Animal Remains from the Pre-NBPW (Without Metal) Contexts at Raipura, Sonbhadra District, Uttar Pradesh

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Abstract*: Department of A.I.H.C. and Archaeology, Banaras Hindu University has conducted excavation at Raipura (24° 40′ 40″ N; 82° 58′ 20″ E) in 2010-2011. The site is situated in tehsil Robertsganj, District Sonbhadra, Uttar Pradesh. Archaeological deposit was divided into three cultural periods: Period I (Pre-NBPW without metal), Period II (Pre-NBPW with Iron), and Period III (NBPW). Animal remains were collected from all three periods and studied using the standard method of faunal analysis developed at the Archaeozoology Laboratory, Deccan College. This article is based on animal remains recovered from Period I. A total of 437 skeletal fragments were examined. The faunal material revealed presence of six domestic species (Cattle, buffalo, sheep, goat, horse and dog). The wild animal species were nilgai, four-horned antelope, sambar, wild pig, wolf, and jungle cat.*

Keywords: Faunal analysis, Pathology, Bone Modifications, Bone Measurements, Pre-NBPW, Raipura, Uttar Pradesh

Introduction

The protohistoric settlement of Raipura (24° 40′ 40″ N; 82° 58′ 20″ E) is situated in tehsil Robertsganj, District Sonbhadra, Uttar Pradesh, at a distance of 100 km from Varanasi and at a distance of 16 km west of Robertsganj (Figs. 1and 2). The site is located in the larger area of Valley of Belan River along the right bank of a stream on the foothills of Vindhya-Kaimur Hills. It was excavated under the Indian National Science Academy (INSA) sponsored project entitled "An Ethno-technological Study of Iron Working around Sonbhadra Region" in season 2010-11 by the Banaras Hindu University (Tripathi and Upadhyaya 2013; Tripathi 2014).

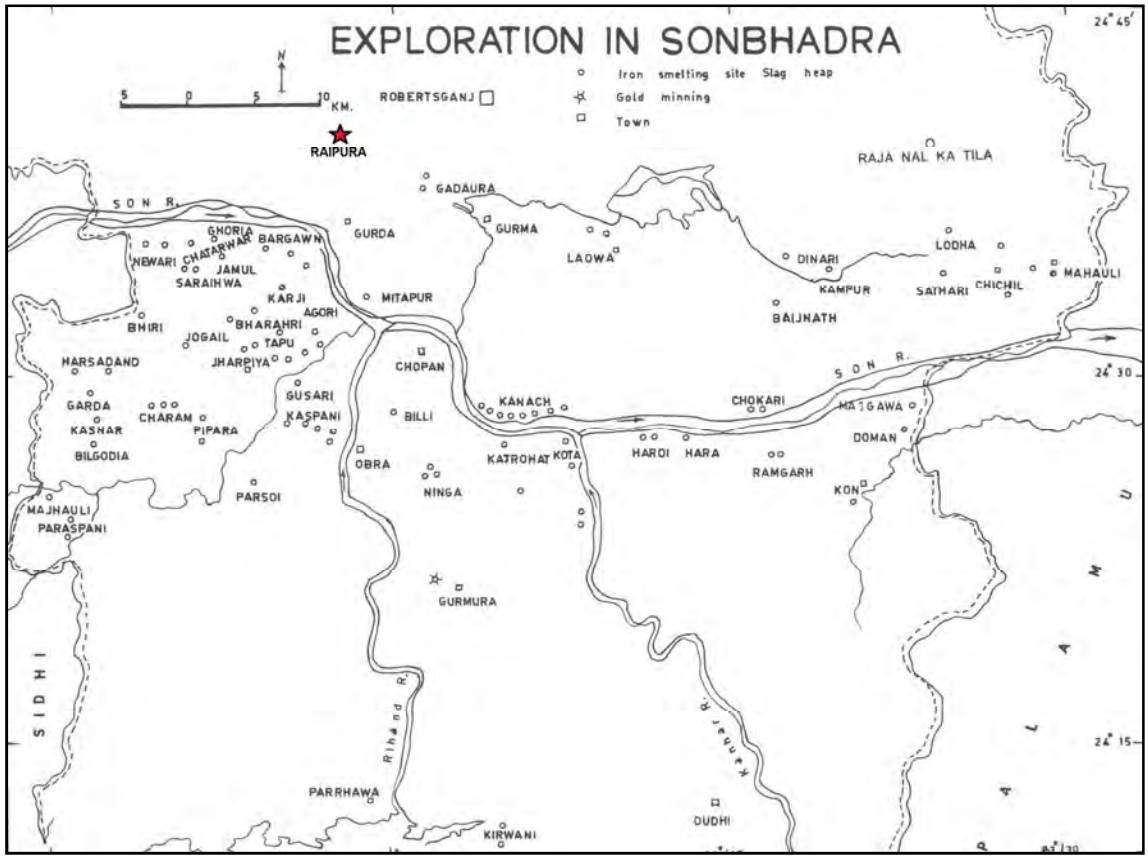

Figure 1: Map showing location of Raipura. Mirzapur District, Uttar Pradesh

Figure 2: Excavation in progress at Raipura

The mound lies about 700 m south-east of present-day village of Rajpura and is surrounded on three sides by a stream flowing down the hills. The mound extends over an area of approximately 400 x 350 m. The stream has cut the mound into two parts. The northern part was labelled by us as Mound 1. The southern part which is approximately four times larger than Mound 1 was labelled as Mound 2. Excavations were conducted on both the mounds. A total of ten trenches of 5 x 5 m were dug on Mound I whereas a single trench of 3 x 3 m was opened on Mound 2. Trenches ZH-10, ZB-10 XJ-5 and YI-11 on Mound 1 were dug up to the natural soil. Based on ceramic assemblage, archaeological deposit has been divided into three cultural periods: Period I (Pre-NBPW without metal), Period II (Pre-NBPW with Iron), and Period III (NBPW). This article is based on animal remains recovered from only Period I.

Period I (Pre-NBPW without metal) was recognised in the cultural deposit of maximum 55-60 cm in trench ZH-10 (Figs. 3 and 4) and 20-30 cm in trenches ZB-10 and XJ-5. No evidence of metal, even copper has been found from Period I deposits. The finds of this period comprised, bone points and bone arrowheads, pottery discs, terracotta beads, semi-precious stone beads, and raw material used for bead making. Period I is characterized by ceramic tradition of Red Ware, Black Slipped Ware, and Black-and-Red Ware, however, Black-and-Red Ware was found in very small quantity at this site. The main types in Black Slipped Ware were bowls, bowls with pedestals, beakers and dishes. In Red Ware, bowls, perforated and legged bowls, dishes, goblets and vases were the principal types. Presence of burnt clay lumps with reed marks indicate that the earliest inhabitants lived in wattle-and-daub houses. Floors have been found in the earliest layers at the site. The radiocarbon dates from Period I range between 3270±130 cal BCE and 2210±140 cal BCE. On the basis of cultural remains, relative stratigraphy and comparison with other sites of the region, a period of c. 3200 to 2200 BCE may be assigned for this period (Tripathi 2014).

Methodology

The work of faunal analysis was carried out at Banaras Hindu University in 2011. Only a few fragments were taken to the Archaeozoology Laboratory at Deccan College for confirmation. After the analysis was over select bones were returned to their respective packets. Entire faunal material recovered from Period I was examined.

A standard protocol of the laboratory analysis, data storage and faunal quantification developed at the Archaeozoology Laboratory, Deccan College was used. As per internationally accepted norms of faunal analysis each bone fragment was examined to study the effects of both pre- and post-depositional factors on the skeletal elements. Bone modification signatures that were searched include intentional fractures (Sadek-Kooros 1975) as well as accidental breakage of bones both in the past and after their recovery during the excavation process. The bones that were complete and measurable were measured using the standard system developed by A. von den Driesch (1976) and utilised world over. The results of bone identification, measurements and comments on the signatures of bone modifications were recorded

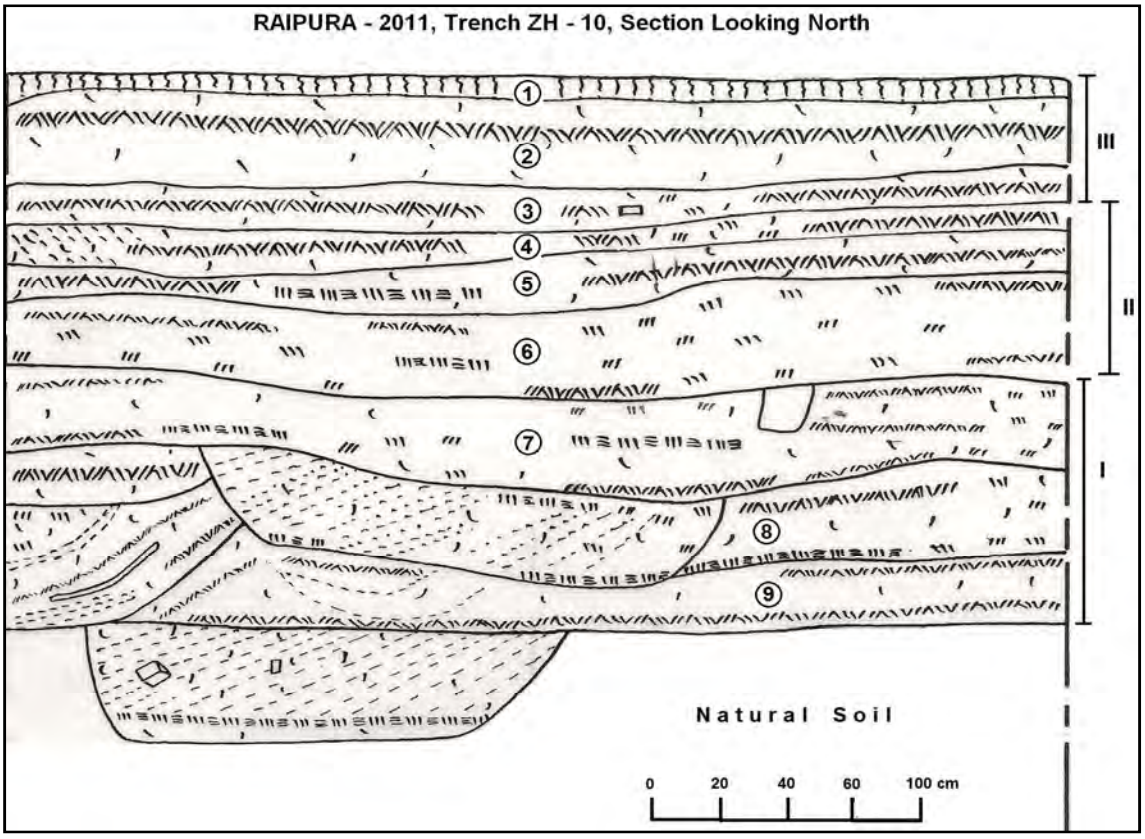

Figure 3: Section of trench ZH10

Figure 4: Nature of archaeological deposit

in the computerized coded format used at the Deccan College. DCPARZ –computer software developed at the archaeozoology laboratory by the author in late 1980s was used for analysis. On the basis of size, UF is grouped into 3 categories i.e., UF- S (small; up to 1 cm), UF-M (medium; between 1 cm to 5 cm) and UF-L (large; larger than 5 cm).

Faunal Material

A total of 437 skeletal fragments were examined of which 390 fragments have been identified with an identification level as high as 89.24% (Table 1; Fig. 5). Most of the identified fragments were large in size. Some of the bone fragments bear soil encrustations. However, in general most of the skeletal elements looked fresh and the edges were not much abraded or rolled due to post-depositional physical factors. Also, the amount of unidentified splinters was found to be small (Table 1).

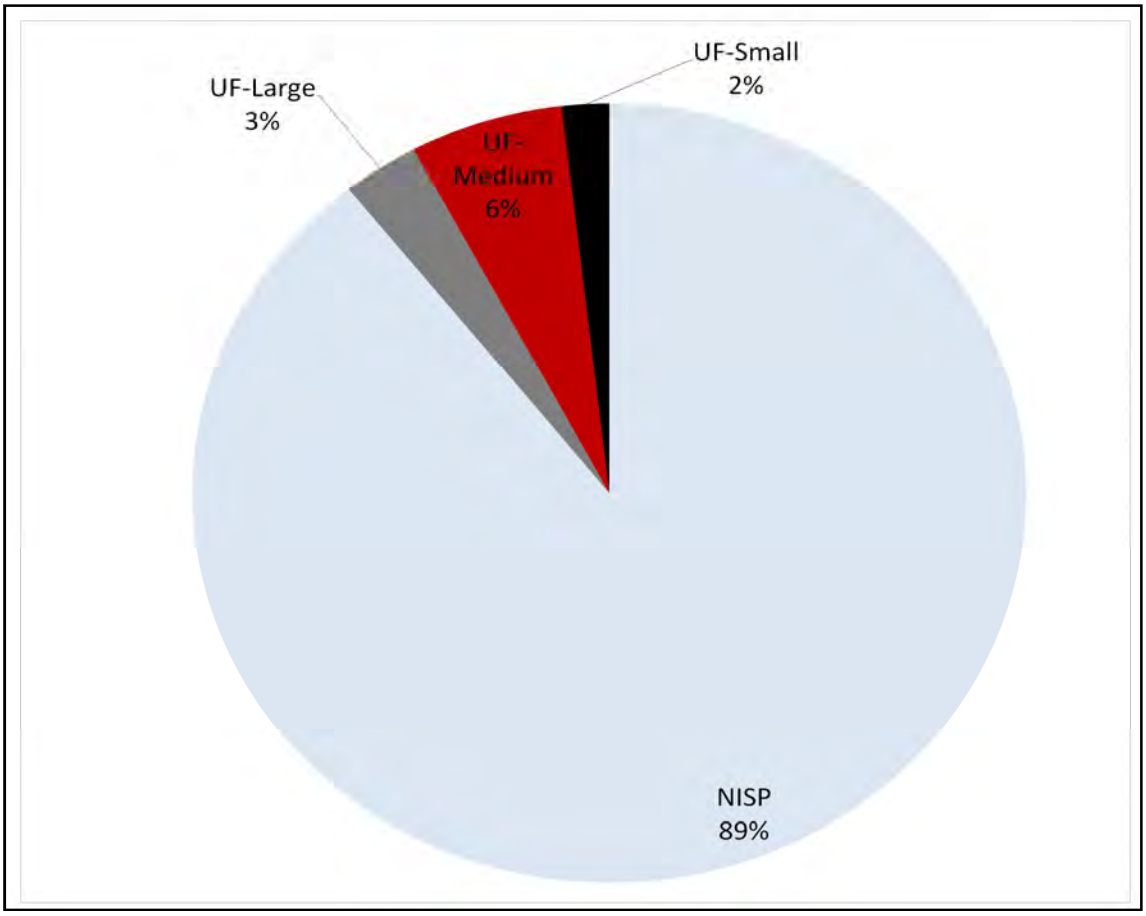

Figure 5: Raipura Period I: Summary of identification

Two cases of pathological conditions were noticed. The proximal end of a femur of goat (Trench ZB10, Layer 6) showed a neoplastic tumour-like growth. A cattle rib head (RPA014) recovered from Trench ZH10 (Layer 8) showed an extra growth like a tumour and swollen condition. In both the cases perhaps these pathological conditions have not been the cause of death as the animals have lived with these neoplastic growths for long period.

Table 1: Summary of Identification: Raipura Period I

Layer	NISP	Unidentified				Total fragments
		Large	Medium	Small	Total	
4	73	0	0	0	0	73
6	83	3	7	1	11	94
8	103	8	8	3	19	122
9	50	0	4	1	5	55
Unit (pit)	81	2	7	3	12	93
	390	13	26	8	47	437
Unit (Pit): Trench ZH10, pit sb (9)						

Carnivore (perhaps dogs) bone modification activities were seen in case of two specimens: a femur of cattle and an atlas vertebra of cattle found from Trench XJ5 (layer 4) showed marks of typical end chewing by dogs.

Marks of anthropogenic activities such as charring and cutting were seen in a few cases (Figs. 6 and 7). Only nine bones were charred and three were completely charred to the cortex. These include ribs, vertebrae and mandible of cattle; and vertebrae and rib of sheep/goat. A total of 14 skeletal elements showed cut marks. These include cranial fragments, ribs, vertebrae and scapulae of cattle; a pelvic bone of buffalo (also completely charred), ribs and femur of sheep/goat and an antler of sambar.

Figure 6: Raipura - long bone of cattle bearing a cut mark

Absence of very small bone fragments needs special attention. It is mainly because the faunal collection made at the site was selective. This also explains absence of fish and bird bones. Thus the faunal collection examined here does not portray the whole spectrum of human-animal interaction on the site during Period I.

Table 2: Identified specimens (NISP) from Period I at Raipura

Layer/Unit	4	6	8	9	Unit (Pit)	Total	% NISP
Bos indicus	44	16	8	6	13	87	22.30
Bos/Bubalus	26	64	87	41	56	274	70.30
Bubalus bubalis	0	0	1	0	2	3	0.77
Capra hircus	0	0	0	1	0	1	0.26
Ovis aries	0	1	1	0	1	3	0.77
Capra hircus/Ovis aries	1	2	4	2	3	12	3.08
Equus caballus	0	0	0	0	3	3	0.77
Canis familiaris	0	0	0	0	1	1	0.26
Boselaphus tragocamelus	0	0	0	0	1	1	0.26
Tetracerus quadricornis	0	0	0	0	1	1	0.26
Cervus unicolor	0	0	1	0	0	1	0.26
Canis lupus	1	0	0	0	0	1	0.26
Sus scrofa	0	0	1	0	0	1	0.26
Felis chaus	0	0	0	0	1	1	0.26
Total	73	83	103	50	81	390	100

Figure 7: Raipura: first phalanx and a long bone of cattle bearing a cut mark

Figure 8: Raipura - horn cores of *Bos indicus*

Figure 9: Raipura- *Bos indicus* metapodia

Figure 10: Raipura - astragali of *Bos indicus*

As seen from Table 2 the faunal collection is dominated by the domestic species (Figs. 8-11). Only 6 skeletal elements out of 390 belonged to wild mammals (Figs. 12-14). A maxilla fragment of nilgai (RPA002) was found from the pit in Trench ZH10. This animal was fairly old male evidenced from a completely worn out first maxillary

molar. A cranial fragment of sambar recovered from Trench ZH10 (Layer 8) had the attached antler (RPA019). The main beam of this antler was cut with not very sharp implement. A single metacarpal of the four-horned antelope (pit in Trench ZH10) showed that it belonged to an adult. Only one skeletal element of the wild pig was found from Trench ZH10 (Layer 8). It was a complete right humerus showing an unfused proximal condition, thus indicating that it was a sub-adult animal.

Figure 11: Raipura- bones of *Capra hircus*

Figure 12: Raipura- cut antler of *Cervus unicolor*

Figure 13: Raipura - charred metacarpus of *Antilope cervicapra*

Figure 14: Raipura- humerus of pig

Figure 15: Raipura- bifid spine of *Bos indicus*

Figure 16: Raipura - Astragalus and maxillary tooth of horse

Table 3: Measurements of mandibular teeth from Period I at Raipura

Reg. No.	Trench	Depth (cm)	Tooth	Length	Width	Species
RPA026	XJ5	100-105	m1	22.57	15.83	*Bos indicus*
RPA026	XJ5	100-105	m2	26.39	15.81	*Bos indicus*
RPA026	XJ5	100-105	m3	36.00	14.17	*Bos indicus*
RPA043	XJ5	80-85	m3	36.26	12.35	*Bos indicus*
RPA087	ZB10	170-175	m0	28.65	16.31	*Bos indicus*
RPA053	XJ5	75-80	m3	37.42	13.88	*Bos indicus*
RPA071	ZH10	230-235	p4	9.52	6.35	*Ovis aries*
RPA071	ZH10	230-235	m1	10.17	7.62	*Ovis aries*

Two interesting finds of carnivores were the wolf and jungle cat. A complete cervical vertebra of the wolf was found from Trench XJ5 (Layer 4). The jungle cat is represented by a complete humerus of left side that was without the unfused proximal end. Both these skeletal elements were devoid of any marks and hence, these carnivores were not part of diet of people at Raipura.

The main domestic food species at Raipura were cattle, buffalo, sheep and goat. These contributed to 97.22% of the identified specimens. The cattle were of humped variety as evidenced by presence of spina bifida (Fig. 15). Two non-food species were the horse (Fig. 16) and the dog. A mandible of an adult dog was recovered from the pit in Trench ZH10. This mandible belonged to a fairly old animal. Three skeletal elements of the horse were found; all from the pit. There were a tooth, an astragalus and a first

Table 4: Measurements of maxillary teeth from Period I at Raipura

Reg. No.	Trench	Depth (cm)	Tooth	Length	Width	Species
RPA002	ZH10	245-250	M0	17.05	19.04	*Bos indicus*
RPA010	ZH10	215-220	M0	15.56	10.93	*Capra hircus*
RPA012	ZH10	240-245	M2	22.80	20.86	*Bos indicus*
RPA012	ZH10	240-245	M3	28.43	19.63	*Bos indicus*
RPA014	ZH10	190-195	M3	29.22	18.02	*Bubalus bubalis*
RPA016	XJ5	100-105	M1	24.25	22.84	*Equus caballus*
RPA039	XJ5	95-100	M2	21.76	21.90	*Bos indicus*
RPA039	XJ5	95-100	M3	28.00	20.24	*Bos indicus*
RPA032	XJ5	100-105	M3	31.18	21.02	*Bos indicus*
RPA042	XJ5	80-85	M2	27.87	21.55	*Bos indicus*
RPA044	XJ5	80-85	M1	26.34	23.00	*Bos indicus*
RPA057	XJ5	65-70	P0	18.96	23.00	*Bos indicus*
RPA058	XJ5	65-70	P0	18.00	19.70	*Bos indicus*
RPA074	ZB10	145-150	M3	28.36	21.66	*Bos indicus*
RPA075	ZB10	145-150	M2	24.38	23.32	*Bos indicus*
RPA076	ZB10	145-150	M1	19.20	21.03	*Bos indicus*
RPA077	ZB10	145-150	P4	16.03	17.61	*Bos indicus*
RPA081	ZB10	150-155	M3	32.82	23.18	*Bos indicus*
RPA081	ZB10	150-155	M2	25.31	23.98	*Bos indicus*
RPA189	XJ5	100-105	M3	30.45	21.10	*Bos indicus*

Table 5: Measurements of radius bones from Period I at Raipura

Reg. No.	Trench	Depth (cm)	Bp	Tp	Bd	Td	Species
RPA501	ZH10	165-170	--	--	68.91	46.38	*Bos indicus*
RPA025	XJ5	100-105	--	--	66.23	45.54	*Bos indicus*
RPA051	XJ5	80-85	--	44.15	--	--	*Bos indicus*
RPA060	ZH10	190-195	--	40.99	--	--	*Bos indicus*
RPA065	ZH10	230-235	--	35.00	--	--	*Bos indicus*
Bp: Maximum proximal width				Tp: Proximal thickness			
Bd: Maximum distal width				Td: Maximum distal thickness			

Table 6: Measurements of astragali from Period I at Raipura

Reg. No.	Trench	Depth (cm)	Lateral Length	Medial Length	Distal Width	Species
RPA084	ZB10	165-170	--	62.96	40.99	*Bos indicus*
RPA082	ZB10	150-155	67.00	63.16	39.91	*Bos indicus*
RPA078	ZB10	125-130	69.45	--	--	*Bos indicus*
RPA066	ZH10	230-235	--	60.86	43.73	*Bos indicus*
RPA062	ZH10	190-195	61.90	57.92	36.95	*Bos indicus*

Table 7: Measurements of calcaneum and centrotarsal bones from Period I at Raipura

Reg. No.	Trench	Depth (cm)	Bone	1	2	3	Bd	Species
RPA023	XJ5	100-105	CA	136.00	40.26	50.67	--	*Bos indicus*
RPA061	ZH10	190-195	CT	--	--	--	54.48	*Bos indicus*
RPA006	ZH10	235-240	CT	--	--	--	53.74	*Bubalus bubalis*
1: Maximum Length					2: Maximum Width			
3: Maximum Height					Bd: Maximal width			

Table 8: Measurements of metapodia from Period I at Raipura

Reg. No.	Trench	Depth (cm)	Bone	Bp	Tp	Bd	Td	Species
RPA004	ZH10	230-235	MC	55.78	34.89	--	--	*Bos indicus*
RPA005	ZH10	230-235	MT	--	--	54.49	29.71	*Bos indicus*
RPA015	ZH10	190-195	MC	25.15	15.03	--	--	*Ovis aries*
RPA021	ZH10	160-165	MC	--	--	49.74	26.35	*Bos indicus*
RPA022	ZH10	165-170	MC	53.22	32.08	--	--	*Bos indicus*
RPA024	XJ5	100-105	MT	42.44	45.13	--	--	*Bos indicus*
RPA036	XJ5	95-100	MT	--	--	50.00	29.25	*Bos indicus*
RPA037	XJ5	95-100	MT	42.34	41.67	--	--	*Bos indicus*
RPA049	XJ5	80-85	MC	--	--	54.88	29.56	*Bos indicus*
RPA059	XJ5	70-75	MC	--	--	22.25	14.16	*A. cervicapra*
RPA067	ZH10	230-235	MT	42.78	40.25	--	--	*Bos indicus*
RPA080	ZB10	125-130	MC	--	--	57.03	27.87	*Bos indicus*
RPA085	ZB10	175-180	MT	15.83	14.91	--	--	*Bos indicus*
Bp: Maximum proximal width					Tp: Proximal thickness			
Bd: Maximum distal width					Td: Maximum distal thickness			

Table 9: Measurements of first phalanges from Period I at Raipura

Reg. No.	Trench	Depth (cm)	GL	Bp	Tp	Bd	Species
RPA001	ZH10	245-250	--	--	--	29.79	*Bos indicus*
RPA008	ZH10	205-210	59.75	24.67	31.05	24.80	*Bos indicus*
RPA017	ZH10	170-175	64.90	29.20	30.15	26.45	*Bos indicus*
RPA045	XJ5	80-85	57.00	29.44	31.90	26.35	*Bos indicus*
RPA046	XJ5	80-85	60.95	--	--	29.79	*Bos indicus*
RPA047	XJ5	80-85	50.13	11.63	17.00	10.35	*Antelope cervicapra*
RPA055	XJ5	65-70	59.75	24.60	27.61	23.70	*Bos indicus*
RPA069	ZH10	230-235	--	--	32.05	--	*Equus caballus*
RPA079	ZB10	125-130	62.75	32.28	34.30	30.30	*Bos indicus*
RPA083	ZB10	135-140	61.82	29.61	35.63	28.95	*Bos indicus*
RPA086	ZB10	170-175	--	28.97	31.70	--	*Bos indicus*
GL: Maximum length				Bp: Maximum proximal width			
Tp: Proximal thickness				Bd: Maximum distal width			

Table 10: Measurements of second phalanges from Period I at Raipura

Reg. No.	Trench	Depth (cm)	GL	Bp	Tp	Bd	Species
RPA011	ZH10	255-260	42.92	30.17	34.65	25.77	*Bos indicus*
RPA048	XJ5	80-85	39.37	--	--	21.55	*Bos indicus*
RPA056	XJ5	65-70	43.14	29.51	31.43	24.80	*Bos indicus*
GL: Maximum length				Bp: Maximum proximal width			
Tp: Proximal thickness				Bd: Maximum distal width			

Table 11: Measurements of third phalanges from Period I at Raipura

Reg. No.	Trench	Depth (cm)	1	2	3	Species
RPA072	ZB10	145-150	--	--	26.45	*Bos indicus*
RPA038	XJ5	95-100	--	--	23.40	*Bos indicus*

phalanx. The general condition and patination indicated that they were from two fairly old animals. None of these fragments showed any mark of pre- or post-depositional modification.

Bone Measurements

Bone measurements are important to understand the sizes of animals in the past. Particularly the estimates of size in terms of weight and the height at the withers are useful to compare animal stocks and the inter-relationships of sites (Joglekar 2011, 2015). The measurements recorded on a small sample like this may seem inadequate for intra-site comparisons, but these can be used further while comparing animal populations at a larger level (Tables 3-11).

It was possible to estimate the height of the cattle at the withers using the medial length of the astragalus (Zalkin 1970). Four astragali gave estimates of withers height to be 109.47 (RPA62), 115.03 (RPA66), 118.99 (RPA84) and 119.37 cm (RPA82). These estimates fall well within the known medium-built cattle variety known from other Ganga Valley and Vindhyan sites such as Jhusi, Agiabir, Raja Nal-ka-Tila and Malhar (Joglekar 2007-08, 2010-11 and 2010-12). The horn cores of short horn type found from Raipura (Fig. 8) are comparable to those found at Jhusi and Raja Nal-ka-Tila.

Concluding Remarks

As mentioned earlier the collection is selective and biased towards large skeletal fragments, yet it has provided an important sample from the non-metal pre-NBPW site in the Vindhyan region. This material could be used for comparison with similar sites in future. At Raipura animal husbandry based on cattle was in a fully developed stage as evidenced from the presence of young, sub-adult and old animals. A few very old animals indicate their use as labour and/or milk, however, sample size is too small to prepare a secure age profile.

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