Supplementary Materials

Stable isotopes and herding strategies in Middle Uruk Period in Tell Humeida (Syrian Euphrates valley)

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Table S-1. Tell Humeida plant macroremains

Cultivated species	**number of remains**
Hordeum vulgare (rachis)	7
Hordeum vulgare	14
Triticum monococcum/dicoccum (gluma base)	10
Triticum cf. *monococcum*	2
Triticum monococcum	2
Triticum dicoccum	1
Triticum dicoccum (spikelets)	5
Triticum dicoccum (glume base)	16
Cereal (fragments)	10
Cereal indet	2
Wild species	**number of remains**
Carex sp.	10
Chenopodium sp.	3
Cyperus sp.	3
Galium sp.	1
Heliotropium sp.	2
Lolium sp.	4
Medicago/Melilotus sp.	15
Poaceae, *Cynodon* type	1
Rumex sp.	10
Salvia sp.	4
Silene sp.	1
Trigonella sp.	7
Aculeus	1

Table S-2. Tell Humeida faunal remains

Bone abbreviations: SKL: skull; D = deciduous; MAN: mandible; HYD: hyoid; ATL: atlas; AXS: axis; VX: vertebra; SAC: sacrum; SC: scapula; HU: humerus; RA: radius; UL: ulna; CAR: carpal; MTC: metacarpal; PEL: pelvis; FE: femur; PAT: patella; TI: tibia; FI: fibula; AST: astragalus; CAL: calcaneus; TAR: tarsal; MTT: metatarsal; PH1: 1st phalanx; PH2: 2nd phalanx; PH3: 3rd phalanx; SES: sesamoid; LBF= long bone fragment. Fgt.: fragmrnent.
Taxa abbreviations: EQU: equid; BOS: cattle; OVA: sheep; OC: sheep/goat; OCG: sheep/goat/gazelle; GAZ: gazelle; CER: Cervidae; CAN: canid; FEL: felid; MSM: medium-sized mammal; LSM: large-sized mammal.

	EQU	BOS	OVA	OC	OCG	GAZ	CER	CAN	FEL	MSM	LSM	unidentified
Skull												
SKL	-	-	1	-	-	-	-	-	-	-	-	
D upper teeth	-	-	-	-	-	-	-	-	-	-	-	
Upper teeth	1	-	-	3	-	-	-	-	-	-	-	
MAN	-	-	1	1	-	2	1	1	-	16	-	
D lower teeth	-	-	1	3	-	1	-	-	-	-	-	
Lower teeth	3	-	1	-	2	-	-	-	-	-	-	
Tooth frag.	-	-	-	-	-	-	-	-	-	1	-	
HYD	-	-	-	-	-	-	-	-	-	-	-	
Axial												
ATL	-	-	-	-	-	-	-	-	-	-	-	
AXS	-	-	-	-	-	-	-	-	-	-	-	
VX	-	-	-	-	-	-	-	-	-	3	-	
SAC	-	-	-	-	-	-	-	-	-	-	-	
RIB	-	-	-	-	-	-	-	-	-	16	1	
Front limb												
SC	1	-	-	-	-	-	-	-	-	3	1	
HU	-	-	-	-	-	-	-	-	-	1	1	
RA	1	-	-	-	-	-	-	-	-	-	1	
UL	-	-	-	-	-	-	-	-	1	1	-	
CAR	-	-	1	-	-	-	-	-	-	-	-	
MTC	-	-	2	2	-	-	-	-	-	-	-	
Back limb												
PEL	1	-	-	1	-	-	-	-	-	-	-	
FE	1	-	-	-	-	-	-	-	-	-	-	
PAT	-	-	-	-	-	-	-	-	-	-	-	
TI	2	-	-	-	-	-	-	-	-	2	1	
AST	-	-	-	-	-	-	-	-	1	-	-	
CAL	1	-	-	-	-	-	-	-	-	1	-	
TAR	-	-	-	-	-	-	-	-	-	-	-	
MTT	-	-	-	-	-	-	-	-	-	2	-	
Feet												
PH1	1	1	-	-	-	-	-	-	-	-	-	
PH2	-	1	-	-	-	-	-	-	-	-	-	
PH3	-	1	-	-	-	-	-	-	-	-	-	
SES	-	-	-	-	-	-	-	-	-	-	-	
MTP	-	-	-	-	-	-	-	-	-	1		
LBF	-	-	-	-	-	-	-	-	-	40	7	
unidentified												67
NR	**12**	**3**	**7**	**10**	**2**	**3**	**1**	**1**	**2**	**87**	**12**	**67**
%	5.8	1.4	3.4	4.8	1.0	1.4	0.5	0.5	1.0	42.0	5.8	32.4

Table S-3. Osteometrical data of Tell Humeida faunal remains.

In mm. Measures according Davis, 1996; von den Driesch, 1976; Levine, 1982. TAL, talus. MTC, metacarpal; PH1, first phalanx; PH2, second phalanx; PH3, third phalanx; LM, lower molar; UM, upper molar.
GL, greatest lenght. BP, proximal breadth; DP, proximal depth; BD, distal breadth; BFd: width of the distal articulation measured in the medio-lateral axis; WCM: medio-lateral width of the medial condyle; WCL: medio-lateral width of the lateral condyle; DEM: antero-posterior diameter of the external trochlea of the medial condyle; DVM: antero-posterior diameter of the verticillus of the medial condyle; DIM: antero-posterior diameter of the internal trochlea of the medial condyle; DIL: antero-posterior diameter of the internal trochlea of the lateral condyle; DVL: antero-posterior diameter of the verticillus of the lateral condyle; DEL: antero-posterior diameter of the external trochlea of the lateral condyle.

TAXA	BONE	GL
Felid	TAL	28.3

TAXA	BONE	BP	DP	BD	BFd	WCM	WCL	Dem	Dvm	Dim	Dil	Dvl	Del
Ovis/Capra	MTC	26.2	-	-	-	-	-	-	-	-	-	-	-
Ovis aries	MTC	-	-	29.9	28.0	12.9	12.7	14.6	20.5	17.7	17.8	19.6	13.1
Ovis aries	MTC [1]	28.8	21.2	-	-	-	-	-	-	-	-	-	-

TAXA	BONE	GL	BP	SD	BD
Equus sp.	PH1	-	-	19.0	30.5
Bos taurus	PH1	-	30.6	26.8	28.3
Bos taurus	PH2	39.3	30.2	25.3	26.5

TAXA	BONE	DLS	MBS	Ld
Bos taurus	PH3	70.6	24.7	55.2

TAXA	Teeth	H	M-D D
Equus sp.	LM [2]	55.9	22.6
Equus sp.	LM [2]	55.1	24.2
Equus sp.	UM	-	18.7
Equus sp.	LM	-	24.3

[1] large specimen
[2] same individual

Davis, S.J.M. 1996. Measurements of a group of adult female Shetland sheep skeletons from a single flock: a baseline for zooarchaeologists. *Journal of Archaeological Science* 23, 593-612.

Driesch v.d., A. 1976. *A guide to the measurement of animal bones from archaeological sites*. Peabody Mus. Bull. 1. Harvard.

Levine, M. 1982. The use of crown height measurements and eruption wear sequences to age horse teeth. En B. Wilson; C. Grigson y S. Payne (eds.): *Ageing and sexing animal bones from archaeological sites, p*p. 223-250*.* BAR British Series; 109. Oxford: BAR.

Table S-4. Peptide markers in bone collagen and taxonomic identification by ZooMS.Peptide markers following Welker *et al.* (2016).

Species	P1	A	A'	B	C	P2	D	E	F	F'	G	G'	Identification
Equus sp	1105.6	1182.6	1198.6	1427.7	1550.8	1649.8	2145.1	2820.4	2883.4	2899.4	2983.5	2999.5	
Sample:													
TH09-H3	+			+	+	+	+				+	+	*Equus* sp.
TH09-H4b	+	+		+	+	+	+	+				+	*Equus* sp.
TH09-H5	+			+		+	+					+	*Equus* sp.
TH09-H6	+	+		+	+	+	+	+				+	*Equus* sp.
TH09-H9	+			+	+	+	+	+				+	*Equus* sp.
TH09-H12	+	+		+	+	+	+					+	*Equus* sp.
TH09-H14	+	+		+	+	+	+					+	*Equus* sp.
TH09-H15	+			+	+	+	+	+				+	*Equus* sp.
TH09-H18	+			+	+	+	+					+	*Equus* sp.
TH09-H19	+			+			+	+				+	*Equus* sp.
Species	**P1**	**A**	**A'**	**B**	**C**	**P2**	**D**	**E**	**F**	**F'**	**G**	**G'**	
Ovis aries	1105.6	1180.6	1196.6	1427.7	1580.8	1648.8	2131.1	2792.3	2883.4	2899.4	3017.5	3033.5	
Capra hircus	1105.6	1180.6	1196.6	1427.7	1580.8	1648.8	2131.1	2792.3	2883.4	2899.4	3077.5	3093.5	
Sample:													
TH09-H1	+		+	+	+	+	+					3033.5	*Ovis* sp.
TH09-H8	+			+	+	+	+					3033.5	*Ovis* sp.
TH09-H17	+		+	+	+	+	+	+				3033.5	*Ovis* sp.
TH09-H20	+	+	+	+	+	+	+					3033.5	*Ovis* sp.
TH11-1	+		+	+	+	+	+					3033.5	*Ovis* sp.
TH11-2	+		+	+	+	+	+	+				3033.5	*Ovis* sp.
TH11-3	+			+	+	+	+						*Ovis/Capra*
TH11-4	+		+	+	+	+	+						*Ovis/Capra*
TH11-6	+		+	+	+	+	+					3093.5	*Capra* sp.
TH11-7	+	+	+	+	+	+	+					3033.5	*Ovis* sp.
TH11-14	+	+	+	+	+	+	+				3017.5	3033.5	*Ovis* sp.
TH11-16	+		+	+	+	+	+				3017.5	3033.5	*Ovis* sp.
TH11-23	+	+	+	+	+	+	+						*Ovis/Capra*
TH11-24	+	+	+	+	+	+	+				3017.5	3033.5	*Ovis* sp.
TH11-20	+		+	+	+	+	+				3017.5	3033.5	*Ovis* sp.

	P1	A	A'	B	C	P2	D	E	F	F'	G	G'	
Cervus. Dama…	1105.6	1180.6	1196.6	1427.7	1550.8	1648.8	2131.1	2792.3	2883.4	2899.4	3017.5	3033.5	
Gazella sp.	(?)	1180.6	1196.6	1427.7	1550.8	(?)	2131.1	(?)	(?)	(?)	3017.5	3033.5	
Sample:													
TH09-H7	+		+	+	+	+	+					+	Cervid/*Gazella*
TH09-H4b	+			+	+	+	+	+	+			+	Cervid/*Gazella*
TH11-11	+		+	+	+	+	+					+	Cervid/*Gazella*
TH11-19	+		+	+	+	+	+	+			+	+	Cervid/*Gazella*
TH11-21	+		+	+	+	+	+					+	Cervid/*Gazella*
TH11-5	+			+		+	+						(ruminant?)
Species	**P1**	**A**	**A'**	**B**	**C**	**P2**	**D**	**E**	**F**	**F'**	**G**	**G'**	
Panthera tigris	1105.6	1207.6	1223.6	1453.7	1566.8	1609.8	2147.1	2820.4	2853.4	2869.4	2983.5	2999.5	
Panthera leo	1105.6	1207.6	1223.6	1453.7	1566.8	(?)	2147.1	2820.4	2853.4	2869.4	2983.5	2999.5	
Felis catus	1105.6	1207.6	1223.6	1453.7	1566.8	1609.8	2163.1	2820.4	2853.4	2869.4	2983.5	2999.5	
Lynx lynx	1105.6	1207.6	1223.6	1453.7	1566.8	1609.8	2163.1	2820.4	2853.4	2869.4	2983.5	2999.5	
Sample:													
TH11-8	+	+		+	+		2147.1					+	*Panthera* sp.
TH11-25	+	+		+	+		2163.1	+				+	*Felis/Lynx*
Species	**P1**	**A**	**A'**	**B**	**C**	**P2**	**D**	**E**	**F**	**F'**	**G**	**G'**	
Vulpes vulpes	1105.6	1210.7	1226.7	1437.7	1566.8	1609.8	2131.1	2820.4	2853.4	2869.4	2983.5	2999.5	
Canis lupus	1105.6	1210.7	1226.7	1453.7	1566.8	1649.8	2131.1	2820.4	2853.4	2869.4	2983.5	2999.5	
Sample:													
TH09-H2a	+			1437.7			+	+				+	*Vulpes vulpes*

Welker, F., Hajdinjak, M., Talamo, S., Jaouen, K., Dannemann, M., David, F., Julien, M., Meyer, M., Kelso, J., Barnes, I., Brace, S., Kamminga, P., Fischer, R., Kessler, B.M., Stewart, J.R., Pääbo, S., Collins, M.J., Hublin, J.J. 2016. Palaeoproteomic evidence identifies archaic hominins associated with the Chatelperronian at the Grotte du Renne. *Proceedings of the National Academy of Sciences of the USA* 113, 11162–11167. https://doi.org/10.1073/pnas.1605834113

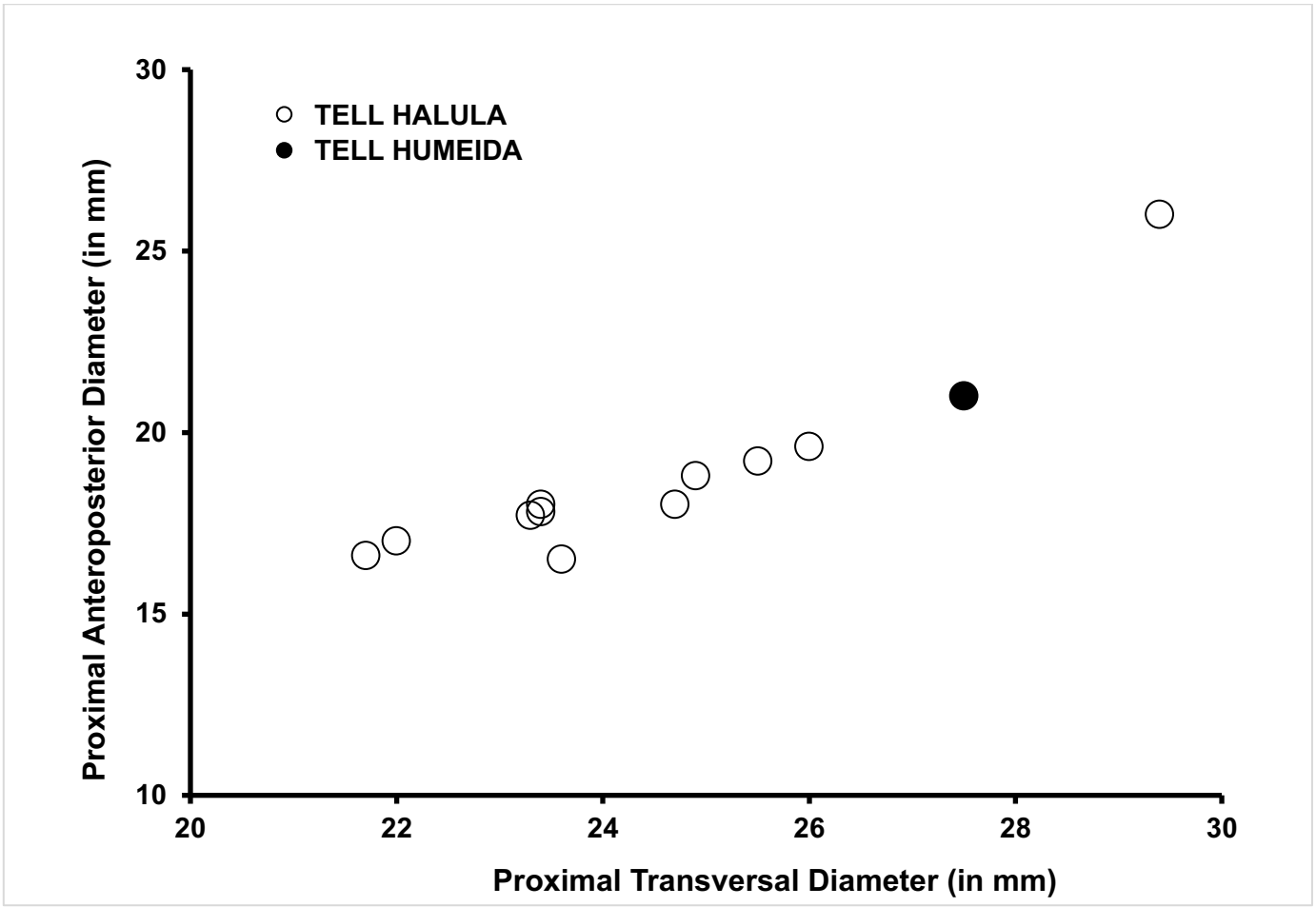

Figure S-1. Measurements of metacarpals (proximal end) from sheep at Tell Halula (Saña Seguí, 1999) and the specimen from Tell Humeida.

Saña Seguí, M. 1999. *Arqueología de la domesticación animal. La gestión de los recursos animales en Tell Halula (valle del Éufrates, Siria) del 8800 al 7000 BP.* Universitat Autònoma de Barcelona, 1999.

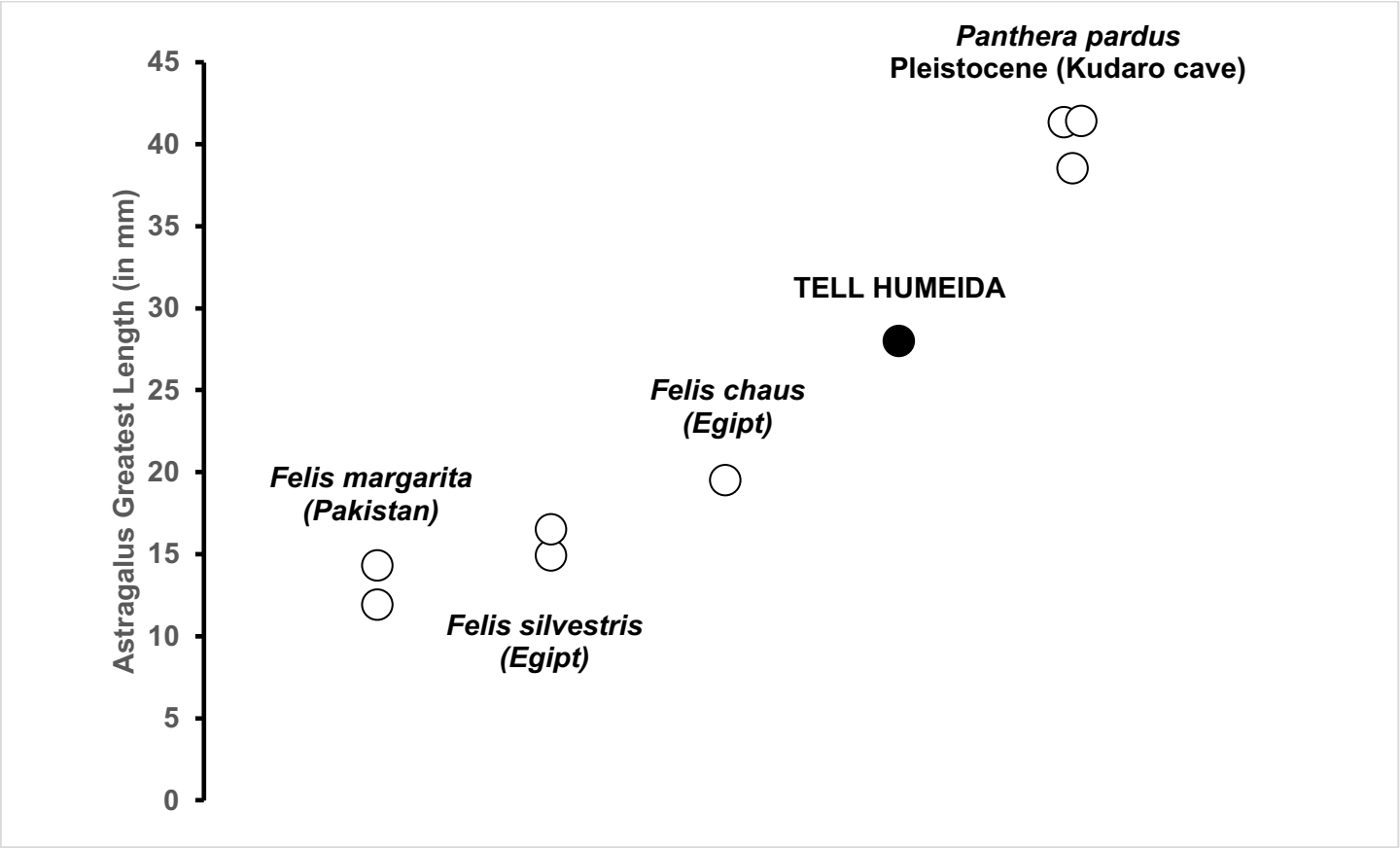

Figure S-2. Greatest length of felid astragalus from Egiptian Predynastic tombs (*Felis silvestris*, *Felis chaus*), *Felis margarita* (from Pakistan) (all of them according Van Neer et al, 2014), Pleistocene leopards from Kudaro cave in the Caucasus (Baryshnikov, 2011) and the specimen from Tell Humeida.

Baryshnikov, G. 2011. Pleistocene Felidae (Mammalia, Carnivora) from the Kudaro Paleolithic cave sites in the Caucasus. *Proceedings of the Zoological Institute RAS* 315 (3), 197–226.

Van Neer, W., Linseele, V., Friedman, R., De Cupere, B. 2014. More evidence for cat taming at the Predynastic elite cemetery of Hierakonpolis (Upper Egypt), *Journal of Archaeological Science* 45, 103-111. https://doi.org/10.1016/j.jas.2014.02.014

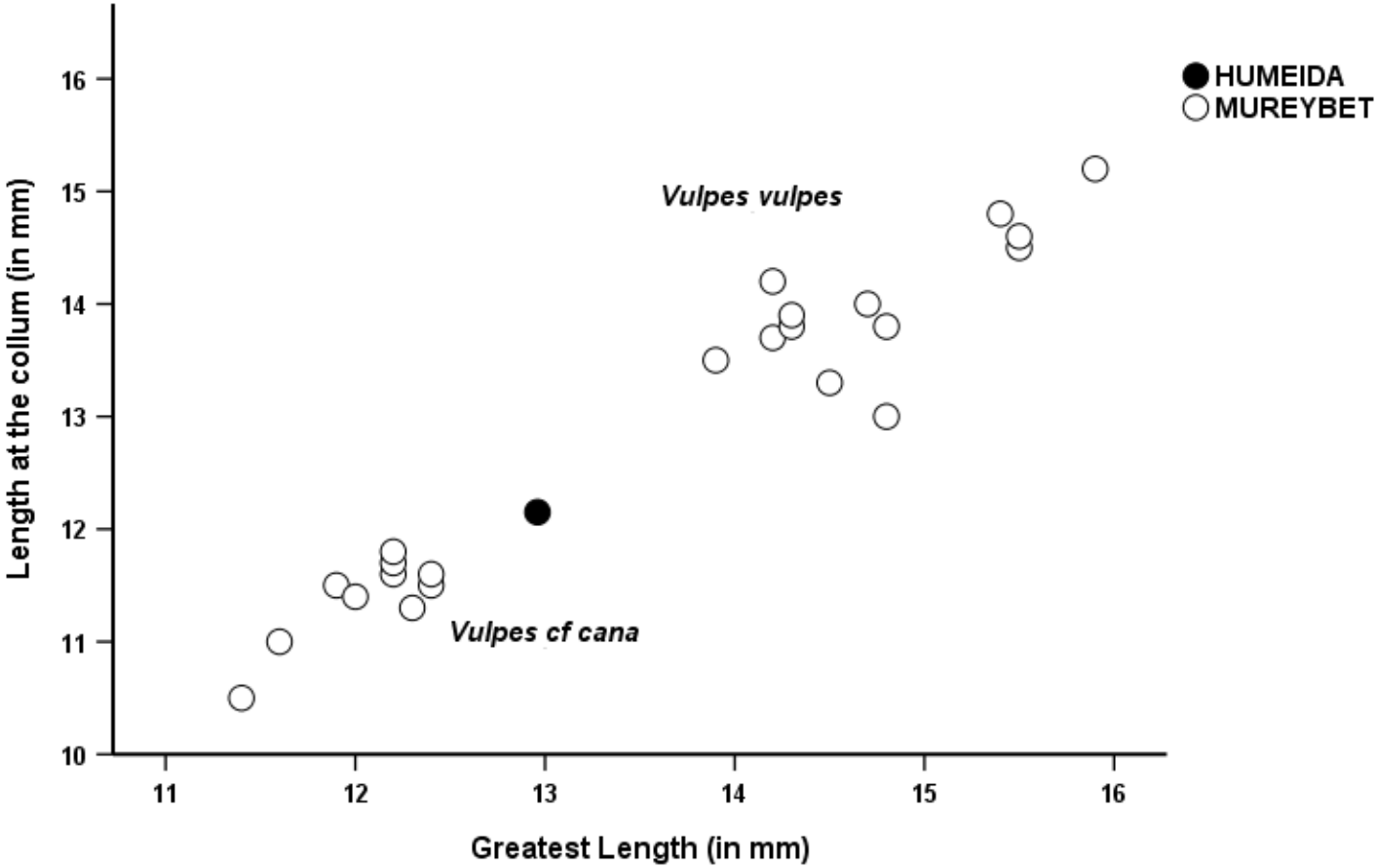

Figure S-3. Measurements of the lower carnassial (m1) from foxes recovered at Tell Mureybet (Gourichon and Helmer 2008, supplement data) and the specimen from Tell Humeida.

Gourichon, L., Helmer, D. 2008. Etude archéozoologique de Mureybet. In Ibáñez, Juan José, - Tell Mureybet, un site néolithique dans le Moyen Euphrate syrien. Lyon, Oxford: Archeopress, Maison de l'Orient et de la Méditerranée/BAR intern. series 1843, pp. 115-227.

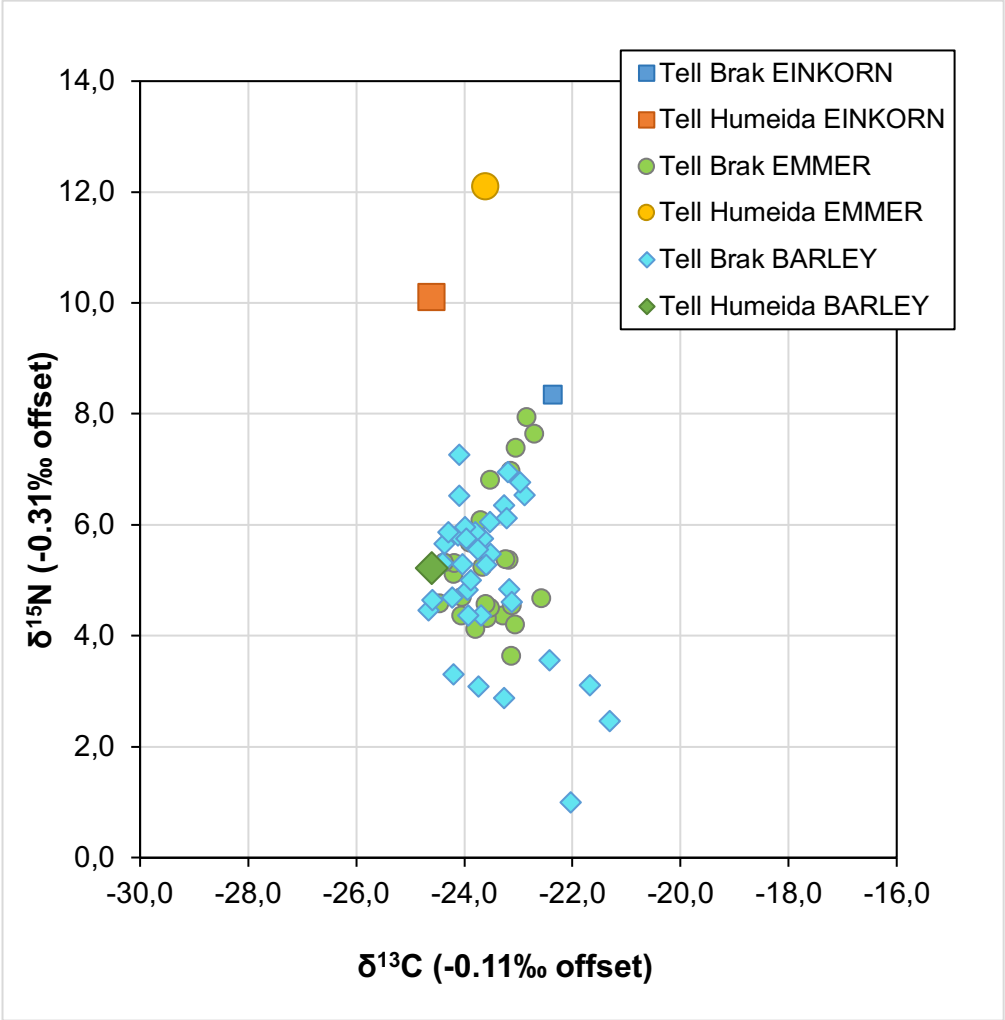

Figure S-4. $\delta^{13}C$ and $\delta^{15}N$ of wheats and barley from Tell Humeida compared with those from Tell Brak of the same chronology (Styring *et al.,* 2017).

Styring, A., Charles, M., Fantone, F., Hald, M.M., McMahon, A., Meadow, R.H., Nicholls, G.K., Patel, A.K., Pitre, M.C., Smith, A., Sołtysiak, A., Stein,G., Weber, J.A., Harvey Weiss, H., Bogaard, A. 2017. Isotope evidence for agricultural extensification reveals how the world's first cities were fed. *Nature Plants* 3, article 17076. https://doi.org/10.1038/nplants.2017.76