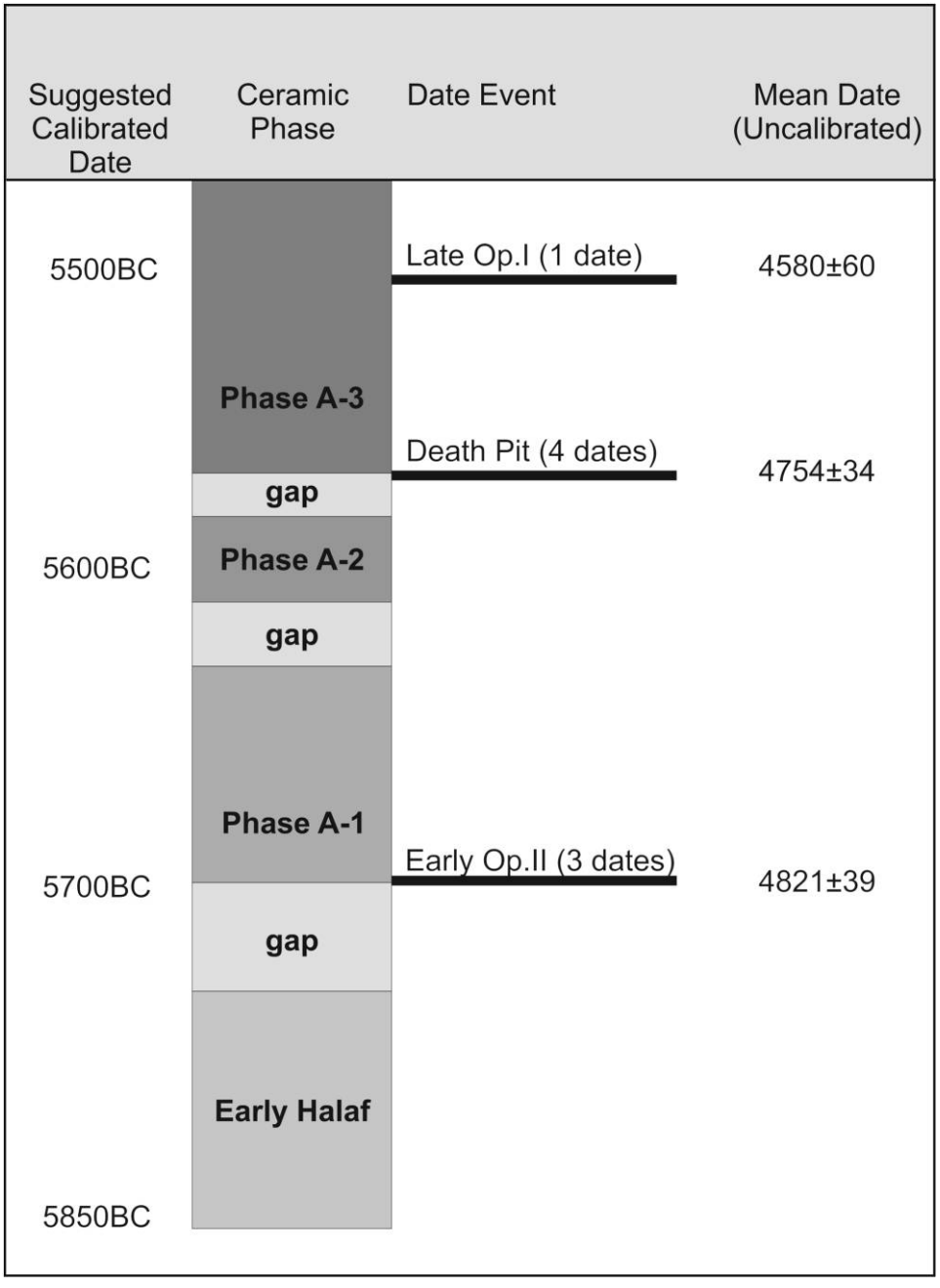

Figure 3. Plan of Domuztepe, showing excavated areas. A color version of this figure is available in the online edition.

for grazing, but the plain is now extensively drained and irrigated, supporting a wide range of crops. The past landscape was certainly more complex. Until extensive drainage was introduced in the 1970s, the area to the immediate west of the site, separating it from the slope of the hills, was wetland. There was a meandering stream, and the area around it was marshy, the habitat for the pigs (*domuz* in Turkish) that give the site its name. There has, however, been extensive alluviation since the Neolithic occupation of the site, probably in excess of 2 m. Nonetheless, a preliminary program of coring around the site suggests that wetlands in different forms were present to its southwest recurrently during the Holocene (Gearey et al., forthcoming). The extent of cultivable land in close vicinity of the site is unclear at present. Although Domuztepe was presumably founded as a small settlement, it is striking that its position seems to optimize access to wetland

and upland areas as much as access to the alluvial plain; this was also the case at early Neolithic Çatalhöyük, which has a very similar environmental setting (Fairbairn et al. 2005). Furthermore, site catchment analysis suggests that, even in the extensively drained landscape of today, the arable land within a conventional 5-km radius of the site could barely produce enough cereals for the subsistence needs of the settlement (Eissenstat 2004). Given that the land immediately surrounding Domuztepe was not ideal for a typical Neolithic agricultural regime, the people of Domuztepe must have organized their agropastoral practices in a way that worked specifically for their needs in their unusual setting. Moreover, if at least some of the agricultural fields were far from the settlement, they would have been difficult to monitor against theft. The site's growth to an exceptionally large settlement does not seem to have been hindered by this apparently nonoptimal location for agriculture. The local landscape diversity may have been an important aspect and proximity to wetlands a key advantage of the settlement location.

Botanical and Faunal Analyses

Identification and quantification of plant and animal remains from Domuztepe indicates a system of mixed farming in a mosaic of ecosystems from wetlands to woodlands. This system required balancing the sometimes competing resource needs of humans, animals, and plants. The spectrum of wild plants and animals locally or seasonally available probably offered the subsistence system some risk reduction and flexibility in planning.

The plant remains discussed in this paper come from 221 flotation samples, mostly representing secondary contexts, although a small number are primary (for a full explanation of the results, see Kennedy, forthcoming). Microscopic analysis reveals a variety of taxa at the site (table 2) consistent with finds at contemporary sites (see table A1). Crop remains consist largely of einkorn and emmer wheat grains (*Triticum monococcum*, *Triticum dicoccum*), with some barley (*Hordeum vulgare*) and free-threshing wheat (*Triticum durum*, *Triticum aestivum*). Emmer and einkorn spikelet forks dominate the chaff, but barley and free-threshing wheat rachis nodes are also present. There are few culm nodes or awns. Small quantities of other crops include pulses such as grass pea (*Lathyrus sativus*, *Lathyrus cicera*), lentil (*Lens* sp.), and pea (*Pisum* sp.), and linseeds (*Linum usitassimum*, *Linum bienne*). Fruit remains include almond (*Amygdalus* sp.), fig (*Ficus carica*), pistachio (*Pistacia* sp.), and plum/cherry (cf. *Prunus* sp.). Many of the wild/weedy seeds recovered are part of the native flora of the region, but some of these may also be ruderal and segetal elements of both summer and winter crop floras. A number of wetland or wet-tolerant taxa are also present (table 2).

Cereal chaff is the most frequent and ubiquitous plant category in the Domuztepe assemblage (83.37% of all items). Cereal grains run a distant second (8.05%), and wild/weed seeds are a close third (6.27%). Pulses (1.62%) and fruits (0.42%) are minor categories in the assemblage. Of the cereal chaff, glume wheat chaff is by far the most common type (98.56%), and of the wild/weed seeds, grasses are the most common (57.17%). The species identified reflect a wide range of available ecological niches, from fields to wetlands, steppe, and park-woodland. This is supported by the results of wood charcoal analysis (Asouti, forthcoming), which indicates that the inhabitants of Domuztepe would have had access to riverine woodland vegetation and possibly marshland. Farther from the site, oak and coniferous forests would have been available (Asouti, forthcoming). Results from offsite cores accord with the macro plant remains and indicate the possible presence of a marsh and/or lake adjacent to the site (B. R. Gearey, personal communication). Pollen analysis in the western side of the valley supports the idea of local oak-pine woodland (Woldring and Kleine, forthcoming).

A total of 6,035 animal bone and tooth fragments were identified to taxon and element from nonfunerary contexts at Domuztepe (tables 3, 4; Kansa, forthcoming *b*). A further 1,995 fragments recovered from an expansive and complex burial deposit (the "Death Pit"), while referenced in this study, are described extensively elsewhere (Kansa, forthcoming *a*; Kansa et al 2009). From the number of identified specimens, domestic sheep (*Ovis aries*) and goats (*Capra hircus*) predominate the assemblage at 51% overall, while cattle (*Bos taurus*) and pigs (*Sus scrofa*) make up 21% and 25%, respectively. This represents the typical suite of Near Eastern food animals since about 10,000 years ago (Zeder and Hesse 2000), although the relative proportion of cattle remains is quite high when compared to that at other contemporary sites (see table A2). While only 2% of the Domuztepe assemblage represents bones of wild animals, bones recovered in flotation suggest that fish played a bigger role than the handpicked assemblage indicates and may have actually made up 5% or more of the entire assemblage. The 132 identified fragments from wild animals reflect the diversity of resources available to the people living at Domuztepe and comprise at least 21 different species, including three species of deer, bear, and leopard (table 4). Like the plants, the animals from Domuztepe represent a variety of ecological niches and support a diverse environment close to the site. The high numbers of pigs and cattle point to a somewhat wet environment, while ducks, deer, beaver, and wild pigs support a mixed environment of marsh and woodland. The exploited animals at Domuztepe have different management and habitat requirements; their relative abundance in the assemblage results from human choices regarding the expected seasonal availability of pasturage and other plant food resources around the settlement.

Agropastoral Activities at Domuztepe

Food and Food Production

The inhabitants of Domuztepe obtained food from a well-established economy of domesticated plants and animals. Plant foods in the Domuztepe diet comprised cereal and pulse crops and fruits (for a more detailed study of crop processing at

Table 2. Plant taxa identified at Domuztepe

Taxa	Common name	Count	Ubiquity	Frequency (%)	Habitat
Cereals					Dry farming and/or irrigation
Hordeum vulgare subspp. *distichum, hexastichum*	Barley grain	60	42	19.1	
H. vulgare subspp. *distichum, hexastichum*	Barley rachis	29	17	7.7	
Triticum monococcum, Triticum boeoticum	Domestic/wild einkorn grain	36	23	10.5	
T. monococcum	Einkorn grain	226	97	44.1	
T. monococcum	Einkorn spikelet fork	960	101	45.9	
Triticum dicoccum	Emmer grain	197	90	40.9	
T. dicoccum	Emmer spikelet fork	1,086	143	65.0	
T. monococcum, T. dicoccum	Glume wheat grain	63	37	16.8	
T. monococcum, T. dicoccum	Glume wheat spikelet fork	14,891	137	62.3	
Triticum spp.	Emmer/free-threshing wheat grain	259	108	49.1	
Triticum durum, Triticum aestivum	Free-threshing wheat grain	43	29	13.2	
T. durum, T. aestivum	Free-threshing wheat rachis	10	7	3.2	
Cerealia	Barley/wheat grain	796	154	70.0	
Cerealia	Barley/wheat rachis	173	60	27.3	
Cerealia	Culm	5	5	2.3	
Pulses					Various
Lathyrus sativus, Lathyrus cicera	Grass pea	7	4	1.8	
Lens sp.	Lentil	223	37	16.8	
Pisum sp.	Pea	11	10	4.5	
Vicia sp.	Vetch	2	2	0.9	
Vicieae	Indeterminate pulse	93	57	25.9	
Other crops:					
Linum usitatissimum, Linum bienne	Domestic/wild linseed	11	8	3.6	Various
Fruit:					
Amygdalus sp.	Almond endocarp	26	21	9.5	Steppe, scrub, forest
Ficus carica	Fig	25	15	6.8	Open places, forest, river valleys
Pistacia sp.	Pistachio shell	26	26	11.8	Maquis, field edge, scrub, forest
Cf. *Prunus* sp.	Plum/cherry endocarp	12	12	5.5	Scrub, forest
Wild/weed:					
Amaranthus sp.	Amaranth	2	2	0.9	Waste places, fields, dunes
Cf. *Ammi majus*	Common bishop's weed	2	2	0.9	Fields, waste ground
Artemisia sp. type	Mugwort	1	1	0.5	Steppe, stream, field
Centaurea sp. type	Starthistle	2	2	0.9	Steppe, field, waste, wood
Arnebia, Buglossoides spp.	Prophet/gromwell	2	2	0.9	Rocky ledges, slopes
Buglossoides arvensis	Corn gromwell	44	10	4.5	Field, steppe
Buglossoides tenuiflorum	Gromwell	3	3	1.4	Stony
Brassicaceae	Cabbage family	55	22	10.0	Various
Cerastium sp.	Mouse ear	5	4	1.8	Damp screes, fields
Gypsophilia sp.	Gypsophilia	10	5	2.3	Forest, steppe

Silene sp. type	Catchfly	11	9	4.1	Steppe, forest, field, sandy
Atriplex sp.	Orache	1	1	0.5	Steppe, field, waste
Chenopodium sp.	Goosefoot	6	6	2.7	Waste, seashore
Cuscuta epithymum	Dodder	1	1	0.5	Shrubs, fields
Carex sp.	Sedge	3	3	1.4	
Cladium mariscus	Sedge	81	49	22.3	Wetland/wet tolerant
Cf. *Eleocharis* sp. type	Spike-rush	1	1	0.5	Wetland/wet tolerant
Schoenus nigricans	Black bog-rush	10	7	3.2	Wetland/wet tolerant
Scirpus maritimus	Sea club-rush	22	16	7.3	Wetland/wet tolerant
Cf. *Medicago* sp.	Medick	2	1	0.5	Woodland, maquis
Cf. *Onobrychis* sp. type	Esparcet	1	1	0.5	Scree, scrub, field, waste, steppe
Trigonella astroites type	Trigonel	4	4	1.8	Steppe, forest, field
Trigonella, Astragalus sp. type	Milk-vetch	18	16	7.3	Steppe, forest, field, disturbed
Cf. *Juncus* sp.	Rush	2	2	0.9	Wetland/wet tolerant
Ziziphora sp.	Ziziphora	1	1	0.5	Steppe, field, sandy, waste
Cf. Lamiaceae	Mint family	2	2	0.9	Various
Fumaria sp.	Fumitory	3	3	1.4	Fields, rocky slopes
Papaver rhoeas type	Poppy	1	1	0.5	field, waste
Plantago sp. type	Plantain	1	1	0.5	Wetland/wet tolerant
Aegilops sp. type	Goat-face grass	81	46	20.9	Scrub, field, wood, steppe
Aegilops sp. type	Goat-face grass spikelet fork	27	17	7.7	
Aeluropis, Aerogrotis sp. type	Aeluropis/aerogrotis	4	4	1.8	Wetland/wet tolerant
Bromus sp.	Brome grass	9	6	2.7	Steppe, field, forest
Echinaria sp.	Bur grass	3	3	1.4	Scrub, steppe, field
Hordeum spontaneum	Wild 2-row barley	1	1	0.5	Forest, scrub, waste, field
Hordeum murinum type	Wall barley	2	2	0.9	Steppe, dune, river flat, field, roadside
Hordeum sp.	Wild barley	12	11	5.0	
Hordeum sp.	Wild barley achis	1	1	0.5	
Lolium sp.	Rye grass	393	96	43.6	Waste, field
Taeniatherum caput-medusae	Medusa-head grass	4	3	1.4	Steppe, scrub
T. caput-medusae	Medusa-head grass spikelet fork	2	2	0.9	
T. boeoticum	Wild einkorn	52	32	14.5	Steppe, field, roadside
Poaceae	Indeterminate wild grass	208	86	39.1	Various
Poaceae	Chaff	3	3	1.4	
Rumex sp.	Dock	6	5	2.3	Field, waste
Rumex, Polygonum sp.	Dock/knotweed	3	2	0.9	Wetland/wet tolerant
Portulaca oleracea	Purslane	5	5	2.3	Field, waste
Adonis sp.	Pheasant's eye	4	4	1.8	Field, disturbed, gully
Gallium sp.	Bedstraw	32	20	9.1	Various
Thymelaea sp.	Thymelaea	10	10	4.5	Forest, stream bed, field, steppe
Valerianella dentata type	Tooth-seeded cornsalad	1	1	0.5	Field, wood
Indeterminate seeds		135	66	30.0	

Note. Count = the total number of specific taxa in the samples; ubiquity = how many samples the taxon occurs in; and frequency is ubiquity as a percentage of the total number of samples. The "Habitat" column displays only the summary from Davis (1965–1988); for the full table, see Kennedy (forthcoming). NB: only samples with 50 or more seeds were analyzed.

Table 3. Animal taxa by chronological phase at Domuztepe

Taxon	Common name	Phase A-1 (ca. 5700–5625 BCE)	Phase A-2 (ca. 5625–5575 BCE)	Phase A-3, Death Pit (ca. 5575 BCE)	Phase A-3, other (ca. 5575–5450 BCE)
Domestic (%):					
Bos taurus	Cattle	28.7	21.7	36.7	21.3
Ovis aries, *Capra hircus*	Sheep, goat	36.9	41.2	42.6	44.6
Ovis aries	Sheep	4.2	3.5	3.4	3.9
Capra hircus	Goat	2.9	3.9	3.5	2.9
Sus scrofa	Pig	25.2	27.6	10.2	24.4
Canis familiaris	Dog	. . .	0.1	1.7[a]	0.4
Total domestic taxa		97.8	98.0	98.1	97.5
Wild (%):					
Bos taurus cf. *primigenius*	Wild cattle	0.2	0.0	0.1	. . .
Ovis orientalis, *Capra aegagrus*	Wild sheep, wild goat	. . .	0.05	. . .	. . .
Ovis orientalis	Wild sheep	. . .	0.1	. . .	0.05
Capra aegagrus	Wild goat	. . .	. . .	0.05	. . .
Gazella gazella	Gazelle	. . .	0.2	. . .	0.1
Cervus elaphus	Red deer	0.2	0.05	0.05	0.05
Dama dama	Fallow deer	. . .	0.1	. . .	0.05
Cervus, *Dama*	Red deer, fallow deer	0.9	0.3	0.3	0.5
Capreolus capreolus	Roe deer	. . .	0.05	0.05	0.05
Sus scrofa	Wild pig	. . .	0.1	. . .	0.2
Equus asinus, *Equus hemionus*	Wild ass, onager	. . .	. . .	. . .	0.05
Equus sp.	Equid	. . .	0.05	0.05	. . .
Canis sp.	Canid	. . .	. . .	0.3	0.2
Canis, *Vulpes*	Dog, wolf	0.2	0.05	. . .	0.05
Canis aureus	Jackal	. . .	. . .	0.05	. . .
Martes cf. *martes*	Pine marten	. . .	. . .	. . .	0.05
Ursus arctos	Brown bear	. . .	0.05	0.1	0.1
Vulpes vulpes	Fox	0.2	0.1	. . .	0.2
Panthera pardus	Leopard	. . .	. . .	. . .	0.05
Lepus spp.	Hare	. . .	0.2	0.05	0.05
Castor fiber	Eurasian beaver	. . .	. . .	. . .	0.05
Rodentia	Rodent	. . .	0.2	0.1	0.1
Testudines	Tortoise/turtle	. . .	0.1	. . .	0.1
Aves	Bird	0.4	0.1	0.5	0.3
Anatinae	Duck	. . .	0.1	. . .	0.1
Fish	Fish	. . .	0.1	0.2	0.2
Total wild taxa		2.2	2.0	1.9	2.5
Total identified specimens[b]		453	2,312	1,995	3,101

Note. Specimens found to rejoin, articulate, pair, or group were counted as a single specimen.

[a]This number includes 116 bones from one dog found in Pit F1193 in Phase 1 of the Death Pit. For the calculations in this table, these 116 bones are counted as 1.

[b]A total of 5,866 specimens could be assigned to a specific chronological phase. This total does not include 139 specimens that were identified but not assigned to a specific phase. These 139 unassigned specimens, however, are included in table 4, making a total of 6,035.

Domuztepe, see Kennedy, forthcoming). Many wild/weedy taxa present in the assemblage were also potential food items, as described in the growing body of ethnographic literature (e.g., Ertuğ-Yaraş 1997). Many of the grain remains were fragmented before charring, perhaps evidence of the processing of grains for consumption as bulgur. The few food/coprolite fragments recovered contain grain and chaff remains that suggest the consumption of gruel-like foods. Studies on the human teeth from the site show that they were not ground down by wear (S. Gauld, personal communication), suggesting an emphasis on gruel-like foods rather than stone-ground flours for bread.

Sheep, goats, cattle, and pigs were all consumed for food at Domuztepe, as evidenced by butchery marks indicating disarticulation and fragmentation for marrow. Dogs were not part of the diet, their bones being few in number and relatively complete. Most of the hunted animals were probably eaten, although it is likely that some of them arrived at the site already processed (as in the case of bear and leopard skins). Pigs, in particular, would have contributed significantly to the diet of the people of Domuztepe, since they reproduce quickly and provide a high amount of meat and fat. They are also easy to keep, happily subsisting on kitchen scraps. Domuz-

Table 4. Animal taxa identified at Domuztepe

Taxon	Common name	No. specimens	%
Domestic:			
Bos taurus	Cattle	1,278	21.2
Ovis aries, Capra hircus	Sheep, goat	2,684	44.5
Ovis aries	Sheep	210	3.5
Capra hircus	Goat	186	3.1
Sus scrofa	Pig	1,529	25.3
Canis familiaris	Dog	16	0.3
Total domestic taxa		5,903	97.8
Wild:			
Bos taurus cf. *primigenius*	Wild cattle	1	0.02
Ovis orientalis, Capra aegagrus	Wild sheep or goat	1	0.02
Ovis orientalis	Wild sheep	3	0.05
Gazella gazella	Gazelle	7	0.1
Cervus elaphus	Red deer	5	0.1
Dama dama	Fallow deer	5	0.1
Cervus, Dama	Red deer, fallow deer	29	0.5
Capreolus capreolus	Roe deer	3	0.05
Sus scrofa	Wild boar	11	0.2
Equus asinus, Equus hemionus	Wild ass, onager	1	0.02
Equus sp.	Equid	1	0.02
Canis sp.	Canid	5	0.1
Canis, Vulpes	Dog, wolf	3	0.05
Martes cf. *martes*	Pine marten	1	0.02
Ursus arctos	Brown bear	5	0.1
Vulpes vulpes	Fox	11	0.2
Panthera pardus	Leopard	1	0.02
Lepus spp.	Hare	5	0.1
Castor fiber	Eurasian beaver	1	0.02
Rodentia	Rodent	6	0.1
Testudines	Tortoise/turtle	4	0.1
Aves	Bird	11	0.2
Anatinae	Duck	4	0.1
Fish	Fish	8	0.1
Total wild taxa		132	2.2
Total		6,035	

Note. This table does not include the 1,995 animal bone specimens from the Death Pit (listed separately in table 3). Specimens found to rejoin, articulate, pair, or group were counted as a single specimen.

tepe's situation near marshes may be related to the large number of pigs at Domuztepe, since cultivated fields some distance from the settlement would be less at risk of damage from pigs than nearby fields. Cattle, too, would have provided a great amount of meat, but they were a much more costly (and economically risky) animal to keep because of their high food and water requirements and less frequent birthings. Given the risks associated with emphasizing cattle herding, the inhabitants of Domuztepe may have regarded threats of theft of valuable and potentially vulnerable livestock as a manageable risk. Perhaps the settlement's large size, long history of occupation, and possible regional reputation deterred aggression against otherwise vulnerable cattle herds and relatively distant agricultural fields.

Another food product that would have been provided by some animals and readily available for immediate or delayed consumption was milk. A suite of lactating sheep, goats, and cattle would provide, for six to ten months of the year, milk that could be processed into butter, yogurt, and storable curds and ghee. If cattle at Domuztepe were milked, they also would have made a significant contribution to the production of fresh and storable milk products for seven to nine months of the year (Marciniak 2005, 40), through the spring and summer months and possibly into the fall. A recent study demonstrated a positive correlation between sites with high numbers of cattle bones and chemical residues of cooked milk products on ceramics from samples dating back to the seventh millennium BC in this region (Evershed et al. 2008). The findings were particularly strong in northwestern Turkey, but it is likely that people in southeastern Turkey also used cattle, sheep, and goats to make milk products.

While the setting of Domuztepe was not ideal for cereal agriculture, the site's inhabitants must have had strategies for coping with the productive capabilities of their local envi-

ronment. All the crops in the assemblage are easily dry-farmed, and a number of species of catchfly, also recovered at Domuztepe, are weeds associated with dry-farmed cereals (McCorriston 1992, 324), hence the possibility that the crops recovered may not necessarily have been grown in close proximity to the site. Plant cultivation (and possibly also processing) in fields located some distance from the settlement would have been facilitated by the use of draft animals. There is scant evidence at Domuztepe for draft cattle; however, sex data indicate that one-third of all adult cattle were male (see fig. B1, in CA+ online supplement B). In a strictly meat-based economy, males would be killed while young, leaving an adult population primarily comprised of females for reproduction and milking. The high proportion of adult male cattle, together with a 3% occurrence in cattle foot bones of morphological changes (exostosis, lipping) that can result from strain from load bearing (Bartosiewicz, Van Neer, and Lentacker 1997), suggests that some of the Domuztepe cattle may have been kept to older ages for labor.

Fodder and Fuel

The mixed economy at Domuztepe involved a spectrum of activities and people reflecting a range of social, political, economic, and symbolic motivations. The balance of plant and animal activities undertaken at various times of the year would certainly have been fluid, changing with shifting social relationships, environmental conditions, and changes in herd structure (based on culling choices, diseases, or birth rates). One area where plants and animals would have interfaced is the cycle of planting and grazing, in which fields left for grazing were thus fertilized and enriched for future food production.

Until recent times, herders in the Domuztepe region followed a pattern of seasonal movements from the winter lowlands around the site to the summer pastures of Elbistan, ca. 100 km distant. It is likely that the inhabitants of Domuztepe also followed some seasonal cycle with their herds of sheep and goats. Cattle, on the other hand, are generally not part of pastoral movements in this area because they have more specific water and food requirements and would not be able to negotiate rocky terrain. Considering the high representation of cattle at Domuztepe, taking herds out to graze away from the site may have been an attractive solution to the problem of feeding such large animals. Ethnographic studies indicate that farmers will graze their animals on a combination of crops and wild foods (Anderson 2006). The Domuztepe cattle most likely grazed in nearby wooded areas, along the flat marshlands unsuitable for agriculture to the west of the site, and on fallow fields, and at other times they would have been foddered (particularly in the winter months). Coring results from the Sağlık Göl on the western side of the Kahramanmaraş Valley (Woldring and Kleine, forthcoming) show that a particular green alga (*Pediastrum boreanum*) peaked during the final stages of the occupation of Domuztepe and declined within a few centuries of its abandonment. This type of algal bloom has been connected with a temporary change in nutrient composition, potentially due to dung from cattle.

Dung is an abundant secondary product that can be used for fuel or fertilizer, and its benefit to various crops can vary, depending on the type of fodder fed to the animals producing the dung (Sansoucy 1997). Grazing animals on unused fields would enrich the soil with their manure. Distinguishing human food from fodder, however, can be challenging because of the diversity of cultural and contextual factors regarding human dietary choices and animal feeding (Valamoti and Charles 2005). As stated above, chaff is the largest component in the Domuztepe plant assemblage as a whole and may have arrived at site as fodder. A number of seeds in the assemblage may have been brought to the settlement in the same way. These include cereals, pulses, linseeds, figs, sea club-rush, small-seeded legumes, and wild grasses (Anderson 2006; Ertuğ-Yaraş 1997; Perdomo-Molina 2006).

It is also possible that the inhabitants of Domuztepe used animal dung as fuel, as is still common in many parts of the Near East today; this may also account for the large amount of cereal chaff in the plant assemblage. Wood charcoal and seed weights (after Miller 1984) can indicate whether the seeds arrived on site as a component of dung or with the fuel wood. An initial comparison of these in 34 samples shows that, in most, charcoal makes up the larger proportion. Because the pollen evidence suggests that tree cover during the late Halaf had not yet been subject to human impact (Woldring and Kleine, forthcoming), there would have been no need to burn dung for lack of wood, although choice of fuel is not dictated only by environment; other factors, such as custom and taboo, may also effect selection (Asouti, forthcoming). Further analysis of the plant remains is required before a more compelling interpretation can be presented.

Animal and Plant Products in Storage and Construction

Many food resources may have been stored at Domuztepe, and we have direct evidence of the storage of pulses because many of the lentils recovered show evidence of insect damage. Some animal products (milk curds and dried meats) may also have been preserved for long-term storage, helping offset the risks and uncertainties of the less productive time of the year, from the late summer into the early winter. Storage, however, probably took place on several levels, and stored goods may have been moved between them at different times. The largest probable storage structures are circular buildings with extremely solid floors made of multiple layers of packed pebbles covered with thick plaster. These range in size from ca. 1 to 2.5 m diameter, and in one case, four contemporary examples stood side by side, suggesting that storage was a communal activity (fig. B2, in CA+ online supplement B). Smaller-scale storage could be accommodated in a range of pottery vessels and other containers made of basketry or hide (a doghide

"bundle" from the Death Pit was identified by a cluster of four paws and a tail from one individual). Some of these vessels were actually built into walls, providing convenient storage "cupboards."

Many plant species in the Domuztepe assemblage (*Hordeum vulgare*, *Triticum* sp., *Linum* sp., *Pistacia* sp., *Prunus* sp., *Artemisia* sp., *Centaurea* sp., *Atriplex* sp., *Chenopodium* sp., *Cladium mariscus*, *Eleocharis* sp., *Juncus* sp., and *Polygonum* sp.) have leaves and stems that (depending on the plant) could have been used to make various items for equally various uses: baskets, containers, mats (for storage and building), building temper, thatching, bedding, brooms, sieves, string and rope, amulets, and hats, all of which are ethnographically attested to (Anderson 2006; Asante 2006; Ertuğ 2006*a*, 2006*b*; Ertuğ-Yaraş 1997; Van der Veen 1999). Evidence of these products is quite rare at the site, undoubtedly because of the conditions of preservation, and we suggest that the use of woven materials at Domuztepe was extensive. A group of plaster-lined baskets was found in the Death Pit. Although only the plaster lining has survived, there are shallow impressions of the basketry in places, and the profile of the vessel can be seen clearly in the best-preserved example (fig. B3, in CA+ online supplement B). The presence of baskets is also attested to by pottery sherds that imitate fine woven basketry (fig. 4). In some cases, there are clear indications that the baskets had decorative patterns created by weaving in different colors. Although this may suggest the use of different grasses or reeds in combination, it is equally likely that vegetable dyes were used in the preparation of material for weaving. The use of grasses, sedges, and rushes for weaving may explain the importance of the nearby wetlands for much more than subsistence.

A burned structure excavated in Operation I provides evidence that plant and animal products were used as parts of buildings. Burned roofing materials preserved in the collapse of the structure indicate that a clay or earth roof was laid on top of small branches and perhaps thick rushes. In one example, a vertical surface with a diagonal pattern of impressions suggests that a woven or knotted mat or rug was pressed up against it when it was wet (fig. B4, in CA+ online supplement B). An unusual line of animal bones, exceptionally well preserved within the same burned structure, indicates an organic partition. In this case, the bones can be seen to be piled along a vertical face, which was most likely made of organic materials that have decayed (fig. B5, in CA+ online supplement B). It is probable that these pieces of evidence are typical of many of the structures at the site, where conditions of preservation have given no indication of organic materials and leave us with only stone foundations and occasional pisé superstructures. An exceptional series of naturalistic paintings on pots from Early Halaf contexts at Domuztepe show tall buildings with walls that, from the cross-hatched patterns used to depict them, may have been made from matting (fig. 5). Between the buildings stand vessels that may have been large baskets. Finally, the checkerboard pattern in front of the buildings may also indicate matting.

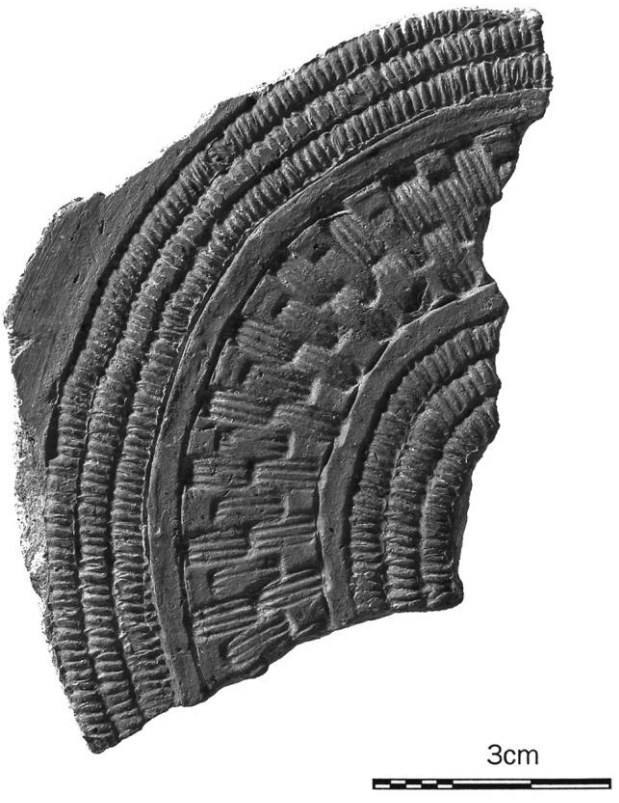

Figure 4. Bottom of a vessel shaped to imitate basketry. The rich red-brown slip applied to the sherd almost certainly is also intended to mimic the color. A color version of this figure is available in the online edition.

Use of Animal and Plant Fibers

Excavations at Domuztepe have recovered an abundance of spindle whorls and bone tools that can be associated with weaving, indicating that fibers of some kind were woven and spun on site. Spindle whorls can be used to spin a variety of fibers, such as wool, hair, and flax. Light spindle whorls can spin a fine thread, are less likely to break the fiber being spun, and are necessary for spinning short fibers (Barber 1991, 52). From the 76 objects identified as spindle whorls from Domuztepe, we were able to determine 48 complete spindle whorl weights, ranging from less than 1 g to 55 g (with a mean of 20 g and a median of 18 g). The mean for the Domuztepe whorls falls in the middle range of reports from present-day spinning by peasants in Afghanistan, who use whorls of 8 g for spinning short, fine wool fibers and whorls of 33 g for spinning long, medium-heavy wool (Barber 1991, 52, citing Ryder 1968, 81). Other whorls, of course, may have been made of wood, but their use would be the same: to spin the variety of fibers likely utilized by the people of Domuztepe.

Although we lack direct evidence for how suitable the hair of Domuztepe caprines may have been for weaving, we can draw on sheep and goat population demographics to investigate the use of fibers. In discussing milk exploitation above, we suggested that sheep and goats were both kept for production

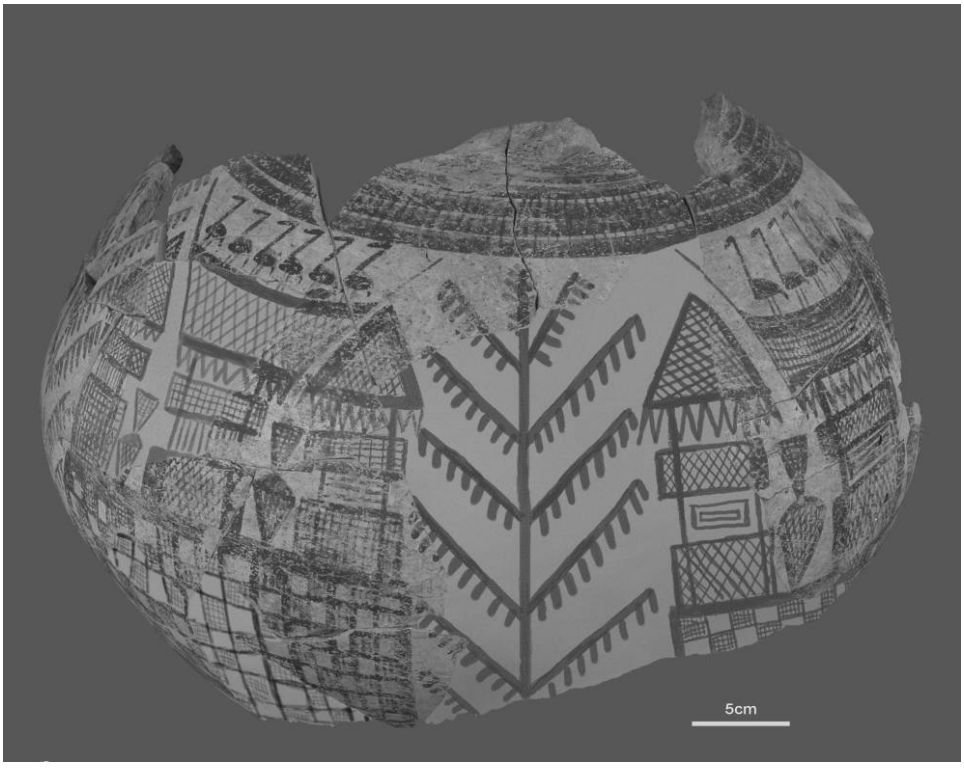

Figure 5. Part of a large jar showing buildings built from possibly organic material alongside trees, possible large baskets and possible matting. Note that part of the scene is restored but with considerable confidence due to the repeating elements in the decoration around the vessel. A color version of this figure is available in the online edition.

of meat, milk, and hair/wool but that there may have been a more intensive focus on sheep. With 80% of the sheep surviving beyond maturity (fig. B6, in CA+ online supplement B), the herd clearly had a large male component; thus, wool is the most likely product, rather than just breeding and milking females. Caroline Grigson observed a nearly identical survivorship pattern for the sheep and goats of Chalcolithic Gilat, with the same conclusion that wool was the desired product (Grigson 2006). It is likely that the Domuztepe sheep would have grown wooly undercoats in the winter, like their wild counterparts (rather than year-round, as do modern sheep). In springtime, they would start to shed this wooly coat, which humans could pluck and gather for spinning or felting.

Flax or linseed, in addition to being a potential food and oil source, was another potential source of fibers available to the inhabitants of Domuztepe. There are few linseeds in the assemblage, but since processing for fiber does not include charring, and indeed part of the process of making flax involves removal of the seed (McCorriston 1997), preservation is likely to have had a large influence on the resultant assemblage. Small linseed counts are common in contemporary sites, despite the fact that fiber (in the form of linen) finds well predate the Halaf. Linseeds require prime agricultural land, frequent watering, damp and readily drained soils, and high labor input for the various stages of production, especially weeding, harvesting, and retting (McCorriston 1997). Domuztepe's situation next to wetlands is potentially good for linseed production, although motivating the required labor would have been necessary. Archaeologically, ditches excavated in Operation I are reminiscent of British Prehistoric retting pits (B. R. Gearey, personal communication) and, together with the spindle whorls and bone tools recovered from the site, show that potential for processing flax into linen existed at Domuztepe.

A Seasonal Cycle of Activities

The agropastoral activities discussed above would have taken place in seasonal cycles based on long-term resource management goals, the availability of certain resources at different times of the year, and the time required to process and prepare certain products for storage. The productive months of early spring (February–April) would see animal births as well as milk production, which would last well into the summer months or early fall. Spring crops would be sown, weeding undertaken, and spring greens collected. The faunal spectrum

and animal kill-off patterns from the Death Pit suggest a spring occurrence, when ample food resources would have been available (Kansa, forthcoming *a*). Thus, springtime was a time of communal feasting and may have been associated with other events, such as the return of storks to the settlement. The early to midsummer at Domuztepe (May–June and possibly August) would see crop harvesting, while the new births would free up some of the herd to be killed for meat and curing. In the hot summer months, it is likely that a portion of the population left to graze flocks of sheep and goats in high mountain pastures. Fruits and nuts could be gathered there. Those remaining at Domuztepe would be occupied with plant processing and gathering wool, along with wood and plants for roofing and basketry. With the onset of fall and concerns over storage, fermented milk products, cured/dried meats, grains, and dried/preserved vegetables would be set aside for the lean early winter months, when the settlement's population was higher but there were fewer fresh resources available. Winter crops would be sown in the fall, and a second pig birthing may have occurred at this time, providing a handy source of fresh meat into the late winter. During the winter months, gazelles, deer, and other wild animals passed near the site in search of winter grazing; thus, hunting may have been more important during these months. It is also likely that some foddering of domestic animals occurred in the winter months, just when the site's inhabitants would have turned to stored resources. Keeping animals alive is also a form of storage, and it is likely that more meat would have been consumed in the wintertime, in order to reduce the number of animals that needed to be fed and to maintain stored grains for human consumption. Winter crops would be weeded, harvested, and processed. Various plant materials for making baskets and mats collected during summer and autumn would have been stored for later processing, perhaps particularly during the slower winter season.

The Symbolic Role of Plants and Animals

The people of Domuztepe used plant and animal products for adornment and decoration and for ritual purposes. Beads were sometimes formed from bone, among other materials, and would have been fastened to clothing or strung together with plant or animal fibers. Two bear paws from the Death Pit almost certainly held ritual significance, as suggested by their extreme rarity in the assemblage. Their articulation indicates that they were attached to a skin when buried in the pit. A number of the plant taxa recovered at Domuztepe may have had medicinal uses, as evidenced in the ethnographic literature (Alparslan and Tuzlacı 2006; Başer et al. 2006; Ertuğ-Yaraş 1997; Özaydin et al. 2006; Tümen et al. 2006), and it is inconceivable that plants and animals did not have a social and symbolic life away from their basic roles as the source of dietary requirements and construction use. (See table A3, in CA+ online supplement A, for medicinal plants.)

The characteristic pottery of the Halaf period is decorated with painted geometric motifs. Both plants and animals are among the rare but striking naturalistic representations, which provide a strong indication of their importance in the rich symbolism of Domuztepe (figs. B7, B8, in CA+ online supplement B). Stylized cattle heads with long horns (bucrania) are the best-known motif, although horned sheep and goat heads also occur. Other animals are also shown, including felines and arguably even imaginary creatures. Humans may also be shown wearing animal masks or headdresses. Trees and bushes are certainly sometimes depicted, and some more-abstract quatrefoils might represent flowers. In the most striking naturalistic scene, repeated on many vessels from the Early Halaf deposits (fig. 5), houses are shown, separated by trees, with birds sitting along the roof ridge. As the birds are almost certainly storks, an element of seasonality is embedded in the setting, and the association with buildings is certainly as much a reflection of symbolic links as naturalistic depiction.

There are strong indications from the Death Pit assemblage that dogs carried symbolic weight. In addition to a relative abundance of dog bones, compared to the non–Death Pit contexts, there is a striking co-occurrence of dog and human remains. Furthermore, dogs and humans both had a high level of skull preservation in the Death Pit, and many show blunt-force trauma in the frontal/parietal area (see Kansa et al. 2009). The importance of dogs to humans as protectors, companions, and hunting aides may have been emphasized through their similar treatment and burial together.

Cattle also held special significance beyond subsistence at Domuztepe, as indicated by the bucrania motifs on ceramics as well as the preference for beef in feasting contexts. Two instances of feasting remains, the Death Pit and a bone spread in Operation III, show an abundance of butchered cattle bones, mirrored by a distinct dearth of pig bones (Kansa and Campbell 2004). In the Death Pit, the bones came from a minimum of eight prime-age females, reflecting a costly sacrifice of prime breeding stock (see Kansa et al. 2009). Cattle would have been used in feasts not only for the symbolic expense they represented but also because they were huge meat packages, requiring either processing for storage or division among a large group of people. Sheep, goats, and pigs, on the other hand, were smaller meat packages that could be processed and shared within a family or small group. Pigs, in particular, provided no secondary products, and their distinctly low representation in feasting contexts at Domuztepe points to their low symbolic value. Cattle also carried prestige because they were a long-term and risky investment requiring substantial plant resources to keep to maturity. They were also a fragile resource, susceptible to sudden changes brought about by environmental changes, diseases, and raiding. The cattle keeper's ability to maintain these large animals over the course of several years offered tangible indications of success and ability to overcome risk. Thus, beyond food production, cattle likely brought prestige to their keepers and may have served as one of the earliest forms of capital. The pervasiveness of cattle in the Domuztepe bone and ceramic assemblages

indicates that cattle played a role well beyond simply being a source of meat, one involving feasting and perceptions of prestige.

Conclusions

By integrating botanical and faunal evidence, we have come to a better understanding of daily life at Domuztepe. As the picture comes into focus, we begin to understand how the site's location, while not matching our preconceptions of what might be optimal, was well suited to the needs of its inhabitants. Indeed, as has been demonstrated at Çatalhöyük (Roberts and Rosen 2009), we can assume that Domuztepe's inhabitants found the site's location central to their suite of economic, social, and symbolic values. That is, though perhaps not optimal for agriculture, the location of Domuztepe provided a functional balance for pastoral activities, cattle and pig keeping, exploitation of wild resources, and access to building materials. Equally important, the utilization of natural resources around Domuztepe contributed strongly to the symbolism of place, reflected in decoration on pottery or the incorporation of animal remains in the Death Pit.

Although this study has linked plants and animals, we are still drawing arbitrary divisions across the material by excluding other resources that were used. For example, not only does pottery share symbolic meanings with plants and animals (whether imitating basketry or showing animals in motifs) but its manufacture also would have formed part of the seasonal cycle of activities. Pottery production exploited the same landscape, and resource procurement may have been interlocked, so that, for example, temper and pigments could have been collected during herding. A similar overlap can also be suggested for the many items produced from locally available stone, the procurement of which may have been embedded in other activities. Seasonally mobile herders were probably also key facilitators of interregional communication, allowing some members of the community much greater interaction with more distant social groups and perhaps also promoting their role in the acquisition of exotic materials, such as obsidian, at particular times of year. The links between the exploitation of plants and animals and other aspects of material culture are likely to have been so extensive that it will be impossible to adequately understand the subtlety and complexity of symbolic meanings at Domuztepe without extending this integration of specializations (see Campbell and Carter, forthcoming).

The seasonality of many resources and their procurement as part of a regular annual cycle may also have linked the exploitation of plants and animals into wider perceptions of time and the recent past. Particular activities would have been tied tightly to particular times of year: specific places would have been visited, and seasonal abundance (and shortages) would have formed key reference points. Years of particular abundance of natural resources might be expected to be one way in which the past was remembered. Although we tend to emphasize the funerary role of archaeological deposits such as the Death Pit, it is important to acknowledge the feasting that seems to have accompanied the funerary events, and large-scale feasting can be a key component of the formation of longer-term memories.

Traditionally, the study of the Halaf has emphasized the interpretation of sites through the degree to which they belong to a larger regional entity. It has also prioritized artifacts, particularly pottery, in social reconstruction, relegating plants and animals to a narrow economic arena. Although this is far from the only area of archaeology to exhibit these priorities, it is important to challenge them. The integration of plants and animals presented here emphasizes the need to understand how Domuztepe functioned as a living settlement and how much it was the product of a specific, local context in which regional traditions could be drawn on and modified. It also draws attention to the extent to which the local exploitation of plants and animals was not simply economic but also, and perhaps primarily, cultural.

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