

The bird diversity and conservation recommendations for Mount Zülküf in southeast Anatolia, Türkiye

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Abstract

Birds have a special importance in the exceptionally rich biodiversity of Türkiye; nevertheless, the ornithological importance of some parts of the country is inadequately known. The bird diversity of Mount Zülküf (MZ) was studied together with recommendations for conservation proposals. In total, 26 field surveys were conducted on MZ, which is located 6 km from Ergani district of Diyarbakır province, south-eastern Türkiye. During the field observations, transect line and point count methodologies were used, accompanied by the use of standard ornithological equipment, between April 2017 and April 2018. It was aimed at determining the seasonal status, breeding status, and threatened categories of bird species, together with suggesting conservation proposals. Within the scope of the studies conducted in the limited area over one year, 73 bird species, belonging to 25 families and nine orders were determined. Among the bird species identified, 19 are possible, 16 are probable, and 14 are certainly breeding species for the area; which means that 67% of them have breeding potential in the study area. Among the recorded bird species, there is one globally threatened species, while seven are threatened within Türkiye with many more least concern or data deficient species. Recording the bird diversity of the mountain, together with the existing cultural importance of the area in terms of religious tourism, will help to bring to light the ecotourism potential of the area, and could be used for monitoring the area for conservation plans. Raising awareness of the region's bird diversity, among the local people, will offer nature-based tourism opportunities via ornithology in the region.

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Introduction

Türkiye (Turkey), located in both a geographical and an ecological transition zone between three northern hemisphere continents (Asia, Africa, and Europe), is an important country in the Palearctic region on account of its biological diversity (Ambarlı et al., 2016). The main factors in the shaping of this biological diversity are geological history, landforms, climatic conditions, and the diversity of habitats that occur accordingly in the country. These advantages made it possible for extraordinary species diversity to emerge in this geography. Birds have a special

importance in the exceptionally rich and unique biodiversity in Türkiye due to being situated on two important bird migration routes in the western Palearctic region, and nearly 500 different bird species have been reported from the country (Kirwan et al., 2008; Kızıroğlu, 2015).

South-eastern Anatolia Region has a special importance in this overall diversity related to its special habitats (e.g., mountain, rangelands, steppe areas, arid / semi-arid and river ecosystems), and this part of Türkiye hosts many plant and animal species (Eken et al., 2006), including some species whose European distribution range is just limited to this part of Türkiye (Tucker and Heath, 1994).

Increasing human populations and unsustainable resource consumption threaten many species and natural habitats in many parts of the world (Mittermeier et al., 2011), including Türkiye. Therefore, determination and protection of these conservation values have a great importance for human futures, despite the difficulties of monitoring and protecting very large areas. However, if local conservation opportunities are researched and implemented, areas will be protected, and the development of the local people will also be ensured by the perception of using nature conservatively, via nature-based tourism like birdwatching. The ornithological importance of some parts of Türkiye is inadequately known, both ecologically and taxonomically. Regional faunistic studies on birds are important for understanding the general characteristics of bird populations and their ecological relationships (Koli, 2014). It is quite useful to use a key group, such as birds, for effective conservation activities. In this context, the bird diversity of Mount Zülküf (MZ) is reported together with conservation proposals both for the area and individual bird species.

The aims of this study are: (1) to determine the residential status of the birds in MZ, together with a complete list of the bird species that use the region, (2) to determine the local breeding bird species, (3) to identify the local threatened bird species according to international criteria, and (4) to develop conservation recommendations for effective monitoring of the area. The likelihood of using local bird diversity in terms of ecotourism potential will be discussed, as the promotion of the bird diversity in the area through ecotourism will provide local financial opportunity through conservation.

Material and Methods

Field observations (Table 1) were carried out on MZ and its adjacent surroundings for 26 days during the April 2017–April 2018 period. Observations were performed by standard ornithological equipment, which is composed of binoculars (Nikon, 10×50), telescope (Nikon, 20–60×80), digital cameras (Nikon D7100 with 80–400 mm), GPS (Magellan), and ornithological handbooks (Heinzel et al., 1998; Mullarney et al., 1999). During the ornithological observations, a combination of transect line and point count methodology was used (Bibby et al., 1998), and two main routes were followed: (I) the road leading to the summit of MZ and (II) the second route leading to the northeast direction from the

foothills of the mountain, with eight observation stations on both routes (Table 2). Field studies started in the early hours of the morning and vary between 3 and 7 hours depending on the weather conditions, working pace, and bird presence. An area of approximately 63.55 km² was monitored with binoculars and telescopes on every observation day, including the aforementioned stations. All the data collected during the field studies, such as bird names, numbers, breeding codes, behaviors, habitat characteristics, and weather conditions, were recorded together with any factors threatening birds. For determining breeding species, breeding categories of the European Bird Census Council (EBCC) (Hagemeijer and Blair, 1997) were applied to our observations, such as the presence of breeding bird behavior, nests, and eggs. Evaluations were made by taking the average number of individuals for the related months in which the species was observed for the seasonal status of species. For the systematic lists and national status of bird species, Kirwan et al. (1999) was followed.

Study area

MZ is part of the Taurus Range and has a maximum altitude (a.s.l.) of 1526 m. It is located in the north of Ergani district of Diyarbakır province, and it is bordered by Kralkızı Dam in the east (Fig. 1). In the southern parts of the mountain, there is an Ergani district center. On the summit of the mountain, there are structures and archaeological remains that are important for religious tourism and are considered sacred. The summit of the mount is 6 km from the Ergani district (Işık, 2013). Although the area is generally poor in terms of vegetation, there are some plants that are considered endemic or rare species in the study area (Ertekin and Yıldırım, 2014). Sparse oaks, especially wooded areas close to settlements, gardens, and the rocky areas that stand out towards the top of the mountain, constitute important habitats (Table 3). It is predicted that MZ is of great importance for many bird species as well as its historical and archaeological values with its special habitats such as sparse oak forest and mountain steppes.

Generally, a continental climate prevails in the region and study area. According to meteorological data, the annual average temperature has been reported as 15 °C, the average maximum temperature is 42 °C, and the average minimum temperature is 2.7 °C. The majority of precipitation occurs during the winter (December – February) and spring seasons (March and April), with an average precipitation of 491 mm annually (data from the Turkish State Meteorological Service related to average for 60 years, www.mgm.gov.tr).

Table 1: Number of field excursions for the related years at Mount Zülküf, Türkiye.

Years	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Totals
2017				2	2	1	2	1	2	2	2	2	16
2018	2	3	2	3									10
Totals	2	3	2	5	2	1	2	1	2	2	2	2	26

Table 2: The main observation points and routes for Mount Zülküf, Türkiye.

Route	Main observation points	UTM	Altitude (a.s.l.)
I	1. Station	37 S 565914 E / 4237251 N	1041 m
I	2. Station	37 S 566129 E / 4237788 N	1108 m
I	3. Station	37 S 567570 E / 4238232 N	1217 m
I	4. Station	37 S 566293 E / 4238992 N	1393 m
I	5. Station	37 S 566531 E / 4238743 N	1497 m
II	6. Station	37 S 568877 E / 4239115 N	1024 m
II	7. Station	37 S 570325 E / 4240000 N	1037 m
II	8. Station	37 S 571818 E / 4242995 N	961 m

Table 3: The main habitat types in the study area in the Mount Zülküf, Türkiye.

Number	1	2	3	4	5	6	7	8
Habitat types	Wooded	Garden	Steppe	Scrub	Stream	Rocky	Agricultural land	Settlement

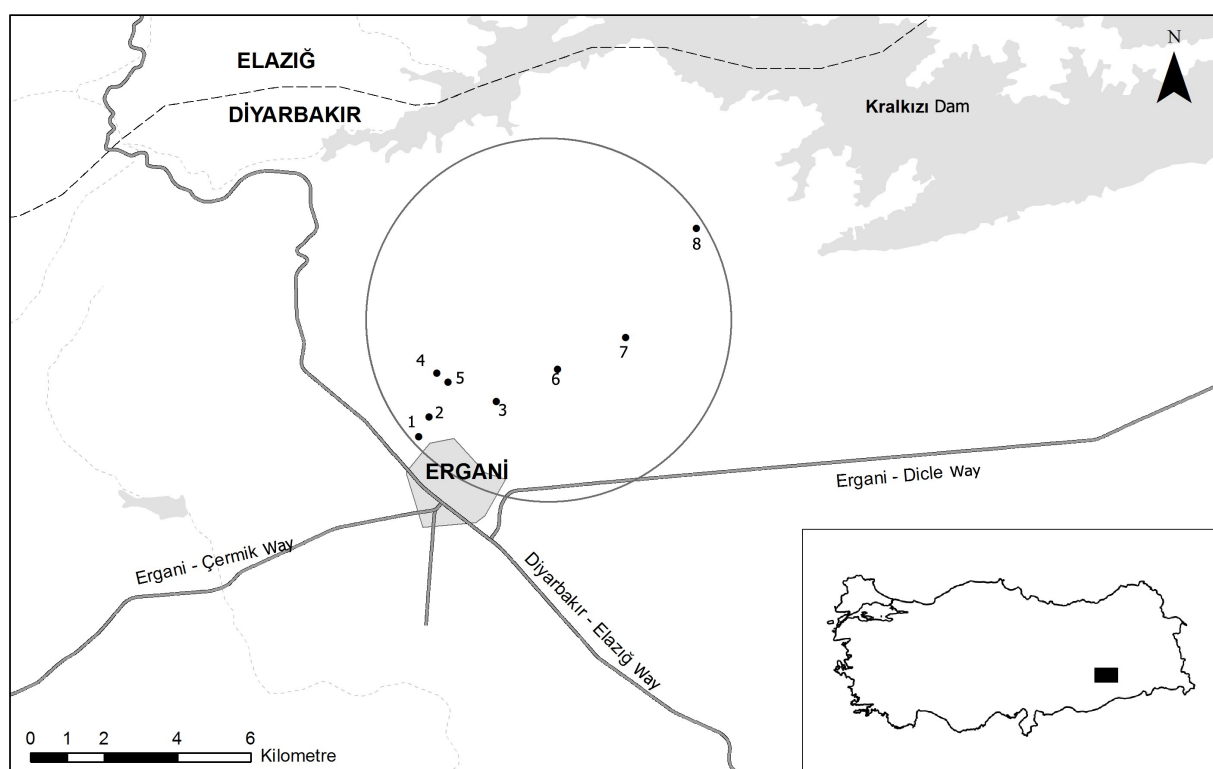


Figure 1: Map of the study area together with location of the observation point around MZ. The map was created with QGIS, an open-source coded GIS software. Data locations are placed on the map according to their coordinate values. (Sources <https://www.harita.gov.tr/urunler/indirilebilir-verilerdosyalar/13>, <https://www.naturalearthdata.com>)

Results

In total, 73 bird species, belonging to 25 families and 9 orders were identified during the field surveys carried out on MZ and its near surroundings over a period of one year (Table 4). It was determined that 53 of the identified bird species belong to the Order Passeriformes while 20 of them belong to the non-passeriformes orders. Among the bird species identified, 19 are possible local breeders, 16 are probable, and 14 are certainly local breeding species for the area. This means that 67% of them have local breeding potential in the study area according to EBCC breeding criteria (Hagemeijer and Blair, 1997). Of the birds observed, 28 were residents, 12 were winter visitors, 22 were summer visitors, and 10

were passage migrants, while one species, the Black-winged kite *Elanus caeruleus* (Desfontaines, 1789), currently is a vagrant on the MZ. Among the recorded bird species, there is one globally threatened species – the Armenian gull *Larus armenicus* Buturlin, 1934- in the near threatened category according to the IUCN (IUCN, 2019) and seven species are threatened for Türkiye (Kılıç and Eken, 2004). Three of them are in the near threatened category: -Long-legged buzzard *Buteo rufinus* (Cretzschmar, 1827), Wood pigeon *Columba palumbus* Linnaeus, 1758 and Roller *Coracias garrulus* Linnaeus, 1758)- while four of them are in the vulnerable category: -Black kite *Milvus migrans* (Boddaert, 1783), Lesser kestrel *Falco naumanni* Fleischer, 1818, House martin *Delichon urbicum*

(Linnaeus, 1758) and Tree sparrow *Passer montanus* (Linnaeus, 1758). At least six of these species that are threatened for Türkiye (Kılıç and Eken, 2004) have the possibility of breeding in the study area. The Armenian gull is not directly dependent on habitats in the study area but uses the area only during daily crossings between where they spend the night and where they feed during the day.

In total, 2025 individuals from 73 different bird species were recorded in the limited area of the one-year study. A large proportion of bird species identified in the area are resident, both for the region and Türkiye. The large number of resident bird species is then followed by those in the summer visitor and winter visitor categories, respectively. The average maximum number of individuals was observed in April, followed by February and July, respectively (Fig. 2). The maximum bird species number was recorded in April as 51 species, followed by May and February with 31 bird species each (Fig. 3). Both the number of bird species and the number of individuals increase during the spring and autumn migration periods.

Although there are several different habitats that could be used by birds on MZ, the eight main habitat types are important and preferred by birds in general. As a result of evaluations, the most preferred habitats are wooded, gardens, rocky areas, scrub, small settlements, then streams, agricultural lands, and steppe areas, decreasing respectively (Fig. 4).

Despite some environmental problems that affect birds negatively, it can be stated that MZ still has some special habitats and shelters many bird species. Also, results suggest that the bird diversity of the area has the potential to contribute to the region economically in various aspects, mainly on account of ecotourism and other tourism potential in the area. Locals should be educated about the historical, cultural, and biological values of the region in order to both protect natural values and obtain income for the locals.

Discussion

Türkiye is revealed as an important country in the western Palearctic region on account of its biological diversity, and birds are one of the most important components of this diversity (Kirwan et al., 2008). There are 35 important biological diversity hotspots in the world, and three of them (Mediterranean basin, Iran-Anatolia, and the Caucasus) intersect in Türkiye (Mittermeier et al., 2011; Ambarlı et al., 2016). Therefore, determining the distribution of bird species in Türkiye is important through ornithological studies.

The birds of MZ were studied regularly and periodically for the first time. Despite the fact that a large portion of the determined bird species are residents or summer visitors to the area, the obtained

data suggest that the area has suitable breeding habitats and that the bird breeding potential of the area is greater than detected. Results of this study were compared with other local studies carried out in the region, and there were no new records for the region (Karakaş and Kılıç, 2004, 2005; Karakaş, 2010, 2017).

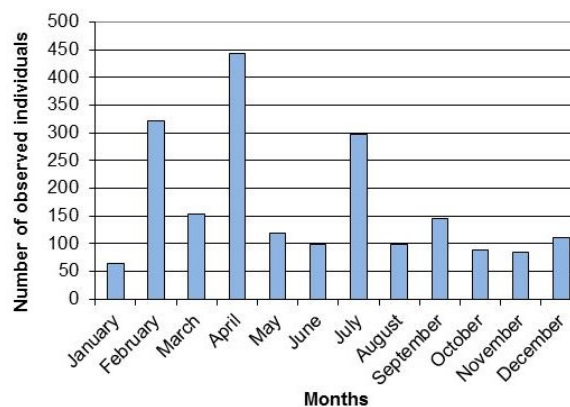


Figure 2: Average bird numbers of any species determined on Mount Zülküf, Türkiye for each month.

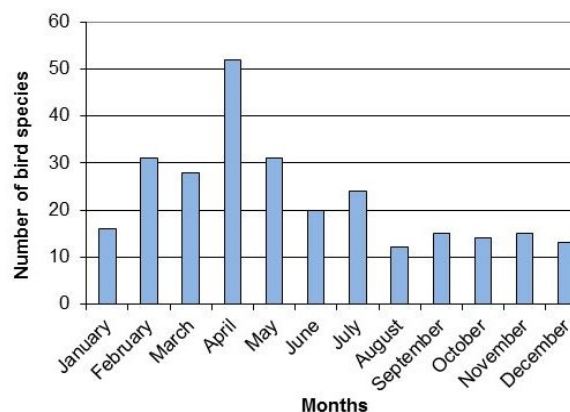


Figure 3: Number of bird species recorded on Mount Zülküf, Türkiye for each month.

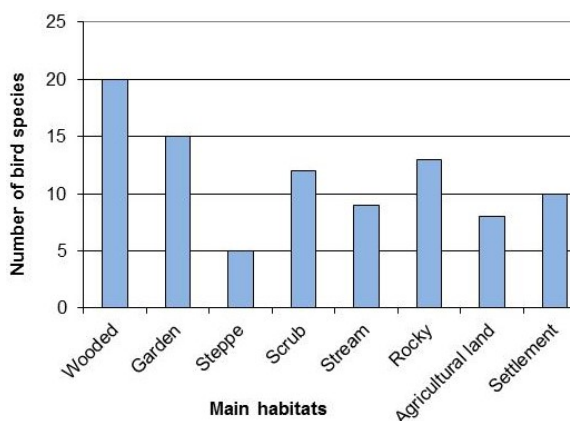


Figure 4: Habitat preferences of bird species identified on Mount Zülküf, Türkiye.

Table 4: Systematic list of the bird species recorded on Mount Zülküf together with average number of individuals for each month. Breeding categories according to the EBCC (1–2 possible breeding, 3–9 probable breeding, 10–16 confirmed breeding) (see Hagemeyer and Blair, 1997), seasonal status (R-Resident, S-Summer visitor, W-Winter visitor, P-Passage migrant, V-Vagrant and categories written in lowercase letters are indicate a less common status (see Kirwan et al., 1999) and risk categories (NE-Not Evaluated, LC-Least Concern, NT-Near Threatened, VU-Vulnerable, EN-Endangered and CR-Critically Endangered (see Kılıç and Eken, 2004).

Order	Family	Species	Months												Breeding category	Seasonal status		Risk status	
			I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		Türkiye	Regional	Türkiye	Global
Ciconiiformes	Ciconiidae	<i>Ciconia ciconia</i> (Linnaeus, 1758)		2	3	1	1	2	2					16	r, S, P	S	LC	LC	
Falconiformes	Accipitridae	<i>Pernis apivorus</i> (Linnaeus, 1758)			1									0	S, P	P	LC	LC	
		<i>Elanus caeruleus</i> (Desfontaines, 1789)			1			1						1	V	V	LC	LC	
		<i>Milvus migrans</i> (Boddaert, 1783)			6										0	S, P, wv	P	VU	LC
		<i>Buteo buteo</i> (Linnaeus, 1758)		1	2	6				2				3	3	R, P, WV	R	LC	LC
		<i>Buteo rufinus</i> (Cretzschmar, 1827)		2	2	2	3			1				1	1	5	R	R	NT
	Falconidae	<i>Falco naumanni</i> Fleischer, 1818			3	1									2	S, wv	S	VU	LC
		<i>Falco tinnunculus</i> Linnaeus, 1758	2	1	1	2	1						2	2	5	R, WV	R	LC	LC
Charadriiformes	Laridae	<i>Larus ridibundus</i> Linnaeus, 1766		58										0	R, WV	R	LC	LC	
		<i>Larus armenicus</i> Buturlin, 1934		30	5	4								0	R	R	LC	NT	
Columbiformes	Columbidae	<i>Columba livia</i> Gmelin, 1789		2	6	18				18	15	2	4	6	13	R	R	LC	LC
		<i>Columba palumbus</i> Linnaeus, 1758		2	6	6			2	4					5	R	R	NT	LC
		<i>Streptopelia decaocto</i> Frivaldszky, 1838		3	4		4				4	4	3		13	R	R	LC	LC
		<i>Streptopelia senegalensis</i> (Linnaeus, 1766)		1		4								2	4	R	R	LC	LC
Strigiformes	Strigidae	<i>Athene noctua</i> (Scopoli, 1769)					1	2		1	1			1	R	R	LC	LC	
Apodiformes	Apodidae	<i>Apus apus</i> (Linnaeus, 1758)			38	8	10	12						6	S, P	S	LC	LC	
Coraciiformes	Meropidae	<i>Merops apiaster</i> Linnaeus, 1758				4	2	6	4	6				13	S, P	S	LC	LC	
	Coraciidae	<i>Coracias garrulus</i> Linnaeus, 1758				2	2							3	S, P	S	NT	LC	
	Upupidae	<i>Upupa epops</i> Linnaeus, 1758				2			1					3	S, P, kg	S	LC	LC	
Piciformes	Picidae	<i>Dendrocopos syriacus</i> (Ehrenberg, 1833)	2	1	8									3	R	R	LC	LC	
Passeriformes	Alaudidae	<i>Calandrella brachydactyla</i> (Leisler, 1814)								10				1	S, P	S	LC	LC	
		<i>Calandrella rufescens</i> (Vieillot, 1820)				10	3	3						1	r, S	S	LC	LC	
		<i>Galerida cristata</i> (Linnaeus, 1758)	6	20	8	24	6	10	20	14	15	10	16	10	12	R	R	LC	LC
			<i>Alauda arvensis</i> Linnaeus, 1758		5	8		3	4					1	Y	R	LC	LC	
			<i>Ptyonoprogne rupestris</i> (Scopoli, 1769)			10								3	S, P, WV	S	LC	LC	
		Hirundinidae	<i>Hirundo rustica</i> Linnaeus, 1758		2	23	10	6	20		15				16	S, P	S	LC	LC
			<i>Delichon urbicum</i> (Linnaeus, 1758)							16					1	S, P	S	VU	LC
			<i>Anthus campestris</i> (Linnaeus, 1758)				2		3		4				1	S, P	S	NE	LC
			<i>Anthus trivialis</i> (Linnaeus, 1758)			1									0	S, P	P	DD	LC
		Motacillidae	<i>Motacilla flava</i> Linnaeus, 1758			6	2		2						1	S, P	S	LC	LC
			<i>Motacilla citreola</i> Pallas, 1776			3									0	S, P	P	LC	LC
		<i>Motacilla cinerea</i> Tunstall, 1771			2									0	R, P, WV	WV	LC	LC	
		<i>Motacilla alba</i> Linnaeus, 1758	5	10	8	6		2						3	R, P, WV	R	LC	LC	

Table 4: (Continued).

Order	Family	Species	Months												Breeding category	Seasonal status		Risk status		
			I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		Türkiye	Regional	Türkiye	Global	
		<i>Cercotrichas galactotes</i> (Temminck, 1820)					3	3	4					3	S, P	S	LC	LC		
		<i>Erethacus rubecula</i> (Linnaeus, 1758)	2	2	4								6	3	0	R, WV, P	WV	LC	LC	
		<i>Phoenicurus ochruros</i> (Gmelin, 1774)	1	1	1	2								1	0	S, WV, P	WV	LC	LC	
		<i>Phoenicurus phoenicurus</i> (Linnaeus, 1758)				3	2							1	1	S, P	S	LC	LC	
	Turdidae	<i>Oenanthe oenanthe</i> (Linnaeus, 1758)				5	2							1	1	S, P	S	LC	LC	
		<i>Oenanthe hispanica</i> (Linnaeus, 1758)				2								0	0	S, P	P	LC	LC	
		<i>Oenanthe finschii</i> (Heuglin, 1869)		2		6	3	8						6	6	S, kg	S	LC	LC	
		<i>Monticola solitarius</i> (Linnaeus, 1758)	1		4	8	2							3	3	R	R	LC	LC	
		<i>Turdus merula</i> Linnaeus, 1758	5	6		10						2		4	4	0	R, WV	WV	LC	LC
		<i>Hippolais pallida</i> (Ehrenberg, 1833)										2			0	S, P	P	LC	LC	
	Sylviidae	<i>Hippolais languida</i> (Ehrenberg, 1833)				4								1	1	S	S	LC	LC	
		<i>Phylloscopus collybita</i> (Vieillot, 1817)			10	10	5	4	10			15	6		2	2	S	S	LC	LC
		<i>Phylloscopus trochilus</i> (Linnaeus, 1758)				2								0	0	P	P	NE	LC	
	Aegithalidae	<i>Aegithalos caudatus</i> (Linnaeus, 1758)		5		6								0	0	R	WV	LC	LC	
	Paridae	<i>Parus major</i> Linnaeus, 1758	4	5	2	6		4					4		6	R	R	LC	LC	
		<i>Parus lugubris</i> (Temminck, 1820)				5								0	0	R	P	LC	LC	
	Sittidae	<i>Sitta neumayer</i> Michahelles, 1830	5	20	15	10	4	6	5				5		12	13	R	R	LC	LC
	Oriolidae	<i>Oriolus oriolus</i> (Linnaeus, 1758)					2	2	2			2			3	3	S, P	S	LC	LC
		<i>Garrulus glandarius</i> (Linnaeus, 1758)	2	5	4	12							2		4	1	R	R	LC	LC
		<i>Pica pica</i> (Linnaeus, 1758)	5	3	5	6	5		5	20	15	6	8	8	16	16	R	R	LC	LC
Passeriformes	Corvidae	<i>Corvus monedula</i> Linnaeus, 1758		3	12		5							3	1	R	R	LC	LC	
		<i>Corvus frugilegus</i> Linnaeus, 1758		2										3	0	R	WV	LC	LC	
		<i>Corvus cornix</i> Linnaeus, 1758			5	5	5							1	1	R	R	LC	LC	
		<i>Corvus corax</i> Linnaeus, 1758		1								2		1	1	R	R	LC	LC	
	Sturnidae	<i>Sturnus vulgaris</i> Linnaeus, 1758				5							2		0	R, WV	WV	LC	LC	
		<i>Passer domesticus</i> (Linnaeus, 1758)	10	20	15	30	10	20	100	10	10	16	16	20	16	16	R	R	LC	LC
	Passeridae	<i>Passer hispaniolensis</i> (Temminck, 1820)				2	10	5	50						12	12	S, p, wv	S	LC	LC
		<i>Passer montanus</i> (Linnaeus, 1758)							5					1	1	R	R	VU	LC	
		<i>Petronia petronia</i> (Linnaeus, 1766)		5		8	4							6	14	R	R	LC	LC	
		<i>Fringilla coelebs</i> Linnaeus, 1758	5	3	6								2	5	0	R, WV	WV	LC	LC	
		<i>Serinus serinus</i> (Linnaeus, 1766)				2									0	R	P	LC	LC	
	Fringillidae	<i>Carduelis chloris</i> (Linnaeus, 1758)						2						1	1	R	R	LC	LC	
		<i>Carduelis carduelis</i> (Linnaeus, 1758)	2		3	12	2	3	3			3	3		13	R	R	LC	LC	
		<i>Carduelis spinus</i> (Linnaeus, 1758)			10	1									0	R, WV	WV	LC	LC	
		<i>Carduelis cannabina</i> (Linnaeus, 1758)				5	2								0	R	P	LC	LC	
		<i>Coccothraustes coccothraustes</i> (Linnaeus, 1758)			2										0	R, WV, P	WV	LC	LC	
		<i>Emberiza citrinella</i> Linnaeus, 1758		3		4									0	s, WV	WV	LC	LC	
	Emberizidae	<i>Emberiza schoeniclus</i> (Linnaeus, 1758)	10	20											0	R, WV, P	WV	LC	LC	
		<i>Emberiza melanocephala</i> Scopoli, 1769				2	3	2	5	6					13	S, P	S	LC	LC	
		<i>Miliaria calandra</i> Linnaeus, 1758	3	10	10	7			6		3		2		12	R	R	LC	LC	

Among the recorded species during this study in MZ; eight of them -Black-winged kite *Elanus caeruleus*, Common wood pigeon *Columba palumbus*, Tree pipit *Anthus trivialis*, Citrine wagtail *Motacilla citreola*, Long-tailed tit *Aegithalos caudatus*, Sombre tit *Parus lugubris*, European serin *Serinus serinus* and Yellowhammer *Emberiza citrinella* were previously not recorded in the Kralkızı Dam area, which is near to the study area (Karakaş and Kılıç, 2005). The Black-winged kite is revealed as a vagrant species in Türkiye (Kirwan, 2008; Karakaş, 2012) and it is still expanding its distribution range in the south-eastern part of Türkiye; probably related to feeding opportunities and suitable breeding areas (Karakaş and Biricik, 2017). It is estimated that this species will probably breed in MZ in the near future, considering the history of the species in Türkiye and in the region.

Conservation of the existing habitats in MZ is important for the future of the bird diversity in the area. Damage or fragmentation of the current habitats will adversely affect the bird population in the area. Conservation of habitats and management are practices that can be implemented with the coordinated and planned action of many components, including official authorities and local units (Eken et al., 2006; Brochet et al., 2016). Habitat degradation and related processes are the main reasons for the extinction of many plant and animal species in many parts of the world, and these affect species, especially via their basic ecological needs such as feeding areas and breeding areas (Sala et al., 2000; Berthier et al., 2012). The numbers of breeding birds in any area are limited by two important factors, which are accessible food sources and available nesting sites (Franco et al., 2005; Catry et al., 2013) and these two basic parameters also determine the carrying capacity of the environment for breeding bird species in any given area. It could be stated that the habitat characteristics of MZ are diverse enough to allow breeding and feeding of many bird species, and the carrying capacity of the area is high due to the fact that 67% of the determined bird species in the area have breeding potential.

Fragmentation, degradation, and loss of habitats are considered among the main causes of the population decrease of many species, including birds, in many parts of the world (Tucker and Heath, 1994; Birdlife, 2004). As a result of human disturbance coupled with intensifying industrial activity and agricultural practices, many natural ecosystems in Türkiye — including Diyarbakır—are losing their natural qualities, putting numerous species at risk (Eken et al., 2006). It is well known that each species is a component of the ecosystem in which it lives, and the species composition of any ecosystem is a reflection of ecological relationships and evolutionary history in that environment. Therefore, protection of areas with holistic approaches will be more beneficial for

effective conservation of ecosystems in the long term, rather than for a single species or group.

As in many parts of Türkiye, illegal hunting is a big problem and negatively affects the bird species in MZ, as do agricultural pesticides, unplanned construction, overgrazing, stubble burning, and uncontrolled mass tourism activities. For example, in a recent floristic study that was conducted in the area covering MZ, it was stated that the region has rich plant diversity, along with some endemic species, but vegetation destruction by overgrazing and deforestation is reported as a problem (Ertekin and Yıldırım, 2014).

Birds can be an important instrument for monitoring environmental changes (Khan and Pant, 2017) including the simple presence or absence of some bird species in a particular area can provide information on environmental pollution and habitat quality. In this sense, both the distribution range and breeding success of birds have frequently been used to examine the long-term effects of habitat loss and fragmentation on populations (Harisha and Hosetti, 2009; Koli, 2014).

Religious tourism activities provide significant economic contributions to the local people in many places in Türkiye (Özgen, 2012). MZ is visited by many people in different periods of the year because it is considered sacred and has important faith tourism potential. Our study showed that MZ has good bird potential, and this should be assessable for bird watching activities on account of ecotourism. Bird-related ecotourism potential of the study area is such that it can further increase the existing visitor potential in relation to faith tourism and this will help local people and incomes. As many bird species are threatened directly or indirectly (Birdlife, 2000), bird watching could be a good tool to raise environmental awareness in people (Cordell and Herbert, 2002; Şekercioğlu, 2002) together with economic contribution to the local people (Redford and Richter, 1999). Ecotourism is an effective instrument for preserving and enhancing the natural environment and cultural heritage. Furthermore, it is expected to enhance the region's current tourism potential with respect to religious tourism.

Conclusions

The bird diversity of MZ and its immediate surroundings was studied, and the obtained results provide valuable information on the bird diversity of the area, which could be used for monitoring the area for long-term conservation plans. The summit of the mountain is visited by many people in different parts of the year because it is considered sacred and has important faith tourism potential. Findings indicated that the mentioned area has a good potential for birds, and because of ecotourism, this should be evaluated for birdwatching activities. The bird-

related ecotourism potential of the study area is enough to increase the current visitor potential of the area regarding faith tourism with plant diversity, including some endemic ones, and this will help local incomes. Raising awareness of the region's bird diversity among the local people will offer nature-based tourism opportunities via ornithology in the region.

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Author contributions

A.A. and R.K. conducted the fieldwork and collected all data. R.K. analysed data contributed to results interpretation. R.K. was the major contributor in writing the manuscript.

Conflicts of interest

All the authors declare that there are no conflicting issues related to this research article.

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