3 **ANIMAL BONES: DATA** by Andy Hammon

3.1 **Appendix 1: methods**

Taxonomic identification

All specimens were identified to species or taxonomic group where possible. Ribs and vertebrae (excluding the axis and atlas) and unidentifiable specimens were assigned to size class (large/medium). The English Heritage vertebrate skeleton reference collection (held at Fort Cumberland, Portsmouth) was used for identification purposes in addition to published criteria (see below).

Sheep/goat

The distinction between sheep (*Ovis aries*) and goat (*Capra hircus*) was attempted on the mandibular third and fourth deciduous premolars using the criteria of Payne (1985) and on the permanent dentition when *in situ* using the criteria of Halstead *et al*. (2002). Distinction of the following elements was attempted using a combination of Boessneck (1969) and Prummel and Frisch (1986): horncore, humerus, radius, ulna, metacarpal, tibia, astragalus, calcaneum and metatarsal. Additionally, the criteria of Kratochvil (1969) was used for the distal tibia.

Pig/wild boar

Metrical data for the mandibular teeth and distal humerus were used to distinguish between domestic pig and its progenitor wild boar (*Sus scrofa*) following Payne and Bull (1988).

Equids

Species distinction was attempted on the maxillary and mandibular dentition when *in situ* using the criteria of Davis (1987b, 1980), primarily in the effort to separate horse (*Equus caballus*) from donkey (*E. asinus*).

Red/fallow deer

The distinction between red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) was attempted on all elements using the criteria of Lister (1996).

Lagomorphs

The distinction between hare (*Lepus* sp.) and rabbit (*Oryctolagus cuniculus*) was attempted on all elements using the criteria of Callou (1997).

Domestic fowl

The distinction between chicken (*Gallus gallus*) and the closely related species of Guinea fowl (*Numida meleagris*) and pheasant (*Phasianus colchicus*) was attempted on the following elements using the criteria of Albarella (pers. comm.) and MacDonald (1992): scapula, carpometacarpus, femur and tarsometatarsus.

Recording

Identified or classified (rib and vertebrae) fragments were recorded on a Microsoft Access XP database. Each fragment was given an identification number and the following information was recorded: site code; context number; taxa/taxonomic group; skeletal element; side; presence/absence of bone zone (see below); mandibular tooth eruption and wear; post-cranial epiphyseal proximal and distal fusion; whether foetal/neonatal or juvenile; and articulation with other specimens. In addition, other variables were recorded relating taphonomy and biometry (see below).

Taphonomy

The recovery method, state of surface preservation, presence/absence of root etching, angularity of breaks, gnawing, burning and completeness were all recorded. The type of burning was recorded because it provides a crude measure of temperature and may indicate cooking or disposal method. The type and location of butchery was recorded, the latter using Serjeantson's (1996, 195–200) zones. This will be especially useful when assessing diachronic butchery patterns and in discussions regarding the acculturation of the indigenous population.

Quantification

Three methods of quantification were used to compare the frequencies of the main taxa/taxonomic groups. These methods mirror those used in the earlier reports to make results directly comparable between the hillfort (Grant 1984), DEP (Hamilton 2000a, 2000c, 2000d, 2000e, 2000f; Roncaglia and Grant 2000) and other DERP (Vol. 2 parts 1–5) assemblages.

Number of Identified Fragments

All fragments identified to species were included in the Number of Identified Fragments (NIF) count; 'classified' vertebrae and ribs have been excluded. NIF equates to Number of Identified Specimens/Skeletal Parts (NISP). The fragmentation of specimens was recorded following the zoning system devised by Cohen and Serjeantson (1996, 109–12) and Serjeantson (1996, 195–200); each element has up to eight zones for which the presence (>50%) or absence is recorded.

Epiphyses Only

The Epiphysis Only (EO) method is described in Grant (1975, 379). In summary, it only includes bones with part of an epiphysis or diaphysis (shaft) fusion surface present, plus mandibles with at least one tooth. Whole bones, except phalanges, are counted twice, once for each epiphysis. Skull fragments, carpals, patella, tarsals, third phalange, sacrum, vertebrae and ribs are excluded.

Minimum Number of Individuals

Minimum Number of Individuals (MNI) was calculated for whole phases following the methodology used by Hamilton (2000b, 75, pers. comm.) for the DEP sites. MNI for individual anatomical elements equates to Minimum Number of Elements (MNE). For the long bones, MNI was calculated from the greater number of left or right ends for each element taking into account fusion. Foetal/neonatal and juvenile bones were treated separately and added to produce a total long bone MNI. A range of methods were used to calculate MNI from mandibles (see Table 7); the greater number of Zone 1 (area of symphysis) or Zone 8 (jaw articulation) taking into account side; the number of mandibles with teeth *in situ* taking into account wear stage and side; the number of mandibular deciduous fourth premolars (dP_4) and third molars (M_3), *in situ* or isolated taking into account side. The overall MNI was the highest element MNE.

Skeletal representation for the main species (sheep/goat, cattle, pig, equid and dog) was calculated using the same method as Grant (1984, 498–500). The percentage for each element is calculated relative to the most common element and corrections are made when there are fewer than two particular bones per skeleton; dog metapodials divided by four, equid phalanges divided by two and cattle/sheep/pig phalanges divided by four.

Ageing

Tooth eruption and wear

Tooth wear was recorded for mandibular teeth *in situ* and isolated: dP_4, permanent fourth premolar (P_4), first molar (M_1), second molar (M_2) and M_3. Tooth eruption and wear for cattle and pig were recorded and 'Mandible Wear Stages' (MWS) assigned using Grant (1982). Payne (1973, 1987) was used for recording eruption and wear stage and assigning age for sheep/goat.

The 'maximum' and 'minimum' values provided in the sheep mortality profiles (Fig. 6.60) follow the format used by Hamilton for the DEP reports, Houghton Down (Hamilton 2000a: microfiche 14:B6–7) for instance.

Post-cranial epiphyseal fusion

Epiphyseal fusion stages were recorded and ages assigned using Silver (1969). The fusion stages for mammalian long bones were recorded as 'unfused', 'fusing' and 'fused'. A bone was recorded as 'fusing' when spicules had formed between the shaft and epiphyses with open spaces still present and 'fused' when the line of fusion was closed (Albarella and Davis 1996, 5). Specimens were also classed as 'foetal/neonatal' and 'juvenile' where pertinent to provide greater resolution.

The data in the epiphyseal fusion tables show figures that have been 'minimized' following the method used in the DEP reports, Hamilton (2000a, 75–6) for instance; the greater number of either unfused epiphyses or number of corresponding shaft fusion surfaces taking side into account.

Discrepancies between tooth eruption and wear and the post-cranial epiphyseal fusion data are the result of small datasets and taphonomic factors, including recovery. Immature mandibles

are especially prone to greater levels of post-depositional destruction (Munson 2000; Munson and Garniewicz 2003).

Sexing

An attempt was made to sex the pelvis of the main domesticates using Grigson (1982). Domestic fowl (chicken) was sexed on the tarsometatarsus using the presence of spurs and spur-scars. This is not always a reliable indicator because hens also occasionally develop spurs (see Sadler 1991; West 1985). No attempt was made to sex (and age) the horn cores of cattle and sheep/goat.

Measurements

Measurements were taken following the standards of von den Driesch (1976). The standardized method allows for the measurements to be compatible with animal bone measurements from the hillfort (Grant 1984: microfiche 16:A3–17:E8) and DEP assemblages, Hamilton (2000a: microfiche 14:B1–D11) for instance, in addition to other Iron Age and Romano-British datasets. The extra measurements to distinguish domestic pig and wild boar are described in Payne and Bull (1988). Additional measurements (BatF, 1, 2, 3, 4, 5, 6, a and b) were taken for cattle, sheep/goat and deer using Davis (1992). Skeletally immature specimens were not measured because to do so would introduce a bias into the dataset. The dimensions of a bone when burnt alter so they were excluded also (see Davis 1987a, 26).

Withers heights for dog were calculated using the factors of Harcourt (1974) and von den Driesch and Boessneck (1974), and for equid using May (1985).

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3.2 **Appendix 2: measurements**

Taxa codes

OVA	Sheep (*Ovis aries*)
CAH	Goat (*Capra hircus*)
O	Sheep (*O. aries*)/goat (*C. hircus*)
B	Cattle (*Bos taurus*)
BOP?	Aurochs? (cf. *B. primigenius*)
EQC	Horse (*Equus caballus*)
EQ	Equid (*Equus* sp.)
CAF	Dog (*Canis familiaris*)
CAF?	Dog? (cf. *Canis familiaris*)
VUV?	Ref fox? (cf. *Vules vulpes*)
GAG	Chicken (*Gallus gallus*)
GN	Chicken (*G. gallus*)/Guinea fowl (*Numida meleagris*)
GP	Chicken (*G. gallus*)/pheasant (*Phasianus colchicus*)
GNP	Chicken (*G. gallus*)/Guinea fowl (*N. meleagris*)/pheasant (*P. colchicus*)

Sheep/goat

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	FF F1291/24 (1)	OVA	6133	6.2
EIA	FF F1291/17 (4)	OVA	6315	5.9
EIA	FF F1317 (2)	OVA	6472	5.9
EIA	FF F1329 (1)	OVA	6531	5.5
EIA	FF F1302 (1)	OVA	6608	5.4
EIA	FF F1302 (2)	OVA	6639	6.0
EIA	FF F1340 (1)	OVA	6670	5.7
EIA	FF F1325 (2)	OVA	6892	6.1
EIA	FF F1298/1 (2)	OVA	7192	6.2
na	FF Ph1537 (1)	CAH	7069	6.6
na	FF Ph1561 (1)	OVA	7119	5.8
na	FF Ph1724 (1)	OVA	7127	6.5

FIRST MOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	FF F1291/6 (2)	OVA	5904	7.2
EIA	FF F1291/6 (2)	OVA	5905	6.7
EIA	FF F1291/4 (1)	O	6012	6.8
EIA	FF F1291/4 (1)	OVA	6013	6.6
EIA	FF F1291/8 (1)	OVA	6022	7.0
EIA	FF F1291/8 (4)	OVA	6074	6.8
EIA	FF F1291/21 (1)	OVA	6254	6.9
EIA	FF F1291/22 (2)	OVA	6269	6.6
EIA	FF F1291/17 (1)	OVA	6300	6.5
EIA	FF F1291/17 (4)	OVA	6315	7.2
EIA	FF F1299/2 (1)	OVA	6572	6.6
EIA	FF F1302 (3)	OVA	6645	6.6
EIA	FF F1340 (1)	OVA	6796	6.7
EIA	FF F1340 (1)	CAH	6797	7.5
EIA	FF F1325 (1a)	O	6864	6.9
EIA	FF F1298/1 (2)	OVA	7196	6.7
na	FF Ph1581 (2)	OVA	7032	6.8
na	FF Ph1561 (1)	OVA	7119	6.5
na	FF Ph1724 (1)	OVA	7127	7.2

SECOND MOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	FF F1291/8 (3)	OVA	5846	7.6
EIA	FF F1291 (1)	O	5956	7.6
EIA	FF F1291/5 (3)	OVA	5997	7.8
EIA	FF F1291/4 (1)	O	6012	7.5
EIA	FF F1291/4 (1)	OVA	6013	7.4
EIA	FF F1291/8 (1)	OVA	6022	7.8
EIA	FF F1291/8 (4)	OVA	6074	7.6
EIA	FF F1291/28 (1)	OVA	6190	7.4
EIA	FF F1291/21 (1)	OVA	6254	7.7
EIA	FF F1291/22 (2)	OVA	6269	7.6
EIA	FF F1291/17 (1)	OVA	6300	7.0
EIA	FF F1291/17 (4)	OVA	6315	8.2
EIA	FF F1336 (2)	OVA	6356	7.6

EIA	FF F1302 (3)	OVA	6645	7.0
EIA	FF F1340 (1)	OVA	6796	7.7
EIA	FF F1340 (1)	CAH	6797	7.9
EIA	FF F1325 (1a)	O	6864	7.6
EIA	FF F1298/1 (2)	OVA	7196	7.8
na	FF Ph1581 (2)	OVA	7032	8.0

THIRD MOLAR

Phase	Context number	Taxa	Bone ID	W
EIA	FF F1291/16 (1)	O	5822	7.6
EIA	FF F1291/8 (3)	OVA	5846	7.6
EIA	FF F1291/5 (1)	O	5876	7.9
EIA	FF F1291/6 (2)	O	5906	8.7
EIA	FF F1291/9 (1)	O	5921	7.4
EIA	FF F1291 (1)	O	5956	8.2
EIA	FF F1291/6 (1)	O	5964	8.4
EIA	FF F1283/4 (2)	O	5980	8.3
EIA	FF F1291/7 (3)	O	5995	7.8
EIA	FF F1291/5 (3)	OVA	5997	7.9
EIA	FF F1291/4 (1)	O	6012	8.0
EIA	FF F1291/4 (1)	OVA	6013	7.8
EIA	FF F1291/8 (1)	OVA	6022	7.7
EIA	FF F1291/8 (2)	O	6043	7.3
EIA	FF F1291/8 (4)	OVA	6074	7.6
EIA	FF F1297/2 (1)	O	6090	7.8
EIA	FF F1297/1 (1)	O	6110	7.5
EIA	FF F1291/23 (1)	O	6155	8.0
EIA	FF F1291/19 (1)	O	6167	7.8
EIA	FF F1291/19 (2)	O	6177	7.9
EIA	FF F1291/28 (1)	OVA	6190	8.0
EIA	FF F1291/21 (1)	OVA	6254	8.3
EIA	FF F1291/21 (1)	O	6258	7.2
EIA	FF F1291/21 (1)	O	6259	8.3
EIA	FF F1291/22 (2)	OVA	6269	7.5
EIA	FF F1291/17 (1)	O	6299	8.2
EIA	FF F1291/17 (1)	OVA	6300	7.2
EIA	FF F1297 +	O	6306	7.5
EIA	FF F1350 (3)	O	6321	8.6
EIA	FF F1336 (2)	OVA	6356	8.1
EIA	FF F1317 (2)	O	6473	7.4
EIA	FF F1317 (6)	O	6496	8.5
EIA	FF F1302 (1)	O	6607	7.7
EIA	FF F1302 (3)	OVA	6645	7.7
EIA	FF F1327 (1)	O	6693	7.5
EIA	FF F1312/7 (2)	O	6705	7.4
EIA	FF F1340 (1)	OVA	6796	7.9
EIA	FF F1340 (1)	CAH	6797	8.0
EIA	FF F1325 (1a)	O	6864	7.8
EIA	FF F1311/4 (1)	O	7030	7.4
EIA	FF F1298/1 (3)	O	7159	7.6
EIA	FF F1298/1 (2)	OVA	7196	7.8
na	FF F1335 (2)	O	6444	7.8
na	FF F1301 (1)	O	6624	8.2
na	FF Ph1581 (2)	OVA	7032	8.1

HUMERUS

Phase	Context number	Taxa	Bone ID	BT	HT	HTC
EIA	FF F1291 (2)	O	6049	25.2	15.6	11.9
EIA	FF F1291/20 (2)	OVA	6199	24.1	15.2	11.5
EIA	FF F1291/21 (1)	O	6260	25.1	16.3	11.9
EIA	FF F1350 (3)	OVA	6322	22.6	14.0	10.5

PELVIS

Phase	Context number	Taxa	Bone ID	LA
EIA	FF F1291/16 (1)	O	5824	25.0

TIBIA

Phase	Context number	Taxa	Bone ID	Bd	Dd
EIA	FF F1297/2 (1)	O	6095	23.6	17.7
EIA	FF F1317 (5)	OVA	6398	22.6	16.1

ASTRAGALUS

Phase	Context number	Taxa	Bone ID	GLl	GLm	Dl	Bd
EIA	FF F1291/16 (1)	OVA	5825	23.7	23.3	13.3	15.0
EIA	FF F1304 (1)	O	6560	25.1	24.6	14.3	16.7
EIA	FF F1302 (5)	OVA	6617	24.2		13.0	
EIA	FF F1325 (2)	OVA	6945	24.1	22.7	13.9	15.8

CALCANEUM

Phase	Context number	Taxa	Bone ID	GL	C	C+D
EIA	FF F1325 (2)	OVA	6900	44.7	9.7	16.9

Cattle

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Bone ID	W
EIA	FF F1291/3 (1)	6002	12.3
EIA	FF F1325 (1a)	6860	12.1
na	FF Ph1540 (1)	7075	13.3

FIRST MOLAR

Phase	Context number	Bone ID	W
EIA	FF F1291/10 (3)	5891	13.9
EIA	FF F1291/3 (1)	5968	14.2
EIA	FF F1297/1 (4)	6129	15.4
EIA	FF F1291/19 (1)	6160	14.1
EIA	FF F1312/3 (4)	6992	15.0

SECOND MOLAR

Phase	Context number	Bone ID	W
EIA	FF F1291/10 (3)	5891	15.7
EIA	FF F1291/3 (1)	5968	14.8
EIA	FF F1297/1 (4)	6129	16.4
EIA	FF F1312/3 (4)	6992	16.0

THIRD MOLAR

Phase	Context number	Bone ID	L	W
EIA	FF F1291/12 (1)	5836	35.7	15.4
EIA	FF F1291/11 (1)	5849		14.6
EIA	FF F1291/9 (1)	5913	32.3	14.0
EIA	FF F1291 (1)	5950		14.9
EIA	FF F1291/3 (1)	5968		14.9
EIA	FF F1283/4 (2)	5972	37.4	14.9
EIA	FF F1297/1 (4)	6129	35.2	15.8
EIA	FF F1291/20 (2)	6195		15.1
EIA	FF F1291/18 (1)	6213	35.6	15.4
EIA	FF F1317 (2)	6454	36.3	15.8
EIA	FF F1317 (2)	6455	37.6	15.9
EIA	FF F1340 (2)	6713	34.2	15.1
EIA	FF F1340 (4)	6748	34.9	16.1
EIA	FF F1325/2 (3)	6838	37.7	16.0
EIA	FF F1325 (1)	6912	36.6	15.6
EIA	FF F1312/5 (2)	6958	34.9	15.2
EIA	FF F1312/3 (6)	6980	34.2	16.0
EIA	FF F1312/3 (4)	6992	33.5	15.2
EIA	FF F1312/3 (3)	7017	35.6	14.3
EIA	FF F1298/3 (3)	7163	35.3	15.5

HORNCORE

Phase	Context number	Bone ID	45	46
EIA	FF F1325 (3)	6874	47.3	32.3
EIA	FF F1325 (2)	6929	61.2	40.2

SCAPULA

Phase	Context number	Bone ID	SLC
EIA	FF F1291/3 (1)	6001	43.2
EIA	FF F1291/24 (1)	6130	44.8
EIA	FF F1340 (4)	6742	50.3

HUMERUS

Phase	Context number	Bone ID	BT	HT	HTC
EIA	FF F1291/16 (2)	5806	63.9	38.5	28.5
EIA	FF F1291/14 (1)	5861	71.8	42.5	32.8
EIA	FF F1291/11 (2)	5899	71.0	42.2	30.6
EIA	FF F1297/2 (4)	6138	66.7	37.0	28.0
EIA	FF F1291/30 (1)	6142	64.7	37.7	27.3
EIA	FF F1317 (1)	6423	68.8	40.6	30.3
na	FF F1335 (5)	6371	65.8	37.3	28.4

RADIUS

Phase	Context number	Bone ID	GL	SD	Bp	BFp	Bd	BFd	Comments
EIA	FF F1311/2 (1)	6974					56.2	53.3	
EIA	FF F1311/4 (1)	7027			70.3	64.7			Articulated; ID 7027-8 (UL)

METACARPAL

Phase	Context number	Bone ID	GL	SD	Bp	BatF	Bd	1	2	3	4	5	6	a	b
EIA	FF F1291/20 (1)	6223	164.7	25.5	44.0	43.2	47.1	19.3		23.7	20.2	26.8	23.5	22.0	22.4
EIA	FF F1291/17 (3)	6233	169.7	27.2	53.0	49.0	54.5	23.5	28.6	25.8	21.4	28.4	26.6	26.3	24.9
EIA	FF F1317 (1)	6425			50.4										
na	FF F1335 (5)	6372				48.8	54.0	23.1	29.8	27.7	21.7	28.9	27.9	26.4	25.3

PELVIS

Phase	Context number	Bone ID	LA
EIA	FF F1317 (3)	6541	65.6

TIBIA

Phase	Context number	Bone ID	Bd	Dd
EIA	FF F1291/5 (1)	5868	50.3	37.8
EIA	FF F1291/17 (2)	6289	51.7	37.9
EIA	FF F1299/3 (1)	6634	53.9	41.2

EIA	FF F1340 (1)	6661	54.7	41.7
EIA	FF F1340 (1)	6782	55.8	40.4
na	FF F1335 (2)	6439	53.4	39.5

ASTRAGALUS

Phase	Context number	Bone ID	GLl	GLm	Dl	Bd
EIA	FF F1291/19 (1)	6164	53.1	46.2	30.4	33.2
EIA	FF F1340 (1)	6662	54.9	50.6	31.3	37.3
EIA	FF F1340 (1)	6663	56.9	50.9	31.1	35.7
EIA	FF F1340 (2)	6719	59.1	55.5	33.6	39.4
EIA	FF F1340 (1)	6786	56.8	50.5	32.2	37.3
EIA	FF F1340 (1)	6787	57.2	52.3	31.2	36.8
EIA	FF F1340 (1)	6788	60.0	53.8	32.5	40.5
EIA	FF F1325 (4)	6855	58.9	53.0	32.6	38.6

Pig

FOURTH DECIDUOUS PREMOLAR

Phase	Context number	Bone ID	L	WP
EIA	FF F1291/3 (1)	5969	19.1	8.8
EIA	FF F1340 (1)	6680	18.8	8.0

FIRST MOLAR

Phase	Context number	Bone ID	WA	WP
EIA	FF F1291/20 (2)	6200	9.3	10.4
EIA	FF F1312/7 (2)	6706	9.9	10.3

SECOND MOLAR

Phase	Context number	Bone ID	WA	WP
EIA	FF F1291/23 (1)	6156	13.1	13.3
EIA	FF F1291/20 (2)	6200	13.3	14.4
EIA	FF F1312/7 (2)	6706	13.5	13.3

THIRD MOLAR

Phase	Context number	Bone ID	L	WA	WC
EIA	FF F1291/5 (1)	5885	30.2	13.6	12.9
EIA	FF F1291/23 (1)	6156		15.2	11.6
EIA	FF F1291/19 (1)	6172		14.7	10.1
EIA	FF Ph1711 (3)	7089		15.5	11.4

ASTRAGALUS

Phase	Context number	Bone ID	GLl	GLm
EIA	FF F1291/8 (3)	5848	40.6	37.1
EIA	FF F1325 (1)	6924	37.8	34.6

CALCANEUM

Phase	Context number	Bone ID	GL
EIA	FF F1302 (5)	6621	71.8

Equid

THIRD PREMOLAR

Phase	Context number	Taxa	Bone ID	Wa
EIA	FF F1312/3 (6)	EQC	7015	14.9

FIRST MOLAR

Phase	Context number	Taxa	Bone ID	Wa	Wd
EIA	FF F1312/3 (6)	EQC	7015	13.7	2.5

SCAPULA

Phase	Context number	Taxa	Bone ID	SLC
EIA	FF F1298/3 (5)	EQ	7144	58.5

METACARPAL

Phase	Context number	Taxa	Bone ID	Bp	Dp	Bd	Dd
EIA	FF F1291/21 (2)	EQ	6193	44.8	29.6		
EIA	FF F1291/21 (3)	EQ	6312			44.9	33.2

PELVIS

Phase	Context number	Taxa	Bone ID	LAR	LA
EIA	FF F1304 (1)	EQ	6562	60.7	67.0

ASTRAGALUS

Phase	Context number	Taxa	Bone ID	GH	LmT	GB	BFd
EIA	FF F1312/5 (2)	EQ	6966	55.6	56.4	58.3	48.9

METATARSAL

Phase	Context number	Taxa	Bone ID	Dd
EIA	FF F1340 (1)	EQ	6684	33.7
EIA	FF F1298/3 (2)	EQ	7149	34.4

Dog

PELVIS

Phase	Context number	Bone ID	LA	Comments
EIA	FF F1291/17 (3)	6238	22.4	Articulated; ID 6238-9 (PE); left
EIA	FF F1291/17 (3)	6239	23.0	Articulated; ID 6238-9 (PE); right
EIA	FF F1317 (1)	6435	20.2	

3.3 A**ppendix 3: mandibular tooth eruption and wear**

Taxa codes

OVA	Sheep (*Ovis aries*)
CAH	Goat (*Capra hircus*)
O	Sheep (*O. aries*)/goat (*C. hircus*)

Element codes

dP4	Deciduous fourth premolar
P4	Fourth premolar
M1	First molar
M2	Second molar
M3	Third molar
M12	First OR second molar

Sheep/goat

Phase	Context number	Bone ID	Taxa	dP4	P4	M1	M2	M3	M12
EIA	FF F1291/12 (2)	5829	O						7A
EIA	FF F1291/12 (2)	5830	O						15A
EIA	FF F1291/8 (3)	5846	OVA		14S	14A	9A	11G	
EIA	FF F1291/5 (1)	5876	O					11G	
EIA	FF F1291/11 (3)	5896	O						8A
EIA	FF F1291/11 (2)	5900	O		E				
EIA	FF F1291/6 (2)	5904	OVA		9A	9A			
EIA	FF F1291/6 (2)	5905	OVA		12S	9A			
EIA	FF F1291/6 (2)	5906	O					4C	
EIA	FF F1291/9 (1)	5920	O						9A
EIA	FF F1291/9 (1)	5921	O					11G	
EIA	FF F1291/10 (1)	5930	O		12S				
EIA	FF F1291 (1)	5955	O						12A
EIA	FF F1291 (1)	5956	O		14S	15A	10A	11G	
EIA	FF F1291/6 (1)	5963	O						8A
EIA	FF F1291/6 (1)	5964	O					11G	
EIA	FF F1283/4 (2)	5978	O						7A
EIA	FF F1283/4 (2)	5980	O					6A	
EIA	FF F1291/7 (3)	5995	O					11G	
EIA	FF F1291/5 (3)	5997	OVA				9A	5A	
EIA	FF F1291/4 (1)	6012	O			9A	7A	3C	
EIA	FF F1291/4 (1)	6013	OVA		7A	9A	9A	2A	
EIA	FF F1291/8 (1)	6022	OVA		9A	9A	7A	2A	
EIA	FF F1291/15 (2)	6030	O						9A
EIA	FF F1291/15 (2)	6031	O						2A
EIA	FF F1283/3 (2)	6036	O						9A
EIA	FF F1283/3 (1)	6037	O						9A
EIA	FF F1283/3 (2)	6038	O		15A				
EIA	FF F1291/8 (2)	6043	O					11G	
EIA	FF F1291 (2)	6048	O						9A
EIA	FF F1291/7 (1)	6054	O						9A
EIA	FF F1291/7 (1)	6055	O						9A
EIA	FF F1291 +	6067	O						9A
EIA	FF F1291/8 (4)	6074	OVA		8B	9A	9A	2A	
EIA	FF F1297/2 (1)	6085	O						9A
EIA	FF F1297/2 (1)	6086	O						9A
EIA	FF F1297/2 (1)	6087	O						9A
EIA	FF F1297/2 (1)	6088	O						15A
EIA	FF F1297/2 (1)	6089	O		14S				
EIA	FF F1297/2 (1)	6090	O					11G	
EIA	FF F1297/1 (1)	6108	O						7A
EIA	FF F1297/1 (1)	6109	O						7A
EIA	FF F1297/1 (1)	6110	O					11G	
EIA	FF F1291/22 (1)	6124	O						9A
EIA	FF F1291/24 (1)	6133	OVA	14L					
EIA	FF F1291/24 (1)	6134	O						7A
EIA	FF F1291/24 (1)	6135	O						9A
EIA	FF F1291/30 (1)	6145	O						8A
EIA	FF F1291/23 (1)	6154	O						9A
EIA	FF F1291/23 (1)	6155	O					6A	
EIA	FF F1291/19 (1)	6167	O					11G	
EIA	FF F1291/19 (2)	6177	O					8G	
EIA	FF F1291/28 (1)	6190	OVA		14S	12A	9A	11G	
EIA	FF F1291/21 (1)	6252	O		12S				

EIA	FF F1291/21 (1)	6253	O						12A
EIA	FF F1291/21 (1)	6254	OVA		12S	9A	9A	10H	
EIA	FF F1291/21 (1)	6255	O		9A				
EIA	FF F1291/21 (1)	6256	O						9A
EIA	FF F1291/21 (1)	6257	O						9A
EIA	FF F1291/21 (1)	6258	O					10H	
EIA	FF F1291/21 (1)	6259	O					6A	
EIA	FF F1291/22 (2)	6269	OVA			9A	9A	2A	
EIA	FF F1291/17 (2)	6291	O						7A
EIA	FF F1291/17 (2)	6292	O						9A
EIA	FF F1291/17 (1)	6300	OVA		6A	9A	9A	3C	
EIA	FF F1297 +	6305	O						9A
EIA	FF F1297 +	6306	O					9G	
EIA	FF F1291/23 (2)	6307	O						8A
EIA	FF F1291/21 (3)	6310	O						
EIA	FF F1291/17 (4)	6315	OVA	16L		9A	7A		
EIA	FF F1350 (3)	6320	O						15A
EIA	FF F1350 (3)	6321	O					11G	
EIA	FF F1350 (3)	6340	O		14S				
EIA	FF F1336 (2)	6357	O						9A
EIA	FF F1336 (2)	6358	O						8A
EIA	FF F1317 (2)	6472	OVA	11L					
EIA	FF F1317 (2)	6473	O					6A	
EIA	FF F1317 (6)	6496	O					11G	
EIA	FF F1317 (5a)	6509	O						7A
EIA	FF F1329 (1)	6531	OVA	0					
EIA	FF F1304 (2)	6536	O						2A
EIA	FF F1304 (1)	6554	O						9A
EIA	FF F1308 (1)	6567	O						9A
EIA	FF F1299/2 (1)	6572	OVA		9A	9A			
EIA	FF F1302 (1)	6606	O						9A
EIA	FF F1302 (1)	6607	O					9G	
EIA	FF F1302 (1)	6608	OVA	10N					
EIA	FF F1302 (1)	6609	O						7A
EIA	FF F1302 (2)	6639	OVA	3A					
EIA	FF F1302 (2)	6640	O						9A
EIA	FF F1302 (3)	6645	OVA		6A	9A	8A	5A	
EIA	FF F1302 (3)	6646	O		12S				
EIA	FF F1340 (1)	6670	OVA	16L					
EIA	FF F1340 (1)	6671	O						5A
EIA	FF F1340 (1)	6672	O						9A
EIA	FF F1340 (1)	6673	O						8A
EIA	FF F1340 (1)	6674	O						9A
EIA	FF F1340 (1)	6675	O						2A
EIA	FF F1327 (1)	6692	O						7A
EIA	FF F1327 (1)	6693	O					5A	
EIA	FF F1312/7 (2)	6705	O					10G	
EIA	FF F1340 (1)	6796	OVA		9A	9A	9A	9G	
EIA	FF F1340 (1)	6797	CAH		15A	9A	9A	2A	
EIA	FF F1325/2 (3)	6842	OVA	13L					
EIA	FF F1325 (1a)	6864	O			9A	7A	8G	
EIA	FF F1325 (3)	6878	O						
EIA	FF F1325 (3)	6879	O						0
EIA	FF F1325 (2)	6892	OVA	13L					
EIA	FF F1325 (2)	6893	O						9A
EIA	FF F1325 (1)	6917	O						4A
EIA	FF F1325 (1)	6918	O						9A
EIA	FF F1325 (2)	6937	O						9A
EIA	FF F1325 (2)	6938	O						7A
EIA	FF F1311/2 (1)	6976	O						9A
EIA	FF Ph1756 (2)	7025	O						9A
EIA	FF F1311/4 (1)	7030	O					4A	
EIA	FF Ph1647 (1)	7101	O						9A
EIA	FF Ph1647 (1)	7102	O						2A
EIA	FF F1298/1 (3)	7156	O						9A
EIA	FF F1298/1 (3)	7157	O						6A
EIA	FF F1298/1 (3)	7158	O						9A
EIA	FF F1298/1 (3)	7159	O					11G	
EIA	FF F1298/1 (2)	7192	OVA	14L					
EIA	FF F1298/1 (2)	7193	O						9A
EIA	FF F1298/1 (2)	7194	O						B
EIA	FF F1298/1 (2)	7195	O				9A	11G	
EIA	FF F1298/1 (2)	7196	OVA		8B	9A	9A	7A	
EIA	FF F1298/1 (2)	7197	O						6A
na	FF F1335 (2)	6443	O						B
na	FF F1335 (2)	6444	O					0	
na	FF F1335 (1)	6523	O		15A	15A	11B		
na	FF Ph1581 (2)	7032	OVA			9A	9A	7A	
na	FF Ph1537 (1)	7069	CAH	13L					
na	FF Ph1561 (1)	7119	OVA	13L		5A			
na	FF Ph1724 (1)	7127	OVA	13L		6A			

Cattle

Phase	Context number	Bone ID	dP4	P4	M1	M2	M3	M12
EIA	FF F1291/16 (1)	5813	g					
EIA	FF F1291/16 (1)	5815						k
EIA	FF F1291/16 (1)	5816						k
EIA	FF F1291/12 (1)	5836					g	
EIA	FF F1291/11 (1)	5849					k	
EIA	FF F1291/10 (3)	5891			g	b		
EIA	FF F1291/6 (2)	5903						j
EIA	FF F1291/9 (1)	5913					g	
EIA	FF F1283 (1)	5937						g
EIA	FF F1291 (1)	5949						g
EIA	FF F1291 (1)	5950					f	
EIA	FF F1291/3 (1)	5968		f	l	k	j	
EIA	FF F1283/4 (2)	5972					k	
EIA	FF F1291/3 (1)	6002	j					
EIA	FF F1291/3 (1)	6003						k
EIA	FF F1291/8 (1)	6018						k
EIA	FF F1283/3 (2)	6034						
EIA	FF F1297/1 (4)	6129		g	l	k	j	
EIA	FF F1291/19 (1)	6160		c	k			
EIA	FF F1291/20 (2)	6195					g	
EIA	FF F1291/18 (1)	6213					g	
EIA	FF F1317 (1)	6422						k
EIA	FF F1317 (2)	6452						k
EIA	FF F1317 (2)	6453						h
EIA	FF F1317 (2)	6454					g	
EIA	FF F1317 (2)	6455					g	
EIA	FF F1299/3 (1)	6633						g
EIA	FF F1340 (1)	6653						l
EIA	FF F1340 (1)	6654						g
EIA	FF F1340 (2)	6713		g	m	k	k	
EIA	FF F1340 (2)	6714	h					
EIA	FF F1340 (2)	6715						k
EIA	FF F1313/2 (1)	6731						j
EIA	FF F1340 (4)	6748					j	
EIA	FF F1340 (1)	6764	j					
EIA	FF F1340 (1)	6765						g
EIA	FF F1313/2 (5)	6834						k
EIA	FF F1325/2 (3)	6838					h	
EIA	FF F1325 (1a)	6860	h		a			
EIA	FF F1325 (1)	6912					j	
EIA	FF F1312/5 (2)	6958					g	
EIA	FF F1312/5 (1)	6968						d
EIA	FF F1312/3 (6)	6979						f
EIA	FF F1312/3 (6)	6980					g	
EIA	FF F1312/5 (3)	6984						k
EIA	FF F1312/3 (4)	6992		e	k	k	g	
EIA	FF F1312/3 (3)	7016						k
EIA	FF F1312/3 (3)	7017					g	
EIA	FF F1298/1 (3)	7152						j
EIA	FF F1298/1 (3)	7153					k	
EIA	FF F1298/3 (3)	7163					h	
EIA	FF F1298/1 (2)	7172			E			
EIA	FF F1298/1 (2)	7173		e				
EIA	FF F1298/1 (2)	7174						c
na	FF F1335 (1)	6517		e	l	k	g	
na	FF F1335 (1)	6519						k
na	FF Ph1540 (1)	7075	j					

Pig

Phase	Context number	Bone ID	dP4	P4	M1	M2	M3	M12
EIA	FF F1291/13 (2)	5859						j
EIA	FF F1291/5 (1)	5885		f			d	
EIA	FF F1291/9 (1)	5926						f
EIA	FF F1291/3 (2)	5961						e
EIA	FF F1291/3 (1)	5969	c					
EIA	FF F1283/4 (2)	5986						d
EIA	FF F1291/23 (1)	6156		f		g	f	
EIA	FF F1291/19 (1)	6172					f	
EIA	FF F1291/20 (2)	6200		E	f	d		
EIA	FF F1291/17 (3)	6236						f
EIA	FF F1299/2 (1)	6573						d
EIA	FF F1302 (2)	6641						c
EIA	FF F1340 (1)	6680	d					
EIA	FF F1312/7 (2)	6706		c	e	d	V	
EIA	FF F1340 (1)	6812		b	f			
EIA	FF F1325 (2)	6949					g	
EIA	FF Ph1711 (3)	7089				j	e	
na	FF Ph1788 (1)	7067		f	k			

3.4 **Tabulated data**

Table 1. Numbers of fragments (NIF) for all cases by phase and feature type

Phase/	**EIA**										**EIA**		**ND**	**TOTAL**	
Feature/	Pit		Ditch		Posthole		Quarry		Other		**Total**				
Taxa	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	%	NIF	NIF	%
Cattle	34	*21.9*	242	*25.7*	11	*6.0*	107	*46.5*	6	*9.8*	400	*25.5*	22	422	*24.4*
Cattle/Red deer	1	*0.6*									1	*0.1*		1	*0.1*
Sheep	2	*1.3*	20	*2.1*	8	*4.4*	4	*1.7*	1	*1.6*	35	*2.2*	5	40	*2.3*
Sheep/Goat	89	*57.4*	326	*34.7*	100	*54.9*	61	*26.5*	21	*34.4*	597	*38.1*	47	644	*37.3*
Goat							2	*0.9*			2	*0.1*	1	3	*0.2*
Pig	5	*3.2*	97	*10.3*	36	*19.8*	18	*7.8*	3	*4.9*	159	*10.1*	26	185	*10.7*
Horse			1	*0.1*							1	*0.1*		1	*0.1*
Equid			41	*4.4*	3	*1.6*	14	*6.1*	1	*1.6*	59	*3.8*		59	*3.4*
Dog	2	*1.3*	18	*1.9*							20	*1.3*		20	*1.2*
Dog/Fox			1	*0.1*							1	*0.1*		1	*0.1*
Red deer			3	*0.3*							3	*0.2*		3	*0.2*
Red deer/Fallow deer			1	*0.1*							1	*0.1*		1	*0.1*
Total identified	133		750		158		206		32		1279		101	1380	
Large mammal	9	*5.8*	97	*10.3*	7	*3.8*	13	*5.7*	10	*16.4*	136	*8.7*	22	158	*9.1*
Medium mammal	13	*8.4*	93	*9.9*	17	*9.3*	11	*4.8*	19	*31.1*	153	*9.8*	37	190	*11.0*
Total classified	22		190		24		24		29		289		59	348	
TOTAL	155		940		182		230		61		1568		160	1728	

Table 2. Surface preservation and root etching by phase and feature type

EIA	**Poor**	*%*	**Moderate**	*%*	**Good**	*%*	**Yes**	*%*	**No**	*%*	**Total**
Pit	37	*27.8*	46	*34.6*	50	*37.6*	67	*50.4*	66	*49.6*	133
Ditch	490	*65.3*	237	*31.6*	23	*3.1*	608	*81.1*	142	*18.9*	750
Posthole	53	*33.5*	83	*52.5*	22	*13.9*	99	*62.7*	59	*37.3*	158
Quarry	142	*68.9*	63	*30.6*	1	*0.5*	175	*85.0*	31	*15.0*	206
Other	27	*84.4*	4	*12.5*	1	*3.1*	30	*93.8*	2	*6.3*	32
Total	748	*58.5*	433	*33.9*	98	*7.7*	978	*76.5*	301	*23.5*	1279

Table 3. Butchery marks by phase and taxa, excluding isolated teeth

EIA	Cattle	*%*	Sheep/goat	*%*	Equid	*%*
Chopped	1	*0.4*	2	*0.5*		
Cut	7	*2.5*	1	*0.3*	1	*2.0*
Sawn						
Shave marks						
Split axially	2	*0.7*				
Unbutchered	268	*96.4*	366	*99.2*	48	*98.0*
Total	278		369		49	

Table 4. Burning frequencies by phase, excluding isolated teeth

EIA	Ditch	*%*	Pit	*%*	Posthole	*%*	Quarry	*%*	Other	*%*	ALL	*%*
Singed	7	*1.6*	3	*3.3*	1	*1.0*	2	*1.7*	2	*7.1*	15	*1.9*
Burnt	3	*0.7*	2	*2.2*					4	*14.3*	9	*1.2*
Calcined			1	*1.1*							1	*0.1*
Unmodified	425	*97.7*	86	*93.5*	96	*99.0*	119	*98.3*	22	*78.6*	748	*96.8*
Total	435		92		97		121		28		773	

Table 5. Gnawing frequencies by phase, excluding isolated teeth

EIA	ALL exc.	*%*	ART.	*%*	Inc.	*%*
Canid	78	*10.1*	5	*8.6*	83	*10.0*
Felid						
Rodent	7	*0.9*	2	*3.4*	9	*1.1*
Part digested	1	*0.1*			1	*0.1*
Unmodified	687	*88.9*	51	*87.9*	738	*88.8*
Total	773		58		831	

Table 6. Numbers of identified fragments (NIF), epiphyses only (EPIF) and minimum numbers of individuals (MNI) by major domesticate and phase

EIA	All except articulated						Articulated					All					
	NIF	%	Epiph.	%	MNI	%	NIF	%	Epiph.	%	MNI	NIF	%	Epiph.	%	MNI	%
Cattle	397	*32.6*	125	*46.8*	21	*28.4*	4	*7.1*	3	*16.7*	1	401	*31.5*	128	*44.9*	22	*26.5*
Sheep	603	*49.5*	89	*33.3*	43	*58.1*	31	*55.4*	9	*50.0*	3	634	*49.7*	98	*34.4*	46	*55.4*
Pig	157	*12.9*	29	*10.9*	6	*8.1*	2	*3.6*	2	*11.1*	2	159	*12.5*	31	*10.9*	8	*9.6*
Equid	56	*4.6*	21	*7.9*	2	*2.7*	4	*7.1*	2	*11.1*	2	60	*4.7*	23	*8.1*	4	*4.8*
Dog	6	*0.5*	3	*1.1*	2	*2.7*	15	*26.8*	2	*11.1*	1	21	*1.6*	5	*1.8*	3	*3.6*
Total	1219		267		74		56		18		9	1275		285		83	

Table 7. Minimum Number of Individuals, using different methods

Cattle	**EIA**	
	ALL exc.	ART.
Longbone	8	**1**
Prox/dist mandible	8	
dP4/M3	**21**	
Teeth *in situ*	1	

Sheep	**EIA**	
	ALL exc.	ART.
Longbone	8	**3**
Prox/dist mandible	8	
dP4/M3	**43**	
Teeth *in situ*	5	

Pig	**EIA**	
	ALL exc.	ART.
Longbone	4	
Prox/dist mandible	**6**	1
dP4/M3	**6**	
Teeth *in situ*	**6**	**2**

Equid	**EIA**	
	ALL exc.	ART.
Longbone	**2**	**2**
Prox/dist mandible	1	1
dP4/M3		
Teeth *in situ*	1	

Dog	**EIA**	
	ALL exc.	ART.
Longbone	**2**	**1**
Prox/dist mandible	1	
dP4/M3		
Teeth *in situ*	1	

Table 8. Sheep mandible wear stages following Payne (1973 and 1987)

EIA	Def.	Attrib.	Accum.	*Accum. %*	Range		Range		*Accum. Min. %*	*Accum. Max. %*	Suggested age
A	1		1	*3.0*					*1.8*	*1.8*	0-2 mnths
B			1	*3.0*	BC	2	BCD	1	*1.8*	*7.1*	2-6 mnths
C		2	3	*9.1*					*10.7*	*10.7*	6-12 mnths
D		1	4	*12.1*					*12.5*	*12.5*	1-2 yrs
E	17		21	*63.6*			EFG	7	*42.9*	*55.4*	2-3 yrs
F	8		29	*87.9*			FGH	11	*69.6*	*89.3*	3-4 yrs
G	3		32	*97.0*	GH	2			*94.6*	*98.2*	4-6 yrs
H	1		33	*100.0*					*100.0*	*100.0*	6-8 yrs
I			33	*100.0*					*100.0*	*100.0*	8-10 yrs
Total	30	3				4		19			

Table 9. Sheep epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		
Element/Fusion	U	F	*F%*
6-8 mnths			
Scapula	1	1	*50.0*
10 mnths			
Humerus D	2	8	*80.0*
Radius P	3	5	*62.5*
Total/Average	*5*	*13*	*72.2*
13-16 mnths			
1st phalange		9	*100.0*
2nd phalange		1	*100.0*
Total/Average		*10*	*100.0*
1.5-2 yrs			
Tibia D	4	9	*69.2*
Metapodial D	2	1	*33.3*
Total/Average	*6*	*10*	*62.5*
2.5-3 yrs			
Radius D	2		
Ulna	2		
Femur P	1		
Total/Average	*5*		
3-3.5 yrs			
Humerus P	3		
Femur D	1		
Tibia P	2		
Calcaneum	1	2	*66.7*
Total/Average	*7*	*2*	*22.2*

NB. Metatarsal 20-28 mnths

Table 10. Sheep anatomical representation by phase

Phase/	**EIA**		
Articulation/	ALL exc.		ART.
Element	N	%	N
Horncore	2	*3.8*	
Skull	42	*79.2*	
Mandible	52	*98.1*	
Atlas	3	*5.7*	2
Axis			1
Scapula	5	*9.4*	2
Humerus P	8	*15.1*	3
Humerus D	24	*45.3*	3
Radius P	36	*67.9*	3
Radius D	34	*64.2*	3
Ulna	7	*13.2*	1
Metacarpal P	19	*35.8*	2
Metacarpal D	21	*39.6*	2
Pelvis	8	*15.1*	4
Femur P	5	*9.4*	
Femur D	6	*11.3*	
Patella			
Tibia P	23	*43.4*	1
Tibia D	53	*100.0*	
Astragalus	5	*9.4*	1
Calcaneum	7	*13.2*	1
Navicular cuboid			1
Metatarsal P	19	*35.8*	1
Metatarsal D	30	*56.6*	1
1st phalange	3	*5.7*	1
2nd phalange	1	*1.9*	
3rd phalange			

Table 11. Cattle mandible wear stages following Grant (1982)

EIA	Def.	Attrib.	Range		Range		Suggested age
1-5		1	1-10	1	1-15		
6-10			6-15		6-20		<6 mnths
11-15			11-20		11-25		
16-20			16-25	1	6-25		
21-25			21-30				
26-30			26-35		26-40		2-2.5 yrs
31-35			31-40				2-3 yrs
36-40			36-45	1	36-50	10	
41-45	3		41-50	7	41-55		
46-50	1		46-55				
Total	4	1		10		10	

Table 12. Cattle epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		
Element/Fusion	U	F	*F%*
7-10 mnths			
Scapula		8	*100.0*
12-16 mnths			
Humerus D		7	*100.0*
Radius P		6	*100.0*
1st phalange		17	*100.0*
2nd phalange		5	*100.0*
Total/Average		*35*	*100.0*
2-3 yrs			
Tibia D	1	10	*90.9*
Metapodial D	2	3	*60.0*
Total/Average	*3*	*13*	*81.3*
3.5-4 yrs			
Humerus P	2	4	*66.7*
Radius D	4	4	*50.0*
Ulna		1	*100.0*
Femur P	1	4	*80.0*
Femur D	4	4	*50.0*
Tibia P	3	1	*25.0*
Calcaneum	2		
Total/Average	*16*	*18*	*52.9*

Table 13. Cattle anatomical representation by phase

Phase/	**EIA**		
Articulation/	ALL exc.		ART.
Element	N	*%*	N
Horncore	1	*4.8*	
Skull	14	*66.7*	
Mandible	21	*100.0*	
Atlas	1	*4.8*	
Axis	2	*9.5*	
Scapula	15	*71.4*	
Humerus P	6	*28.6*	
Humerus D	17	*81.0*	
Radius P	8	*38.1*	1
Radius D	7	*33.3*	
Ulna	5	*23.8*	1
Metacarpal P	14	*66.7*	
Metacarpal D	11	*52.4*	
Pelvis	8	*38.1*	
Femur P	7	*33.3*	2
Femur D	12	*57.1*	2
Patella	1	*4.8*	
Tibia P	6	*28.6*	
Tibia D	12	*57.1*	
Astragalus	9	*42.9*	
Calcaneum	19	*90.5*	
Navicular cuboid	2	*9.5*	
Metatarsal P	9	*42.9*	
Metatarsal D	11	*52.4*	
1st phalange	5	*23.8*	
2nd phalange	2	*9.5*	
3rd phalange	1	*4.8*	

Table 14. Pig mandible wear stages following Payne (1973 and 1987)

EIA	Def.	Attrib.	Range	Range		Suggeted age
1-5			1-10			<6 mnths
6-10			6-15			<12 mnths
11-15			11-20	11-35	2(1)	<15 mnths
16-20			16-25			c. 15 mnths
21-25			21-30	21-50	3	<2 yrs
26-30			26-35			
31-35			31-40			>2 yrs
36-40			36-45			
41-45		1	41-50			
46-50		1	46-55			
Total		2			5(1)	

Table 15. Pig epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		
Element/Fusion	U	F	*F%*
1 yr			
Scapula			
Humerus D	1		
Radius P	1	4	*80.0*
2nd phalange		2	*100.0*
Total/Average	*2*	*6*	*75.0*
2-3 yrs			
Tibia D	1	2	*66.7*
Calcaneum	2	1	*33.3*
Metapodial D		1	*100.0*
1st phalange	1	2	*66.7*
Total/Average	*4*	*6*	*60.0*
3.5-4 yrs			
Humerus P			
Radius D			
Ulna			
Femur P	1		
Femur D			
Tibia P			
Total/Average	*1*		

Table 16. Pig anatomical representation by phase

Phase/	**EIA**		
Articulation/	ALL exc.		ART.
Element	N	*%*	N
Skull	11	*91.7*	
Mandible	7	*58.3*	2
Atlas	2	*16.7*	
Axis			
Scapula	12	*100.0*	
Humerus P	3	*25.0*	
Humerus D	5	*41.7*	
Radius P	6	*50.0*	
Radius D	4	*33.3*	
Ulna	6	*50.0*	
Metacarpal P	1	*8.3*	
Metacarpal D	1	*8.3*	
Pelvis	3	*25.0*	
Femur P	1	*8.3*	
Femur D	4	*33.3*	
Patella			
Tibia P	7	*58.3*	
Tibia D	6	*50.0*	
Astragalus	2	*16.7*	
Calcaneum	3	*25.0*	
Navicular cuboid			
Metatarsal P			
Metatarsal D			
1st phalange	1	*8.3*	
2nd phalange	1	*8.3*	
3rd phalange	1	*8.3*	

Table 17. Equid epiphysial fusion data following Silver (1969), excluding articulated specimens

Phase	**EIA**		
Element/Fusion	U	F	*F%*
1 yr			
Scapula		2	*100.0*
1st phalange		3	*100.0*
2nd phalange		2	*100.0*
Total/Average		*7*	*100.0*
15-18 mnths			
Humerus D		2	*100.0*
Radius P			
Metapodial D		4	*100.0*
Total/Average		*6*	*100.0*
20-24 mnths			
Tibia D		2	*100.0*
3-3.5 yrs			
Humerus P			
Radius D			
Ulna			
Femur P			
Femur D			
Tibia P			
Calcaneum			
Total/Average			

NB. Scapula 12 mnths; Metatarsal 16-20 mnths; 1st phalange 13-15 mnths; 2nd phalange 9 mnths

Table 18. Equid anatomical representation by phase

Phase/	**EIA**	
Articulation/	ALL exc.	ART.
Element	N	N
Skull	2	
Mandible	1	2
Atlas	1	
Axis	1	
Scapula	5	
Humerus P	1	
Humerus D	2	
Radius P		
Radius D		
Ulna		
Metacarpal P	1	
Metacarpal D	1	
Pelvis	2	2
Femur P		
Femur D		
Patella		
Tibia P		
Tibia D	2	
Astragalus	1	
Calcaneum		
Navicular cuboid	2	
Metatarsal P	3	
Metatarsal D	2	
1st phalange	2	
2nd phalange	1	
3rd phalange		

Table 19. Dog anatomical representation by phase

Phase/	**EIA**	
Articulation/	ALL exc.	ART.
Element	N	N
Skull	1	
Mandible	2	
Atlas		
Axis		
Scapula		
Humerus P		
Humerus D		
Radius P		
Radius D		
Ulna		
Metacarpal P		
Metacarpal D		
Pelvis	2	2
Femur P		
Femur D		
Patella		
Tibia P	1	
Tibia D		
Astragalus		
Calcaneum		
Navicular cuboid		
Metatarsal P		
Metatarsal D		
1st phalange		
2nd phalange		
3rd phalange		

3.5 **Small mammals** by Jim Williams

Table 1. Small mammal species from Flint Farm

SITE	FFO4	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04
CONTEXT	F1291/7 (3)	F1317 (3)	F1301 (1)	PH1487 (2)	PH1491 (3)	F1291/30 (2)	F1317 (5a)	F1297/2 (1b)	F1291/30 (1)	F1338/1 (2)	F1303 (3)	F1317/ (5)	PH1787 (1)	F1283 (1)	F1312/3 (3)	F1325/2 (4)	F1317 (5a)	F1317 (5a)	F1325 (3)	PH1711 (1)	PH1711 (1)
SAMPLE		4331	4357	4309	4318	4348	4332	4358	4347	4307	4592	4333	4591	4330	4299	4362	4332	4332	4325	4349	4349
SPECIES	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	3	3	20	3
No. of bones	1	8	7	2	2	9	4	3	1	3	2	1	1	2	1	4	23	7	2	12	1
Right mandible			1															1	1		
R M_1																		1			
R M_2																		1			
R M_3																		1			
Left mandible																					
L M_1																					
L M_2																					
L M_3																					
Man. Incisors		1	1		1	1												1	1		
Right maxilla																					
R M^1																					1
R M^2																					
R M^3																					
Left maxilla																		1			
L M^1																		1			
L M^2																					
L M^3																					
Max. incisors					1									1		1				1	
Scapula		1					1														

SITE	FFO4	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04	FF04
CONTEXT	F1291/7 (3)	F1317 (3)	F1301 (1)	PH1487 (2)	PH1491 (3)	F1291/30 (2)	F1317 (5a)	F1297/2 (1b)	F1291/30 (1)	F1338/1 (2)	F1303 (3)	F1317/ (5)	PH1787 (1)	F1283 (1)	F1312/3 (3)	F1325/2 (4)	F1317 (5a)	F1317 (5a)	F1325 (3)	PH1711 (1)	PH1711 (1)
SAMPLE		4331	4357	4309	4318	4348	4332	4358	4347	4307	4592	4333	4591	4330	4299	4362	4332	4332	4325	4349	4349
SPECIES	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	3	3	20	3
Ulna			1			2									1		1				
Radius																	2				
Humerus		1										1				1					
Pelvis											1										
Femur	1		1				1			1			1	1						2	
Tibia			1			2	2		1												
Fibula																					
Other small bones		5	2	2		4		3		2	1					2	20			9	

Species code: 20 = indet. Rodentia; 3 = house mouse

3.6 **Assessment of amphibian bones** by Chris Gleed-Owen

Introduction

Locations in the vicinity of Danebury Hillfort, Hampshire, were excavated as part of the Danebury Environs Roman Project between 1994 and 2004, led by Barry Cunliffe (Institute of Archaeology, University of Oxford). The excavations are reported elsewhere (Vol. 2 *passim*). This assessment was carried out in order to evaluate the significance of amphibian remains from the Danebury sites. A series of bags of sorted amphibian bones were selected and provided (by Andy Hammon, English Heritage Centre for Archaeology), mostly from the 2002 excavations at Thruxton Villa and 2003 excavations at Rowbury Farm. It is unusual for amphibian or reptile remains from archaeological excavations to be investigated in any detail, but herpetofauna can be used as palaeoenvironmental indicators (Gleed-Owen 1998, 1999), and even for historical and conservation purposes (Beebee *et al.* 2005; Gleed-Owen 2000). They potentially also have archaeological significance as a human food resource (Bailon 1999), although this has not unequivocably been demonstrated in Britain (Gleed-Owen 2006).

Aim

This assessment aimed to examine sorted amphibian bones from a range of samples, to identify the taxa represented and count the number of identifiable specimens (NISP) and minimum number of individuals (MNI). Agents of accumulation would be considered (predator, pitfall, natural death in hibernation, etc.) and any signs of digestion (as opposed to weathering) would be noted. Comparison between phases and deposits, e.g. relative abundance, modes of accumulation, were not attempted. Sex, age and demography of the assemblages could be usefully considered in the context of accumulation mechanisms and season.

Methodology

Bulk sample sieving and flotation produced the 80 bags of sorted amphibian bones upon which this study was based. These comprised 56 bags from Rowbury Farm (RF03), 20 bags from Thruxton Villa (TH02), two bags from Flint Farm (FF04), and one bag each from Grateley South (GR99) and Houghton Down (HD97). It was assumed that the sorting had been accurate, and that the bags contained all or nearly all the amphibian remains from the samples. No reptile remains were seen and it is assumed that none were recovered. The remains were identified using a binocular microscope at x6-x40 magnification, and separated according to taxon to the highest level possible. Remains from each sample were sub-bagged according to taxon. Specific identification is normally possible for most toad skeletal elements, even in poor condition. It is possible for some frog elements, but many frog elements can only reliably be identified to genus *(Rana*). For newts (and reptiles), vertebrae are the most useful for specific identification, although cranial elements can be identified to species. Even where species cannot be identified, it is normally possible to identify the genus, and almost certainly the family. Some of the flots samples studied here had an unusually high incidence of certain newt cranial elements that was evidently due to their containing trapped air. Whilst this might be fortuitous, it highlights the loss of most other newt bones through the wet sieving programme (i.e. they do not appear in any of the residue sorts).

Results

Table 1 (at the end of this report) summarizes the results for each sample and fraction, showing MNI and NISP for each taxon. Of the 80 samples seen, 78 contained amphibian remains (only those from Grateley South and Houghton Down did not). The abundance and condition of remains varies greatly. Table 1 gives MNI and NISP values for each sample, and describes the patterns of predatory and non-predatory damage seen. Taxonomic identification is generally possible to generic level, even with poorly preserved frog and toad remains, and this assemblage is fairly typical in this respect.

Figure 1 (at the end of this report) shows that, as might be expected, MNI is roughly proportional to NISP whatever the taxonomic level. For example, three male common toad right humeri give the same MNI as three indeterminate frog/toad urostyles. Some bones are more readily useful for MNI counts, such as paired elements that are easy to side (e.g. humeri), and readily recognizable axial elements (e.g. sacra). Femora and tibiofibulae are not easy to side when incomplete, and I have typically divided totals by two.

Column 'Pred?' shows the occurrence of observed predatory damage of four types: breakage, crunching, digestive corrosion, toothmarks. These forms of damage may be seen singly or in combination, and can be very variable in their frequency (I have observed them previously in archaeological material at frequencies ranging from nil to virtually 100 per cent of bones). The column 'Sex' shows which sexes were identifiable in each sample. It is possible to sex frogs and toads using the humerus which bears posterolateral crests in males associated with breeding amplexus. Male frogs and toads also have a distinctive metacarpal. The column 'Age' shows the lifestages present.

Discussion

Although amphibian remains appear to be moderately abundant within many of the samples seen, the herpetofaunal assemblage it represents is quite impoverished. Only two species (common frog and common toad) are found in the majority of samples; a third species (smooth newt) is only found in two samples. All sexable bones were noted: nine samples had both male and female bones, six had only male bones, and 14 had only female bones. This demonstrates a general bias towards females across the samples seen. Moreover, an unusually high proportion of female frogs and toads was visible in two samples, at a ratio of 5:1. This is an unusually skewed ratio (populations are normally fairly evenly balanced, or 2:1 at most), and may suggest selective factors biasing predation towards females, or may be related to different behaviours in the frogs/toads (e.g. male frogs hibernate at the bottom of ponds, females on land).

Across the samples seen, most remains were from adults or subadults. Some samples contained juveniles and/or metamorphs, suggesting summer/autumn death, but there are relatively few juvenile remains here compared to other sites where I have recorded large numbers of juveniles (Gleed-Owen 2003, 2006). Large accumulations of juvenile frogs and toads usually imply pitfall scenarios. The preponderance of adults and subadults seen here is consistent with other accumulative mechanisms such as predation.

The preponderance of common toad and common frog and the paucity of other herpetofaunal remains is not unusual, but rather frustrating. These are the most catholic amphibian species in Britain, and their presence here alongside smooth newt (the most catholic newt) provides limited environmental information. The presence of common toad in significant volume

implies a scrubby or deciduous wooded environment, typically more closed vegetation cover than the common frog prefers. Common toads require a still water-body in which to breed (usually within a few hundred metres but potentially several kilometres away); breeding ponds are usually clear, deep and relatively larger and deeper than ponds used by frogs. However, the common toad is a fairly ubiquitous species, and may inhabit a range of environments. The common frog is fairly catholic but more of an open country species, typically suggesting open grass and herb cover, rather than blanket woodland. It may breed in any permanent or ephemeral water-body, often small and shallow, such as a ditch or pit.

Whilst this impoverished fauna lacks elements with narrow tolerances that could build a more specific environmental picture, it doesn't mean that other amphibian and reptile species weren't present nearby. Taphonomic factors, such as the predator species responsible for accumulating microfaunal remains, can bias an assemblage. Various mustelids, insectivores, canids, felids, raptors, corvids, ardeids may predate frogs, toads, newts, lizards and snakes, and even passerines may feed on larval and juvenile lifestages. Reptiles are active during the daytime, rarely above ground at night, and therefore only available to diurnal predators. Hence, the absence of reptiles from an assemblage may reflect the absence of diurnal predators as accumulators, rather than the absence of reptiles locally. Amphibians are active in the daytime, too, particularly during the breeding season, but they are most active at night. Nocturnal (and crepuscular) predators such as owls will obviously be able to take amphibians readily at night, but will rarely come into contact with reptiles.

The behaviour of the amphibian species themselves can also account for patterns of accumulation in archaeological features. One post-hole at Puggetoften, Scania, Sweden (Gleed-Owen 2003) contained the remains of over 900 froglets, almost certainly pitfall victims in their summer/autumn diaspora.

Amphibians are most active in the spring breeding season; in modern times this is from January to March for frogs and March to May for common toads. This is the most likely time that predators find them in large numbers. Frogs do not have such an *en masse* peak migration as toads do. Toads embark on mass migrations during damp/wet nights in spring, heading for traditional breeding ponds. This is the most likely time that so many adult toads would have been predated. Toad skin is also very distasteful to many animals, and some may skin them before eating them. Scatterings of mutilated toads are sometimes found near breeding sites, although there is no agreement whether this is carried out by corvids, otters or other mustelids. It is quite possible that nocturnal raptors or mustelids predated the majority of the amphibians during breeding migrations.

As there is definite evidence of digestion and other predatory damage in many of the amphibian remains, it implies accumulation by diurnal predator(s) such as the kestrel and small mustelids such as weasels. Breakage consistent with predation was noted in at least five samples. Damage due to crunching was observed in at least 18 samples (with a high degree noted in six of them). Crunching that obviously occurred at death is recognizable as crushing and contortion of bone whilst it was still pliable, which has then hardened post-mortem. Digestive corrosion was also seen in at least 18 samples, and follows typical patterns of thinned ends and exposed cancellous bone on articular surfaces. Toothmarks were seen in at least nine samples (probably more), and were prevalent in three samples. Small toothmarks can be inflicted by snakes, but in this case are consistent with small mustelids such as weasels, or possibly insectivores such as hedgehogs. Little experimental research has been carried out to satisfactorily characterize the effects of British predator species on herpetofauna remains.

Acknowledgements

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Site name	Site code	Tr.	Context	Samp	Box	Cut	Notes	Pred?	Sex	Age	Tv NISP	Tv MNI	Tv/h NISP	Tv/h MNI	Bb NISP	Bb MNI	Bsp NISP	Bsp MNI	Rt NISP	Rt MNI	Rsp NISP	Rsp MNI	Anu NISP	Anu MNI
Flint Farm	FF04		F1340	6			No obvious digestion; covered in marly deposit. Bb/Bsp - adult, subadult. Rt/Rsp - subadult.			I					3	1	2	1	1	1	1	1	2	2
Flint Farm	FF04		F1340	6			Broken bits of tibiofibula (small).														4	1		
Grately South	GR99		F812	7 "Hand coll"			(No herpetofauna - only mammal innominate).																	
Houghton Down	HD97		F609	1			(No herpetofauna - only mammal/bird, digested).																	
Rowbury Farm	RFO3	1	F1197/8	1	19		Adult. Very worn (PM?), possibly root damage.			A					4	1								
Rowbury Farm	RF03	1	P405	4F		4206	Adult female, good condition, no digestion.		F	A					1	1								
Rowbury Farm	RFO3	1	P405	6A	1		Some moderate damage, but no apparent digestion. Both sexes present.		MF						16	2	3	1					2	1
Rowbury Farm	RFO3	1	P405	6A		4207	Bb - 1yr (crunched?) and <1yr old (1st autumn).	?C									2	1						
Rowbury Farm	RFO3	1	P405	6C			Rsp - 1 femur and tribiofibula with possible predation crunching of ends, tibiale with possible toothhole.	C?T											1	1	7	2		
Rowbury Farm	RF03	1	P406	5F		4200	Subadult, very broken/worn ends, probably digested.	BD		I											1	1		
Rowbury Farm	RF03	1	P407	3F		4201	Subadult,broken, possibly digested.	BD		I											1	1		
Rowbury Farm	RFO3	?	P408	1		4229	Young adult.			A					2	1								
Rowbury Farm	RFO3	?	P408	12	2		All bones with dusty/marly sediment coating. No obvious predation, just usual PM wear/damage. Rt/Rsp - most are 1yr old or less (8/13 ilia, 10/15 femora, 23/27 tibiofibulae), others are adult, includes both sexes. Bb - c.40% adult, 40% subadult (1-2yrs), 20% juvs (metamorphs). Some Bb long bones from recent metamorph (mid to late summer). Bb humeri include both sexes (9 female:1 male).		MF	AIJ					111	8			13	8	51	14	31	13
Rowbury Farm	RFO3	1	P408	16		4236	Bb - adult/subadult. Rt is male humerus. Rsp includes a few definitely crunched bones, MNI from size differences, all juvs <1yr or metamorhps (early-mid summer).	C	M	AIJ							4	1	1	1	16	7	5	1

Site name	Site code	Tr.	Context	Samp	Box	Cut	Notes	Pred?	Sex	Age	Tv NISP	Tv MNI	Tv/h NISP	Tv/h MNI	Bb NISP	Bb MNI	Bsp NISP	Bsp MNI	Rt NISP	Rt MNI	Rsp NISP	Rsp MNI	Anu NISP	Anu MNI
Rowbury Farm	RF03	1	P408	16		4233	Most in perfect condition (occasional crunching and some digestion observable in the mammal bones, e.g. rodent mandible). Bb - c.1yr old. Bsp - immature to adult. Rsp - metamorphs and juveniles to c.1yr old. Anu - metamorphs, juveniles and immatures (mostly phalanges/metapodials). Tv - 30L and 26R prootic-exoccipitals, 7 trunk vertebrae, 11 caudal vertebrae, all efts/juveniles. Tsp (Tv/h) - 5L and 4R ischia, and various long bones, all efts/juvs/immatures. Prootic-exoccipitals obviously float very well, hence bias towards their recovery in flots. Only tin (juvenile) vertebrae; adult vertebrae would presumably be recovered in the sieve residues.	CD		AIJ	74	3	2	5	1	1	26	2			33	2	85	3
Rowbury Farm	RF03	1	P408	16F		4236	Most in perfect condition (no sign of predation). Bb - juvenile femora, <1yr old (autumn). Bsp - c.1yr old, subadult and adult. Rsp - all metamorphs (died in summer) or juveniles <1yr old (died in autumn), with 3 size classes of coracoid giving MNI. Anu - 10 bones from metamorphs (early to mid-summer), others are juveniles and subadults (probably Rt). Tv - 7L and 10 R prootic-exoccipitals (all juv/imm), 8 trunk vertebrae and 1 caudal vertebra (all efts/juvs). Tsp (Tv/h) - various elements, all juv/imm (MNI from humeri).			AIJ	26	1	16	3	2	1	6	2			28	3	29	1
Rowbury Farm	RFO3	1	P408 "Special deposit"	16	2		All good condition, no predation, just worn PM. Bb - all ad females (humeri), except subad L and R ilia and 2 femora (same individual?), MNI from ilia sizes. Rsp - 1 L ilium, 2 tibiofibulae and 1 femur are c.1yr old, others are ad/subad (some c.2yrs, others older). Rt/Rsp humeri = 5 female:1 male.		MF	AI					4	4	1	1	7	4	48	7	7	5
Rowbury Farm	RF03	1	P410	2F		4197	Digested, subadult.	D		I											1	1		
Rowbury Farm	RFO3	1	P411	2	4		Slight damage, not predation. Bb is female.		F						1	1					1	1		
Rowbury Farm	RFO3	1	P411	3	6		Rt - 2 tibiofibulae with severe puncture/digestion, both sexes present. Bb - all ad/subad, R ilium with severe punctures, lots bones badly damaged ends (not sure if digested), both sexes present. Bsp - 1 tibiofibula subadult, others adult.	DT	MF	AI					47	7	13	2	11	6	41	8	15	9
Rowbury Farm	RFO3	1	P411	3	5		Bb adults (different sizes), includes both sexes (5 females:1 male) some excellent condition, some v. worn, possibly rootmarks, lots of etching. Rt/Rsp - ad/subad (c.3yrs), includes male. Anu - 1 urostyle with severe etching (rootmarks?).		MF	AI					43	5			4	2	3	2	13	5

Site name	Site code	Tr.	Context	Samp	Box	Cut	Notes	Pred?	Sex	Age	Tv NISP	Tv MNI	Tv/h NISP	Tv/h MNI	Bb NISP	Bb MNI	Bsp NISP	Bsp MNI	Rt NISP	Rt MNI	Rsp NISP	Rsp MNI	Anu NISP	Anu MNI
Rowbury Farm	RFO3	1	P411	1 (1st bag)	4		Bb - quite a few with flaking damage, including various probable toothholes. Bsp - 1 subad femur, others adult. Bb and Rsp include females.	?T	F	AI					2	3	6	1			4	1	3	1
Rowbury Farm	RFO3	1	P411	1 (2nd bag)	4		All adult. Quite a few in poor condition, seems to be PM though. Bb includes both sexes.		MF	A					21	3	2	1			5	1	2	1
Rowbury Farm	RF03	1	P411	2F		4230	Bb/Bsp - some breakage and possible toothmarks, but no unequivocal digestion/predation (MNI of 3 ad/subad, 1 juv post-metamorph but <1yr old, late summer/autumn). Rt - no digestion. Rsp - end breakage/digestion.	?B?T		AIJ					14	4	18	2	1	1	2	1		
Rowbury Farm	RF03	1	P412	1F		4202	Very fragmentary, adult and subadult, lots of toothmarks.	TT		AI							19	3						
Rowbury Farm	RFO3	?	P413	3		4224	Rsp is 1yr or less, Bb is metamorph (<1yr, mid-late summer). Ends of both worn thin, possibly digested but can't confirm.	?D		IJ					1	1					1	1	2	1
Rowbury Farm	RFO3	?	P413	6		4226	c.1yr old or less.			I											1	1		
Rowbury Farm	RFO3	1	P414	4		4212	Bb is juv, 1yr maximum.			J					2	1							1	1
Rowbury Farm	RFO3	1	P414	6		4214	Young adult.			A											2	1	1	1
Rowbury Farm	RFO3	1	P414	6		4214	Subadult (c.2yr old).			I									4	1				
Rowbury Farm	RFO3	1	P414	7	7		Adult, v. good condition.			A					1	1								
Rowbury Farm	RFO3	1	P414	8	7		Adult, not damaged.			A					1	1								
Rowbury Farm	RFO3	1	P415	2	7		Adult, includes female.		F	A					3	1								
Rowbury Farm	RFO3	1	P415	3	7		Adult.			A					2	1								
Rowbury Farm	RFO3	1	P415	4	7		Partial skeleton of 1 adult female, in good condition. Small feature, sealed context?		F	A					11	1								
Rowbury Farm	RFO3	1	P419	3	7		All adults. No obvious predation. Bb remains represent 2 partial skeletons (male and female).		MF	A					29	2	6	2			2	1	3	1
Rowbury Farm	RFO3	1	P419	3	7		Adult.			A					1	1								
Rowbury Farm	RFO3	?	P419	4		4220	Adult.			A							1	1						
Rowbury Farm	RFO3	1	P419	4	7		Subadult.			I					1	1								
Rowbury Farm	RFO3	?	P419	6		4222	Bb/Bsp - no apparent digestion/predation; 5 ilia = 3 x <1yr olds, 1 x c.1yr old, 1 adult; includes both sexes (3 females:2 male). Rsp - c.1yr old or less, digested. Anu - metamorph.		MF	AIJ					2	5	7	1			1	1	4	2
Rowbury Farm	RFO3	1	P419	6	8		Mostly v. good condition, no pattern of damage. Both sexes present. MNI from size diffs in tibiofibulae and femora.		MF	AI					27	5	2	1						

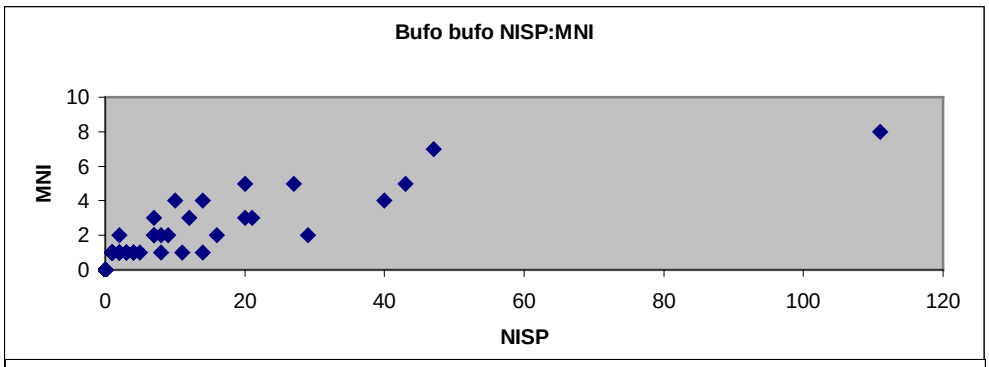
Site name	Site code	Tr.	Context	Samp	Box	Cut	Notes	Pred?	Sex	Age	Tv NISP	Tv MNI	Tv/h NISP	Tv/h MNI	Bb NISP	Bb MNI	Bsp NISP	Bsp MNI	Rt NISP	Rt MNI	Rsp NISP	Rsp MNI	Anu NISP	Anu MNI
Rowbury Farm	RF03	1	P419	5F		4221	(Mammal).																	
Rowbury Farm	RFO3	1	P421	4	8		Adult. Clearly predated, ends very crunched, obviously contemporary with death, poss teethmarks too. (Worth photo)	C?T		A					1	1								
Rowbury Farm	RFO3	1	P421	5	8		Partial skeleton of subadult female (c.2-3yr old). No signs of predation, all fairly complete, good condition.		F	I									2	1	19	1		
Rowbury Farm	RFO3	1	P422	3	8		Adults. Bit of damage but not clear cause. Possible tooth graze on Bb tibiofibula. Rsp MNI from slight size diffs in tibiofibulae. Bb includes females, Rt includes male.	?T	M	A					4	1			2	1	4	1		
Rowbury Farm	RFO3	1	P425	4	9		Damaged. PM?														1	1		
Rowbury Farm	RFO3	1	P425	7		4249	Rsp tibiofibulae crunched (predated). Half Rsp ad/subad, half less than 1yr old.	C		AIJ							1	1			7	4	3	1
Rowbury Farm	RFO3	1	P425	7	9		Fairly complete skeleton of 1 adult female.		F	A					14	1	15	1						
Rowbury Farm	RFO3	1	P425	7	9		Adult. Ends worn PM.			A					1	1								
Rowbury Farm	RFO3	1	P425	9		4252	c.1yr old or less.			I									1	1				
Rowbury Farm	RFO3	1	P428	3	9		Adults. MNI from humeri, both adult males.		M	A					7	2								
Rowbury Farm	RFO3	1	P434	13	10		Bb adult. Rt - all 3 probably young male (2-3yrs), 1 ilium crunched mid-shaft at death.	C	M	AI					1	1			3	2	1	1		
Rowbury Farm	RFO3	1	P436	3	10		Adult. Bit worn (PM?).			A					1	1								
Rowbury Farm	RFO3	2	P438	9	22		Partial skeleton of 1 adult female. Dirty but good condition.		F	A					8	1	1	1						
Rowbury Farm	RFO3	2	P442	10	25		Adult, includes female. MNI from femora but also different radioulnae sizes.		F	A					7	2	2	1						
Rowbury Farm	RFO3	2	P442	11		4296	Rt includes male. Rsp - subad c.2yrs, some broken into pieces, prob predation crunching.	?B?C	M	I					1	1	2	1	3	1	17	2	22	1
Rowbury Farm	RFO3	2	P442 "Skulls special deposit B"		23		Adult. Very worn PM.			A					2	1							1	1
Rowbury Farm	RFO3	2	P442 "Special deposit A"	4	23		Partial skeleton of 1 adult female. All very worn PM.		F	A					5	1	4	1						
Rowbury Farm	RFO3	2	P442 "Special deposit C"	10C			Partial skeleton of 1 adult female. Quite smooth.		F	A					4	1								
Rowbury Farm	RFO3	2	P442 "Special deposit D"	10C			Adult. End broken (recent PM) into fragments.			A					1	1								
Thruxton Villa	TH02		729				Subadult; pathological; worn, broken, poor condition.			I											1	1		

Site name	Site code	Tr.	Context	Samp	Box	Cut	Notes	Pred?	Sex	Age	Tv NISP	Tv MNI	Tv/h NISP	Tv/h MNI	Bb NISP	Bb MNI	Bsp NISP	Bsp MNI	Rt NISP	Rt MNI	Rsp NISP	Rsp MNI	Anu NISP	Anu MNI
Thruxton Villa	TH02		743				All adults. Bb - lots toothmarks. Bsp - toothmarks, crunched. Rsp - broken, digested.	CDTT		A					1	1	1	1			1	1		
Thruxton Villa	TH02		755				Bb - adult; intact. Bsp - adult; crunched, broken. Rsp - adult, subadult; worn, broken, digested.	BCD		AI					1	1	1	1			6	2		
Thruxton Villa	TH02		"?"				All very poor condition, lots of crunching, breakage, possible digestive corrosion. Lots of anuran fragments are continuing to break in bag. Bb - 2 males. Rt - 2 males.	BCC?D	MF	AI					9	2	25	3	2	2	6	1	26	1
Thruxton Villa	TH02		F1064	1			All adults and subadults; lots of crunching in particular, but also toothmarks, digestion. Possibly more anuran fragments in 'non-herp' bag (difficult to separate/identify due to poor condition). Rt - 1 male.	CCDT	M	AI					8	2	7	2	5	3	12	3	5	2
Thruxton Villa	TH02		F1066/2	1			Some digestion, worn, broken, crunching. Bb - predatory crunching, toothmarks, breakage, digestion. Bb/Bsp - adult. Rsp - adult, subadult.	BCDT		AI					3	1	3	1			4	2		
Thruxton Villa	TH02		F1066/3	1			Bb - adult female; badly corroded, possible toothmarks. Rsp - adult, subadult; toothmarks, crunching.	D?T	F	AI					1	1					7	3		
Thruxton Villa	TH02		F1066/3	1		4069	Adults, subadults. Lots crunched, with toothmarks.	CT		AI									3	3	8	3		
Thruxton Villa	TH02		F1066/4	1			Crunching, digestion, toothmarks. Bsp - ilial ala very crunched (Worth photo).	CCDT							1	1	1	1	1	1	5	2	9	1
Thruxton Villa	TH02		F1078	1			Rt/Rsp - some toothmarks, crunching, some end digestion; adults, subadults. Bb/Bsp - lots crunching, breakage; adults, subadults.	CCDT		AI					7	3	5	1	6	3	19	5	3	1
Thruxton Villa	TH02		F1112	5			All good condition, no sign of predation. Bb - large adult. Rsp - young adult.			A					3	1					3	2		
Thruxton Villa	TH02		F1112	6			All very good condition, no sign of digestion. Bb - adult, large adult.			A					12	3	5	3	3	2	18	5		
Thruxton Villa	TH02		F1112	8		4071	Bb/Bsp - adult, good condition. Rsp - 3 adult bones, 8 subadult (1-2yrs); some definite digestion, but most in good intact condition. Bb - 1 female.	D	F	AI					2	1	3	2			11	3		
Thruxton Villa	TH02		F1112	8			Virtually intact, no crunching/digestion								1	1								
Thruxton Villa	TH02		F1112	9		4073	Pathogenically fused adult sacrum and urostyle; left transverse process crooked and directed posteriorly.								1	1								

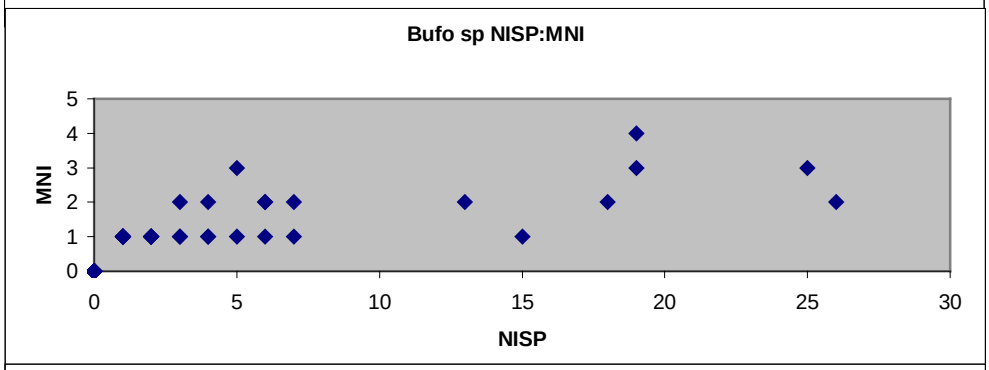
Site name	Site code	Tr.	Context	Samp	Box	Cut	Notes	Pred?	Sex	Age	Tv NISP	Tv MNI	Tv/h NISP	Tv/h MNI	Bb NISP	Bb MNI	Bsp NISP	Bsp MNI	Rt NISP	Rt MNI	Rsp NISP	Rsp MNI	Anu NISP	Anu MNI
Thruxton Villa	TH02		F1124	2			Lots of crunching and toothmarks, some digestion; poor condition. Tiny anuran fragments.	CCDTT							1	4	19	4	1	1	2	1	15	1
Thruxton Villa	TH02		F1125	1			Bb - adult female, possible predation breakage/toothmarks.	?B?T	F	A					1	1								
Thruxton Villa	TH02		F1125	2			Definite crunching & digestion. Rt/Rsp - adults and subadult (<2yr). Bb/Bsp - adults.	CD		AI					2	2	4	2	3	2	7	2	2	1
Thruxton Villa	TH02		F1146	1			Crunched and definitely digested.	CD															1	1
Thruxton Villa	TH02		PH1225	1			Rt - 2 adults, 1 less than 1yr. Rsp - strong toothmarks & digestion in tibiofibulae. Bsp - very crunched (worth photo); adults.	CCDT		AJ					1	1	1	1	3	3	5	1		

Table 1. Amphibian and reptile remains from selected samples from Longstone Edge. Species abbreviations: Tv = *Triturus vulgaris* (smooth newt), Tv/h = *Triturus* sp *(vulgaris* or *helveticus)* (smooth or palmate newt), Bb = *Bufo bufo* (common toad), Bsp = *Bufo* sp (toad), Rt = *Rana temporaria* (common frog), Rsp = *Rana* sp (frog), Anu = Anura indet. (frog or toad). Lifestages: Ad = adults, subad = subadult, imm = immature, juv = juvenile. L = left, R = right. PM = post-mortem. B = predatory breakage, C = crunching, D = digestive corrosion, T = toothmarks (doubled if lots); query '?' preceding a letter denotes uncertainty. M = male, F = female, A = adult, I = immature, J = juvenile.

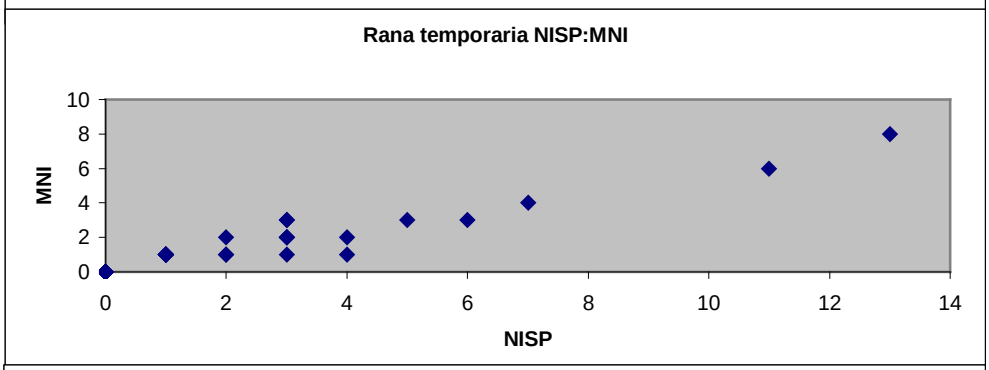
a)



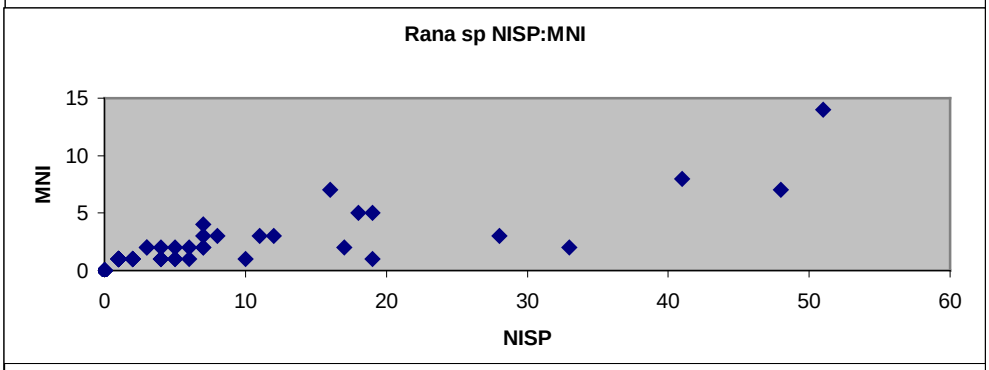
b)



c)



d)



e)

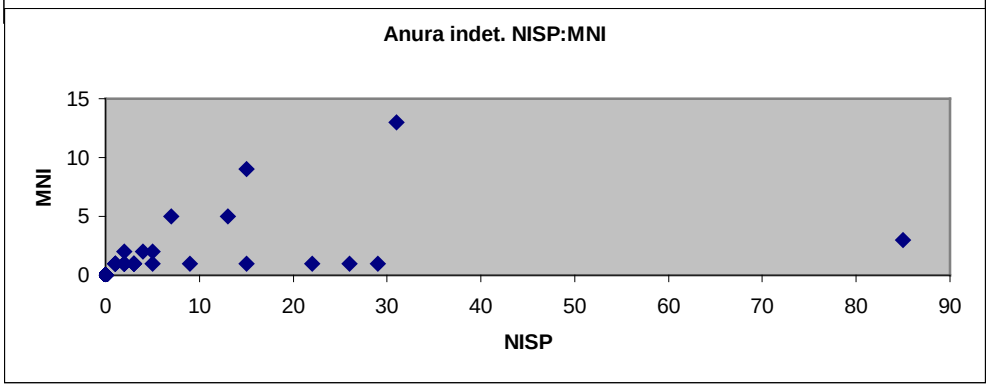


Figure 1a-e. Scatterplots showing ratio of NISP:MNI for a) common toad, b) indet. toad, c) common frog, d) indet. frog, e) indet frog/toad.