M.K. Şahin et al. / Hacettepe J. Biol. & Chem., 2021, 49 (1), 43-55

Research Article

Hacettepe Journal of Biology and Chemistry

journal homepage: www.hjbc.hacettepe.edu.tr

Terrestrial Vertebrate Fauna of Beytepe Campus, Hacettepe University

Hacettepe Üniversitesi Beytepe Yerleşkesinin Karasal Omurgalı Faunası

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ABSTRACT

Beytepe Campus (Hacettepe University) is one of the few isolated areas with large scale for wildlife within Ankara metropolis (Turkey). However, there is no checklist regarding to the terrestrial vertebrate (amphibian, reptile, avian and mammalian) fauna of this campus has ever been published so far. Therefore, field studies and literature surveys were conducted towards Beytepe Campus from 2005 to 2019. According to the results, a total of 3 amphibians, 11 reptilians, 93 avian and 14 mammalian species were identified in the study area. Due to increasing urbanization trends in this metropolitan city, this study will provide us a useful guide for further surveys and conservation activities in similar areas.

Key Words

Ankara, urbanization, amphibians, reptiles, birds, mammals.

ÖZ

Beytepe Yerleşkesi (Hacettepe Üniversitesi), Ankara'daki (Türkiye) kentsel yaşamda yaban hayatı için birkaç büyük izole alandan birisidir. Bununla birlikte, şimdiye kadar bu yerleşkenin karasal omurgalı (amfibi, sürüngen, kuş ve memeli) faunasına ilişkin genel bir tür listesi bulunmamaktadır. Bu amaçla 2005 – 2019 yılları arasında Beytepe Yerleşkesi'nde yapılan çalışmalar sonucunda toplam 3 amfibi, 11 sürüngen, 93 kuş ve 14 memeli türü tespit edilmiştir. Kentselleşmenin büyükşehirlerde giderek artan trendi nedeniyle, bu çalışma bize benzer alanlarda yapılacak araştırmalar ve koruma faaliyetleri için faydalı bir rehber olacaktır.

Anahtar Kelimeler

Ankara, kentselleşme, amfibiler, sürüngenler, kuşlar, memeliler.

Article History: Received: Apr 18, 2020; Revised: Jun 26, 2020; Accepted: Sep 22, 2020; Available Online: Nov 22, 2020.

DOI: https://doi.org/10.15671/hjbc.722876

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INTRODUCTION

Urbanization is a key component of land-use changes due to extremely modified and intricate landscapes urban regions, within which green or open areas are seen as valuable for human welfare as well as wildlife [1,2]. The biological processes of dispersal interact with the landscape structure in influencing the distribution of populations of species present [3]. During the last decade, many researches, related to urban biodiversity, embed this issue under conservation perspective [4–7]. Urbanization phenomenon has been an important component of land use and land cover change, and its significance will certainly continue to increase in Turkey's metropolitans, like many others in the world [8]. In addition to that, while focusing on urbanization in Turkey, it cannot be neglected that rapid inhabitant increase, immigration from rural areas to urban places, and industrial progress after 1960s' has an important role to change the dynamics for people and natural habitats.
The other major case for the land and biological resources around the cities is that they have tended to be consumed. Therefore, some restoration areas, like city parks, school campuses, which were built on such areas, need to be evaluated under the terms of biodiversity [9].

Here, we would like to introduce the actual terrestrial vertebrate fauna of Hacettepe University Beytepe Campus as an official record for a guideline about forthcoming studies on human – wildlife interactions in urban zones.

MATERIALS and METHODS

Study area

The field studies have been carried out from 2005 to 2019 to identify each species of terrestrial vertebrate class (amphibians, reptiles, birds and mammals) in Beytepe Campus, Ankara, which is transformed from rural to urban area year after year. Beytepe Campus comprises about 1500 ha and this region is about 918 m asl (Figure 1). It was established in 1967 on the western side of Ankara. There are two artificial wetlands in (Beytepe pond) and around Beytepe Campus (Ministry of Agriculture and Forest Work Campus pond) that contribute to maintain water sources for related terrestrial vertebrate groups. In addition to these wetlands, the study area covers coniferous forests, steppe vegetation, urbanized areas with the constructions of educational buildings and dormitories. Average annual precipitation of 413 mm falls, and relative humidity is 45.61±18.36 in recent years. The average annual temperature is 10.1°C [10,11].

Methodologies for detecting species

Amphibia surveys were carried out by visual search [12]. The survey has been done between March and October irregularly once a month in studied years. However, we focused on spring and early summer months particularly for reproduction activities. During the daytime, visual searches were made by simply walking around the pond edge and the surrounding of terrestrial habitat to look for amphibians and clusters of their spawn in the water. And also amphibians under refugia such as logs and large stones were also searched.

General observations on the reptile fauna of the region were irregularly made by visual encounter surveys from spring to fall seasons while intensive activity of specimens was clearly seen [13]. Surveys were conducted both daytime and nighttime. Flashlights were used at night patrols. All habitats including water bodies, under rocks, logs and decaying vegetation, and woodlands and bushes up to 5 m were thoroughly searched for the presence of reptiles. All collected specimens were examined carefully and recorded prior to being released back to their original point of capture.

Both amphibian and reptile species were identified by nation-wide guides [14] and websites which provide the latest articles with identification of new species about herpetofauna [15,16]. However, the species former common synonym names were also given in related fauna lists (Table 1,2).

Bird watching was done from 6:30 to 10:00 irregularly per month when weather conditions were suitable. Bird species were identified by naked eyes or professional binocular and documented immediately after observation. Several local, regional and international avian guidebooks were used in the identification process of bird species [17,18]. For nocturnal birds, such as owls, night surveys were carried out.

Mammal surveys were undertaken during different seasons of the year (2005–2019) and the report was compiled. Occasional field surveys were conducted to cover several habitats, like forests, steppe vegetation in Beytepe Campus and surroundings. The most favorable time for observation was between March and July. All

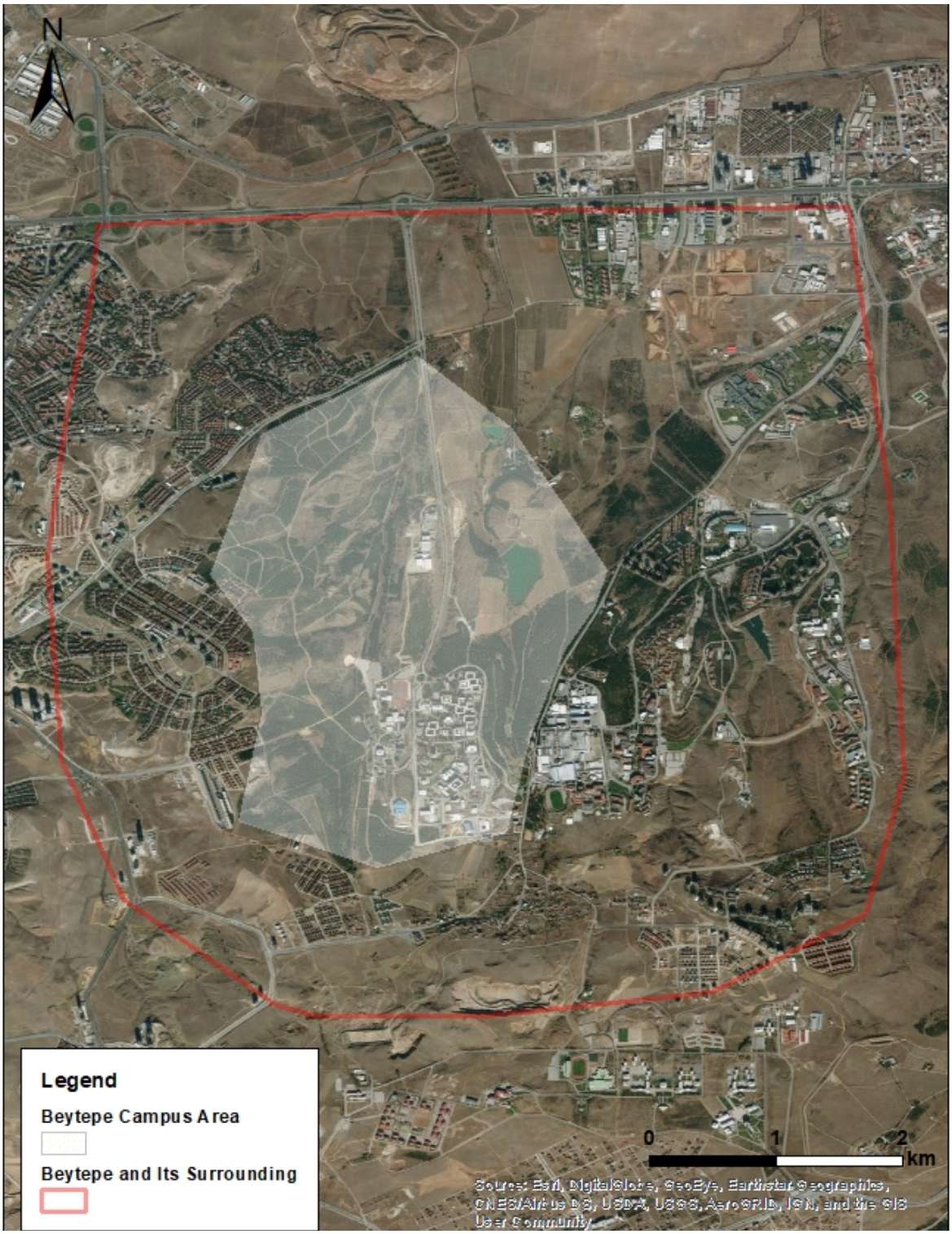

Figure 1. Study area: Beytepe Campus and near environment.

mammal sightings and signs were recorded and identified according to the trustful guide [19]. Active ground searches were undertaken throughout the study site. The survey was principally opportunistic and based on observations by using different techniques. Noninvasive methods such as capturing with camera traps, counting scats, footprints and other remains were used to determine medium and large size mammals like foxes. In the detection of small mammals, Sherman live capture traps were used. Individuals were released after identification of the species. Ultrasonic bat sound recorders (Pettersson D500X), BatSound and BatExplorer computer software were used to identify bat species.

RESULTS and DISCUSSION

The climate regime in the study area is affected by steppe conditions, and the plantation of coniferous trees might have an influence on local climatic conditions. That might provide suitable conditions for several terrestrial vertebrate groups. The results from each class given respectively in below:

A total of 3 amphibian and 11 reptile species were recorded in different areas of the campus (Table 1, 2). According to the recent publishing data, number of amphibian species have been reported from Ankara and entire Turkey are 9 and 33 respectively [20,21] so far. The situation of reptiles in province and country based is 30 and 132 respectively. Therefore, the records from a limited area (Beytepe Campus) is remarkable, compared to the entire country [20,21]. Although herptile species studies are undervalued in urbanized areas of developing countries, like Turkey, there are serious issues that should be focused immediately and efficiently. Because Turkey is about to be in a crisis from a biodiversity perspective [22]. Here, we recommend some crucial take-action plans to monitor amphibian habitat sustainability. For example, focusing on *Pelophylax ridibundus* population level might contribute to assessing aquatic life dynamics in an urban area. On the other hand, there are several studies which are still going on to understand the ecosystem services of reptiles; such as *Ablepharus kitaibelii* habitat preferences, *Emys orbicularis-Trachemys scripta* competition in terms of these action plans. Therefore, this checklist is beneficial for continuous and further studies to understand the urban wildlife in Beytepe Campus scale.

Table 1. The list of amphibians of Beytepe Campus.

ORDO	Scientific Name	*Former Synonym*	Common name	IUCN	BERN	CITES
ANURA	*Bufotes variabilis*	*Pseudepidalea variabilis*	*Varying toad*	DD	APP-III	-
	Pelophylax ridibundus	*Rana ridibunda*	*Eurasian marsh frog*	LC	APP-III	-
	Hyla orientalis	*Hyla arborea orientalis*	*Oriental tree frog*	LC	APP-II	-

Table 2. The list of reptiles of Beytepe Campus.

ORDO	Scientific Name	*Former Synonym*	Common name	IUCN	BERN	CITES
TESTUDINES	*Testudo graeca*		Spur-thighed tortoise	VU	APP-II	APP-II
	Emys orbicularis		European pond turtle	NT	APP-II	-
	Trachemys scripta		Yellow-bellied slider turtle	LC	APP-II	-
SQUAMATA	*Mediodactylus danilewskii*	*Cyrtopodion kotschyi*	Thin-toed gecko	LC	APP-II	-
	Lacerta diplochondrodes	*Lacerta trilineata ssp. diplochondrodes*	Green lizard	-	-	
	Ophisops elegans		Snake-eyed lizard	LC	APP-II	
	Ablepharus kitaibellii		Juniper skink	LC	APP-II	
	Xerotyphlops vermicularis	*Typhlops vermicularis*	Eurasian blind snake	LC	APP-III	
	Natrix natrix		Grass snake	LC	APP-II	
	Elaphe sauromates	*Elaphe quatuorlineata sauromates*	Eastern four-lined ratsnake	LC	APP-II	
	Dolichophis caspius	*Coluber caspius*	Large Whip Snake	LC	APP-III	

Table 3. The list of birds of Beytepe Campus.

ORDO	Scientific Name	Common name	IUCN	BERN	CITES	STATUS*
PODICIPEDIFORMES	*Tachybaptus ruficollis*	Little grebe	LC	APP-II	-	R
	Podiceps cristatus	Great crested grebe	LC	APP-III	-	R
	Podiceps nigricollis	Black-necked grebe	LC	APP-II	-	W
PELECANIFORMES	*Phalacrocorax carbo*	Great cormorant	LC	APP-III	-	R
	Ixobrychus minutus	Little bittern	LC	APP-II	-	R
	Nycticorax nycticorax	Black-crowned night heron	LC	APP-II	-	R
	Ardeola ralloides	Squacco heron	LC	APP-II	-	W
	Casmerodius albus	Great white egret	LC	APP-II	-	W
	Egretta garzetta	Little egret	LC	APP-II	-	R
	Ardea cinerea	Grey heron	LC	APP-III	-	W
	Ardea purpurea	Purple heron	LC	APP-II	-	W
CICONIIFORMES	*Ciconia nigra*	Black stork	LC	APP-II	APP-II	M
	Ciconia ciconia	White stork	LC	APP-II	-	M
ANSERIFORMES	*Alopochen aegyptiacus*	Egyptian goose	LC	APP-III	-	V
	Tadorna ferruginea	Ruddy shelduck	LC	APP-II	-	R
	Anas crecca	Common teal	LC	APP-III	-	W
	Anas platyrhynchos	Mallard	LC	APP-III	-	W
	Anas querquedula	Garganey	LC	APP-III	-	W
	Aythya ferina	Common pochard	LC	APP-II	-	W

Table 3. TThe list of birds of Beytepe Campus. (Continue)

ORDO	Scientific Name	Common name	IUCN	BERN	CITES	STATUS*
ACCIPITRIFORMES	*Pernis apivorus*	European honey buzzard	LC	APP-III	APP-II	M
	Milvus migrans	Black kite	LC	APP-III	APP-II	M
	Neophron percnopterus	Egyptian vulture	EN	APP-III	APP-II	M
	Circaetus gallicus	Short-toed snake eagle	LC	APP-III	APP-II	M
	Circus aeruginosus	Western marsh harrier	LC	APP-III	APP-II	R
	Circus cyaneus	Northern harrier	LC	APP-III	APP-II	W
	Accipiter gentilis	Northern goshawk	LC	APP-III	APP-II	M
	Accipiter nisus	Sparrowhawk	LC	APP-III	APP-II	R
	Buteo buteo	Buzzard	LC	APP-III	APP-II	R
	Buteo rufinus	Long-legged buzzard	LC	APP-III	APP-II	R
FALCONIFORMES	*Falco tinnunculus*	Common kestrel	LC	APP-II	APP-II	R
	Falco peregrinus	Peregrine falcon	LC	APP-II	APP-I	R
GALLIFORMES	*Alectoris chukar*	Chukar partridge	LC	APP-III	-	R
	Perdix perdix	Grey partridge	LC	APP-III	-	R
GRUIFORMES	*Gallinula chloropus*	Moorhen	LC	APP-III	-	R
	Fulica atra	Coot	LC	APP-III	-	W
CHARADRIIFORMES	*Charadrius dubius*	Little ringed plover	LC	APP-II	-	W
	Actitis hypoleucos	Comman sandpiper	LC	APP-II	-	R
COLUMBIFORMES	*Columba livia*	Rock pigeon	LC	APP-III	-	R
	Columba palumbus	Woodpigeon	LC	-	-	W
	Streptopelia decaocto	Collared dove	LC	APP-III	-	R

Table 3. The list of birds of Beytepe Campus. (Continue)

ORDO	Scientific Name	Common name	IUCN	BERN	CITES	STATUS*
STRIGIFORMES	*Athene noctua*	Little owl	LC	APP-II	APP-II	R
	Asio otus	Long-eared owl	LC	APP-II	-	R
CORACIIFOR-MES	*Alcedo atthis*	Kingfisher	LC	APP-II	-	R
	Merops apiaster	Bee-eater	LC	APP-III	-	M
BUCEROTIFOR-MES	*Upupa epops*	Hoope	LC	APP-II	-	N
PICIFORMES	*Dendrocopos syriacus*	Syrian woodpecker	LC	APP-II	-	R
PASSERIFORMES	*Hirundo rustica*	Barn swallow	LC	APP-II	-	N
	Delichon urbicum	House martin	LC	APP-II	-	N
	Anthus campestris	Twany pipit	LC	APP-II	-	W
	Anthus trivialis	Tree pipit	LC	APP-II	-	M
	Anthus pratensis	Meadow pipit	LC	APP-II	-	W
	Motacilla flava	Western yellow wagtail	LC	APP-II	-	W
	Motacilla cinerea	Gray wagtail	LC	APP-II	-	W
	Motacilla alba	White wagtail	LC	APP-II	-	R
	Erithacus rubecula	European robin	LC	APP-II	-	R
	Luscinia megarynchos	Nigtingale	LC	APP-II	-	N
	Phoenicurus ochruros	Black redstart	LC	APP-II	-	W
	Phoenicurus phoenicurus	Redstart	LC	APP-II	-	M
	Saxicola rubetra	Whinchat	LC	APP-II	-	N
	Oenanthe isabellina	Isabelline wheather	LC	APP-II	-	N
	Turdus merula	Blackbird	LC	APP-II	-	R
	Cettia cetti	Cetti's warbler	LC	APP-II	-	R

Table 3. The list of birds of Beytepe Campus. (Continue)

ORDO	Scientific Name	Common name	IUCN	BERN	CITES	STATUS*
PASSERIFORMES	*Hippolais pallida*	Olivceous warbler	LC	APP-II	-	N
	Phylloscopus collybita	Chiffchaff	LC	APP-II	-	R
	Muscicapa striata	Spotted flycatcher	LC	APP-II	-	N
	Ficedula parva	Red-breasted flycatcher	LC	APP-II	-	M
	Aegithalos caudatus	Long-tailed tit	LC	APP-II	-	W
	Parus ater	Coal tit	LC	APP-II	-	R
	Parus caeruleus	Blue tit	LC	APP-II	-	R
	Parus major	Great tit	LC	APP-II	-	R
	Certhia brachydactyla	Short-toed treecreeper	LC	APP-II	-	R
	Lanius collurio	Red-backed shrike	LC	APP-III	-	N
	Lanius minor	Lesser gray shrike	LC	APP-III	-	M
	Lanius nubicus	Masked shrike	LC	APP-III	-	M
	Garrulus glandarius	Jay	LC	-	-	R
	Pica pica	Magpie	LC	-	-	R
	Corvus monedula	Jackdaw	LC	-	-	R
	Corvus frugilegus	Rook	LC	-	-	W
	Corvus cornix	Carrion crow	-	-	-	R
	Corvus corax	Raven	LC	APP-III	-	R
	Sturnus vulgaris	Starling	LC	-	-	R
	Passer domesticus	House sparrow	LC	-	-	R
	Passer montanus	Tree sparrow	LC	APP-III	-	R
	Fringilla coelebs	Chaffinch	LC	APP-III	-	R

Table 3. The list of birds of Beytepe Campus. (Continue)

ORDO	Scientific Name	Common name	IUCN	BERN	CITES	STATUS*
PASSERIFORMES	*Carduelis chloris*	Greenfinch	LC	APP-II	-	W
	Carduelis carduelis	Goldfinch	LC	APP-II	-	R
	Carduelis cannabina	Linnet	LC	APP-II	-	W
	Coccothraustes coccothraustes	Hawfinch	LC	APP-II	-	W
	Emberiza cirtrinella	Yellow hummer bunting	LC	APP-II	-	W
	Emberiza hortulana	Ortolan bunting	LC	APP-III	-	W
	Emberiza schoeniclus	Reed bunting	LC	APP-II	-	R
	Emberiza melanocephala	Black-headed bunting	LC	APP-II	-	N
	Miliaria calandra	Corn bunting	LC	APP-III	-	N

*Status N: nesting, V: vagrant, W:wintering, M: migratory/stopover

The results pointed out that a total number of 93 bird species, belonging to 15 orders. Passeriformes is the largest order and comprised 47 (50%) of the recorded bird species. The rest 47 species (50%) represented the non-passerines, which form the other bird orders (Table 3). According to recent reports, while 324 species were recorded in Ankara, the species number increased up to 478 (364 of them are resident) in Turkey [20,23]. Therefore, avifauna records from Beytepe Campus are remarkable and that's why this area can be identified as an isolated refuge within this metropolis.

The mammalian diversity recorded in the campus till 2019 is represented by 5 orders and 14 species (Table 4). Compared to Turkey (165-168 species) [24], Beytepe Campus and its near environment host 14 species that consist of 8.48% of the entire country's fauna. While 51 mammal species were recorded from Ankara Province, the records from Beytepe Campus shows us that, this isolated refuge does not only provide suitable habitats for other vertebrate groups, but also hosts several mammal species. Most species belong to the Rodentia and Carnivora order followed by Chiroptera.

It is clear that human values, perceptions, and limited city budgets often cause many dilemmas for urban conservation biology. In addition to that, sometimes it is difficult for the general public to comprehend why this biotic diversity should be protected. People directly affect urban vegetation, and as a result urban habitat quality and quantity, due to habitats, defined by vegetation [25]. The rest of the biological community is mostly

Table 4. The list of mammals of Beytepe Campus.

ORDO	Scientific Name	Common name	IUCN	BERN	CITES
EULIPOTYPHLA	*Erinaceus concolor*	Hedgehog	LC	-	-
	Crocidura suaveolens	Lesser shrew	LC	APP-II	-
CHIROPTERA	*Hypsigo savii*	Savi's pipistrelle	LC	-	-
	Pipistrellus pipistrellus	Commen pipistrelle	LC	-	-
LAGOMORPHA	*Lepus europaeus*	European hare	LC	-	-
RODENTIA	*Microtus guentheri*	Mediterranean vole	LC	-	-
	Apodemus witherbyi	Steppe field mouse	LC	-	-
	Apodemus flavicollis	Yellow-necked field mouse	LC	-	-
	Mus macedonicus	Macedonian mouse	LC	-	-
	Mus domesticus	House mouse	LC	-	-
	Rattus rattus	Black rat	LC	-	-
CARNIVORA	*Vulpes vulpes*	Red fox	LC	-	APP-III
	Mustela nivalis	Least weasel	LC	APP-III	-
	Martes foina	Stone marten	LC	APP-III	APP-III

determined by this vegetation template and interactions with other species and its environment [25]. Moreover, fragmentation via constructions is also inherent in cities and might be one of the causes of biodiversity loss. Except for a few exceptional examples, terrestrial vertebrate species feel the pressure of urbanization in their life cycles via several factors, such as habitat loss or fragmentation, destruction to their nests, distanced by ecological corridors, and etc [26-28]. However, campus areas maintain relatively better sites to focus on many kinds of anthropogenic risks on terrestrial or aquatic wildlife sustainability. As a result, Beytepe Campus hosts 8.64% of Turkish herpetofauna, 19.45% of avifauna and 8.48% of mammal fauna elements. We can conclude that isolated areas such as campuses are essential to maintain urban biodiversity [26].

Here, conservation status of recorded species were organized according to the IUCN, BERN, and CITES criteria in related tables (Table 1-4) [29-31]. Species that represent the class were given in Appendix:

Acknowledgments: This study was supported by Hacettepe University Scientific Research Projects Coordination Unit (012 D10 601 001-46).

APPENDIX: Representative species from Beytepe Campus fauna

a Pelophylax ridibundus

b Hyla orientalis

c Testudo graeca

d Ophisops elegans

e Phylloscopus collybita

f Asio otus

g Crocidura suaveolens

h Vulpes vulpes

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