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Animal Subsistence of the Bronze Age in Tepe Taghiabad, Varamin plain, the Northern Central of Iranian Plateau

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Abstract: Animal remains from Taghiabad in the Varamin plain are analyzed, conducted in 2018. This site is located north of Taghiabad and south of Ajorbast villages, Javadabad district in Varamin town. All the excavated bones are of animal origin, and no human bones have been retrieved. This site dates back to the Iron and Bronze ages; in this study, we deal with Bronze Age. Two hills were excavated, which are referred to as Taghiabad 1 and 2. Taghiabad 1 relates to the recent and middle Bronze Ages, containing ten loci (Seven loci of the Late and three loci of the Middle Bronze Age, respectively), and Taghiabad 2 contains three loci of the Late Bronze Age. Burning and cutmarks were found on some of the bones, which cutmarks might be secondary to butchery. This study is based on field, and lab studies on animals remain retrieved from these two hills (Taghiabad 1 and Taghiabad 2). Results show that sheep, goat, cattle, gazelle, equid, deer, and canine in Taghiabad 1 and sheep, cattle, gazelle, and small carnivorous in Taghiabad 2 are the most prevalent findings. The people's primary sources of meat supplies were sheep, goats, and cattle.

Keywords: Animal Species, Subsistence, Bronze Age, Iron Age.

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Introduction

Zooarchaeology identifies the subsistence, economy, feeding pattern, and meat consumption among Taghiabad dwellers in ancient times. Extrapolation of subsistence in ancient societies is an essential multidisciplinary approach in archaeology that involves archaeology, biology, and ecology. Animals remaining could provide invaluable information for an archaeologist to know which animals had been domesticated in primary ancient villages (Rackham 1971). Moreover, it could help them to understand the subsistence of societies and help them to know the methods of hunting/gathering in ancient societies (Gneco and Cristobal 2003). Comparing the weight and amount of animal remaining can partially show the importance of those animals in the subsistence of ancient societies; classification of different parts of corps could represent the economic value and clarify why some parts had been used more (Jones 2003: 41). Previously, zoologists only evaluated the recognizable bones obtained from these remaining (Davis 1987: 23). Recognition of species, their prevalence, and sexes could effectively identify the strategy in the animal selection, husbandry, and meat consumption (London 2005). One of the goals of the excavation on Taghiabad was to identify animal species and their role in the meat supply. The other goals are whether the ancient residents depended on domestic animals for their meat supply or whether hunting was as crucial as husbandry if they were farmers or animal herders. The main goal is to study human behavior toward their environment, especially faunas. This study aims to recognize animal species and identify whether domestic or wild and their proportions. The proposed theory about Taghiabad in Varamin is that the feeding system of the ancient residents was based on husbandry and hunting. Through the study of the findings, their proportions could be identified. By analyzing the animal bones, we can understand the relationship between humans and their environments, environment changes, methods of husbandry, and the goals of animal herding.

Varamin plain is located in the southeast of Tehran Province. This plain is in a flat fertile plain with semi-arid climate and loam soils. Its altitude is 750-1100 meters above sea level, and located in the alluvial area of Jajroud River (Fig. 1).

Tepe Taghiabad

The last 20 years have seen a steep rise in archaeological activities in the Varamin plain. It has been realized that this area has a rich archaeological heritage, among which remnants of the Paleolithic to the Islamic period. This site is located in the North of Taghiabad and South of Ajorbast villages, in the heart of farmlands, Javadabad district in Varamin town. Tepe Taghiabad belongs to the Early Bronze age to the Iron age. Some careful selections of the samples used for C^{14} dating are crucial for dating from context—the samples dated to the Bronze and Iron Ages (Fig. 2).

Results

One hundred and seventy-eight bone particles weighing 1570.77 g were obtained from the site related to Bronze Age, which 155 particles weighing 1428.92 g were from Taghiabad 1 (63 bones weighing 914.16 g related to the Late Bronze Age and 92 bones weighing 514.56 g to Middle Bronze Age) and 23 bones weighing 141.85 g of Taghiabad 2 is related to the Late Bronze Age. First, the bones were cleansed, prepared (numbered based on the loci), then studied to recognize the species and organs; for the latter purpose, a comparative collection of animal bones and animal anatomic manuals were used. Identified species were all mammals, either domestic or wild.

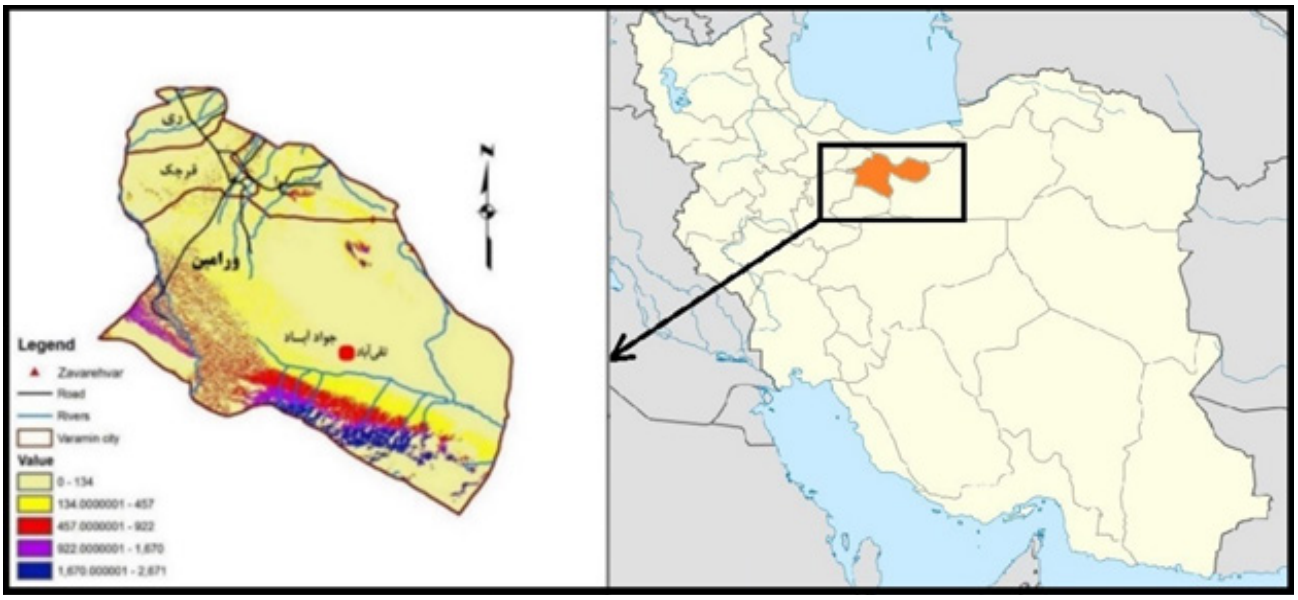

Fig. 1: Varamin Plain and the location of Tepe Taghiabad

Fig. 1: A view from Taghiabad hill (Authors 2018)

Several Identified Specimens (NISP) of the Bronze Age of Taghiabad 1

One hundred fifty-five pieces of bones had been retrieved from Taghiabad 1 dated to Bronze Age, 63 pieces (40.64%) and 92 pieces (59.35%) of them was related to the Late and Middle Bronze Age, respectively. Species recognized in Taghiabad 1 contain: Sheep 18 fragments (11.6%) (Fig. 3a), Goat 6 pieces (3.87%) (Fig. 3b), Cattle 23 parts (14.83%) (Fig. 3c), Gazelle 5 fragments (3.22%) (Fig. 3d), Canine 1 piece (1.08%) (Fig. 3g), Equus 2 fragments (3.17%) (Fig. 3e), Deer 1 part (1.58%) (Fig. 3f), and 99 (63.87%) broken and non-recognizable pieces (Table 1 and 2; Diagram 1).

Five pieces out of 18 sheep bones carry burning (27.77%), and one piece is related to non-adult sheep (5.55%). One goat bone out of 6 (16.66%) was non-adult. Species recognized out of 63 bone fragments is related to the Late Bronze Age that between them, 9 pieces (14.27%) are Sheeps, 3 fragments (4.76%) of Goat, 11 (17.46%) of cattle, 1 (1.58%) of deer, 2 pieces (3.17%) of Equus and 34 fragments (53.96%) of them are broken non-recognizable particles. Ninety-two pieces of bones were retrieved dated to the Middle Bronze age, of which 65 (70.65%) are broken and non-recognizable. The other bones related to Sheep 9 (9.87%), Goat 3 (7.69%), Gazelle 2 (2.17%), Cattle 12 (13.04%), and Canine 1 (1.08%).

Two pieces related to adult equid (1.29%) contain jaws and teeth. 5 (3.22%) pieces of adult gazelle bones were retrieved containing teeth, rib, jaw, and scapula. Burnings were found on one piece. On the only piece of deer bone found, bite marks on the metatarsal were noticeable. 5 (21.73%) and 3 (13.04%) out of 23 Cattle bones (14.83%) carry burnings and cut marks, respectively. One piece carries break and fusion marks. 7 pieces (30.04%) are of non-adult cattle.

Number of Identified Specimens (NISP) during the Bronze Age of Taghiabad 2

Found bones are scary. Only 23 pieces were retrieved, 11 (47.82%) of them were broken and non-recognizable, adult sheep 6 (26.08%), gazelle 1(4.34%), cattle 4 (17.39%), small carnivorous 1 (4.34%) (Fig. 2h), were the recognizable species. No goat bone was recognized in Taghiabad 2. Four pieces (17.39%) of 23 founded bones were adult cattle: Talus, Vertebrae, Jaw, Patella, Metatarsal, and Radius. The only gazelle bone was Talus. One piece of bone of an adult small carnivorous (phalange) was found in Taghiabad 1, which carries burnings. In Taghiabad 2, the only piece of carnivorous bone found was jaw bone carrying teeth. Most sheep and goat bones were teeth, jaw, rib, horn, and vertebrae. Cattle bones were the most prevalent findings on the site (Table 1, 2; Diagram 2).

The Comparison of Animal Findings of the Bronze Age and the Iron Age in Taghiabad

Species recognized in Taghiabad1 during the Iron Age are: 326 fragments of bones (the Iron age I, 225 pieces and the Iron age II, 101 pieces) in Taghiabad 1, and 386 fragments (the Iron age I, 379 pieces and the Iron age II, seven pieces) in Taghiabad 2 were found. Recognized species in Taghiabad 1 were Sheep, 114 pieces of bones (the Iron age I and II, 71 and 43 respectively), Goat 9 fragments (Iron age I and II, 6 and 3 pieces respectively), Gazelle 26 bones (Iron age I and II, 19 and 7 respectively), Cattle 32 bones (Iron age I and II, 19 and 13 respectively), Fox one piece of Iron age II, Canine eight pieces of Iron age II, small Carnivorous two bones of Iron age II, Equid two bones of Iron age II, Equus (6 and 2 pieces of Iron age I and II respectively), Sus Scrofa two pieces of Iron age I, Deer one piece of Iron age I, Avian three pieces (1 and 2 of Iron age I and II respectively), Urial one piece of Iron age I and 118 non-recognizable parts.

Species Recognized in Taghiabad 2 in the Iron Age

63 fragments of bones (62 pieces from the Iron Age I and one piece in the Iron Age II) in Taghiabad 2 were found. Recognized species in Taghiabad 1 included the 114 bones of Sheep (Iron age I and Iron age II, 71 and 43 respectively), five bones of Goat (Iron age I), ten fragments of Gazelle (Iron age I and Iron age II, 9 and 1 respectively), 23 bones of Cattle (Iron age I), one piece of Fox in the Iron Age II, Canine including ten pieces (Iron age I and Iron age II, 9 and 1), one bones of small Carnivorous ۵۵ Iron Age I, two bones of Equid from Iron Age I, 1 piece of Equus from the Iron age II, 1 piece of Equid (ass) of the Iron age I, 11 pieces of Sus Scrofa during the Iron age I, one piece of Deer from the Iron age I, one piece of Avian from the Iron age I and 257 non-recognizable parts. Sheep bones were the most found remaining, followed by

Fig. 3. Recognized animal species at site (Sheep 3a, Goat 3b, Cattle 3c, Gazelle 3d, Equid 3e, Deer 3f, Canine 3g and small Carnivorous 3h)

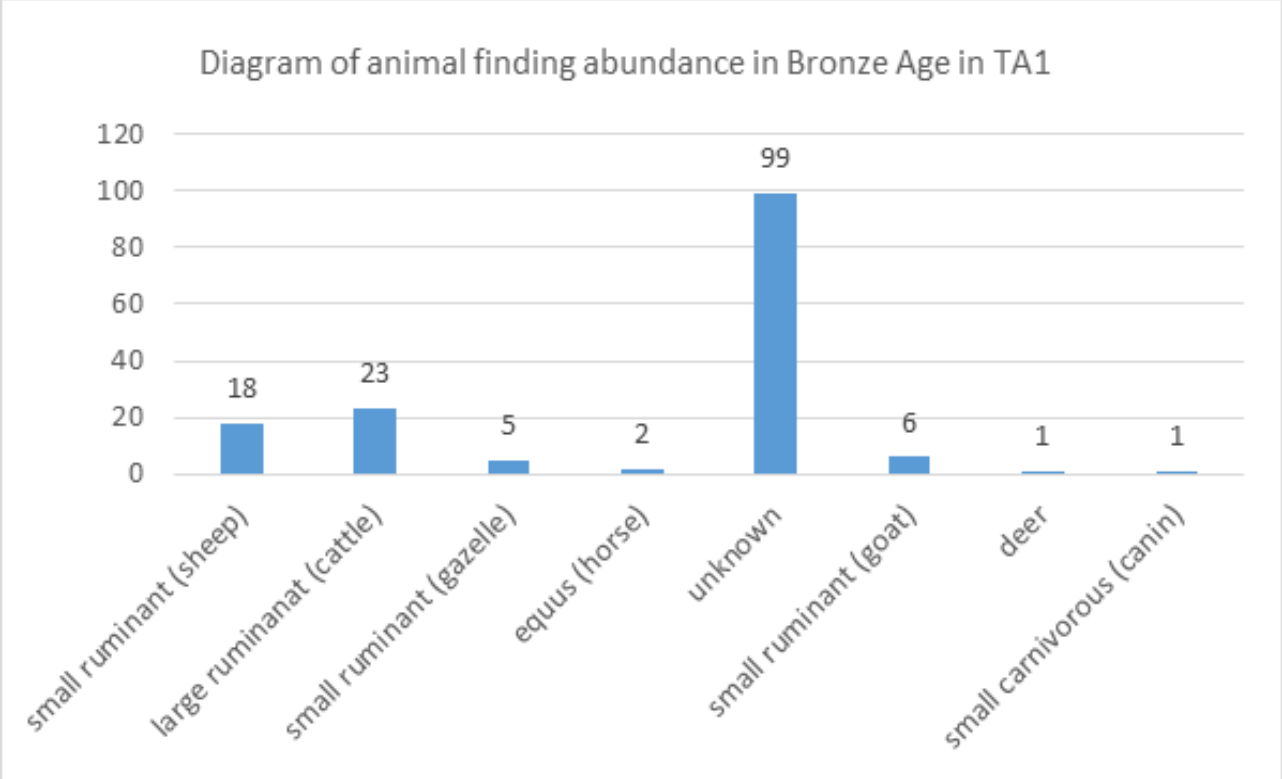

Diagram 1: The abundance of Animal finding in Bronze Age of Taghiabad 1

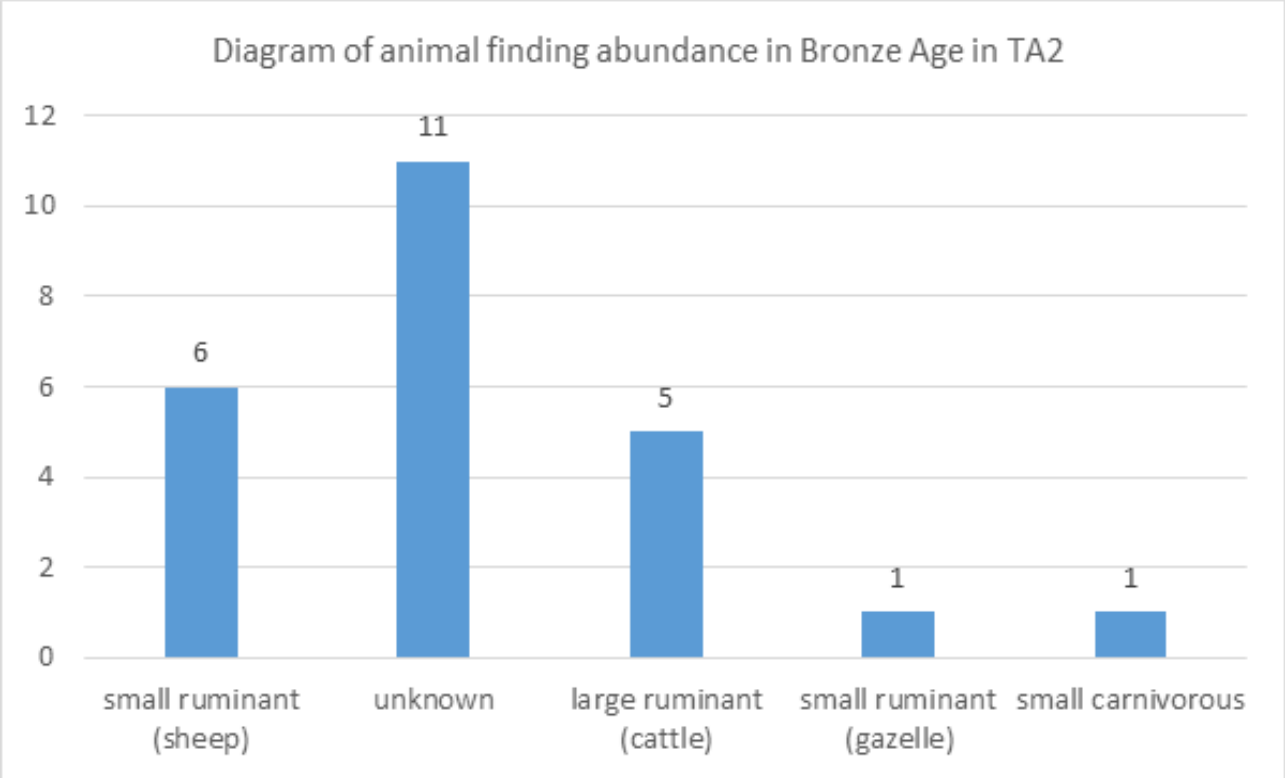

Diagram 2: The Frequency of Animal finding in Bronze Age of Taghiabad 2

cattle bones in the Bronze and Iron ages. Hunted animal bones were the least found in all sites like Taghiabad 2, but Gazelle and Sus Scrofa hunting were practiced in both ages. Some scary remains were obtained from both ages such as birds and canine bones.

Pathology

The most crucial role of paleopathology in zooarchaeology is to find out the method of domestic animal exploitation, such as weight carrying and labor which can cause bone deformities, especially in extremities (Bartosiewicz 2021). Human-caused damages: Superficial and deep cutmarks secondary to butchery for cutting the meat from bones. Cutmarks secondary to chops impacts for mincing meat and bones and burning, which is the effect of fire for cooking meat, could be seen on bones (Figs. 4 and 5). Animal-caused damages are caused by biting or chewing during animal battles or by carnivorous animals. A bite mark could be seen on one of the bones from the site. Environmental damages is included the effects of surrounding environments such as moisture, acidity, temperature, burning, or breaking due to soil mass and pressure.

Age Estimation

Estimating the killing age and pattern of the domestic animal were being kept for different purposes, such as primarily for meat or secondarily for their by-products such as diaries, wool, or as a labor force (Payne 1973; Redding 1981). Recognition of killings age is a clue to identifying the purpose of their herding (Rackham 1994: 10). For instance, if a sheep had been butchered before three years, it is solely for its meat; if slaughtered after three years, it had been used for secondary products like wool and diaries (Beizaee Doost et al., 2020).

Butchering patterns of domestic sheep and goats reflects the strategy to use the primary (meat) and secondary (wool, diaries) products, which determines the plan for their breeding.

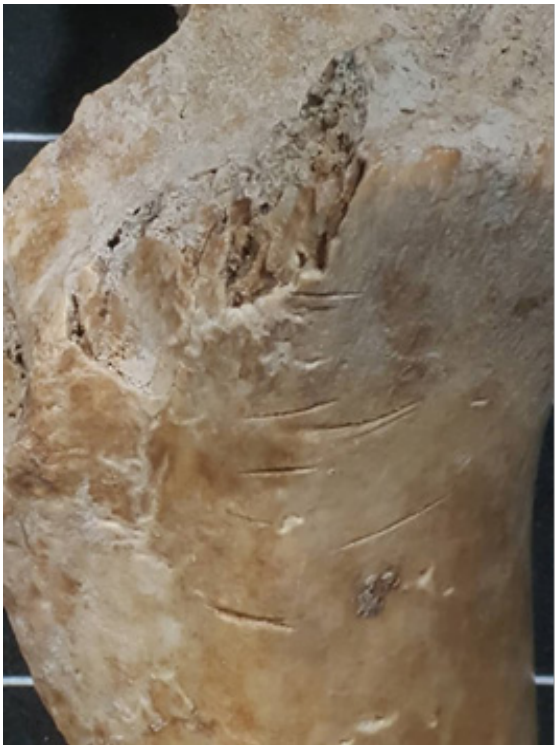

Fig. 4 and 5: Cut marks on bones under a microscope (4: left, 5: Right).

(Sherrat 1981, 1983). Silver, in 1969, proposed a model to restore the slaughter patterns of sheep and goats based on age estimation derived from the teeth worn out and epiphyseal closure in bones inferior to the skull (Omar 2017).

The size difference in species and their age when slaughtered animals could be estimated with their study (Clutton-Brock 1990). Anatomic findings which could show the age at which the animal had been slaughtered are epiphyseal closure, cranial sutures closure, permanent teeth, teeth worn out, and corns (Reitz and Wing 2008: 172). Fusion of bones distal to the cranium and teeth were worn out had been used to depict the death curve of animals (Munro et al., 2009).

In this site, 30 sheep bones from the Bronze Age were excavated; 2 bones (6.66%) were non-adult, and 7 (25.97%) out of 27 cattle bones were no-adult too. This finding shows that most of the sheep were adult while being slaughtered, which reflects the use of their secondary products such as diaries, wool, and reproductivity as well as their meat, as an instance one the advantages of Goat herding was its high productivity which facilitated the use of their milk (Ezatpour 2003: 127). The same applies to cattle, although this could not be emphasized of the scarcity of cattle bones.

Conclusion

Based on findings, in the Bronze and Iron Ages, their subsistence was based on husbandry, not only as the primary source of food supply but also as a labor force. The hunted animals were 3.87% and 4.34% of Taghiabad 1 and Taghiabad 2, respectively, and 3.93% overall, which reflects the low importance of hunting for meat supply in these ancient societies. The low number of wild animals in Taghiabad is secondary to their lifestyle. He shows that their subsistence was based on husbandry, and hunting was not the primary source of meat supply but a complement to it. The lower count of animal remainings related to the Bronze Age makes the conclusion difficult for that Age.

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TA1									
Taxa									
Locus	Phase	Period	SR (Sheep)	SR (Goat)	SR (Gazelle)	LR (Cattle)	SC (Canin)	Equus (Horse)	Deer
29	IIIa	Late Bronze age	*		*	*		*	
30			*						
34	IIIb								
35			*						
36				*					
37			*	*		*			*
39			*	*		*			
40	IV	Middle Bronze Age	*	*	*	*	*		
41			*						
43			*	*		*			

TA2						
Taxa						
Locus	Phase	Period	SR (Sheep)	SR (Gazelle)	LR (Cattle)	SC (Canin)
29	IIIa	Late Bronze age	*	*	*	
30			*		*	
31			*		*	*

Table 1: Prevalence of animal species in Taghiabad 1 and 2 during the different phases of the Bronze Age

Site	TA1			TA2
Taxa	**Late Bronze age** Count/Percent	**Middle Bronze Age** Count/Percent	**Sum**	**Late Bronze age** Count/Percent
Sheep	9 (14.27%)	9 (9.78%)	18 (11.6 %)	6 (26.08 %)
Goat	3 (4.76%)	3 (7.69%)	6 (3.87 %)	
Gazelle	3 (4.76%)	2 (2.17%)	5 (3.22 %)	1 (4.34 %)
Cattle	11 (17.46%)	12 (13.04%)	23 (14.83 %)	4 (17.39 %)
Canin	_	1 (1.08%)	1 (0.64%)	_
Small Carnivorous	_	_	_	1 (4.34 %)
Equus(Horse)	2 (3.17%)	_	2 (1.29 %)	_
Deer	1 (1.58%)	_	1 (0.64%)	_
Unknown (Fragmented Bones)	34 (53.96%)	65 (70.65%)	99 (63.87 %)	11(47.82 %)
Total	63	92	155	23

Table 2: Prevalence and percentage of animal species during the Bronze Age of Taghiabad 1 and 2

Table 3: the Weight of Found Bones in Taghiabad				
Site	TA1			TA2
Taxa	Late Bronze Age	Middle Bronze Age	Sum (Weight)	Late Bronze Age (Weight)
Sheep	45.75 g	46.46 g	94.21 g	26.23 g
Goat	50.39 g	26.48 g	76.87 g	_
Gazelle	51.02 g	6.11 g	57.13 g	4.00 g
Cattle	402.33 g	275.04 g	677.37 g	74.24 g
Canin	_	2.71 g	2.71 g	_
Small Carnivorous	_	_	_	18.62 g
Equus (Horse)	69.83 g	_	69.83 g	_
Deer	105.63 g	_	105.63 g	_
Unknown (Fragmented Bones)	189.21 g	157.76 g	346.97 g	18.76 g
Total	914.16 g	514.56 g	1428.92 g	141.85 g