

## Ornithofauna of Bartın Sökü Wildlife Development Area

İlkan KALKAN<sup>1</sup>, Nuri Kaan ÖZKAZANÇ<sup>2,\*</sup>

<sup>1</sup> Amasya Regional Directorate of Forestry, Alaçam Forest Management Directorate, Kuruçay Forest Management Chief, 55800, Samsun, Türkiye

<sup>2,\*</sup> Bartın University, Faculty of Forestry, Department of Forest Engineering, 74100, Bartın, Türkiye

### Article History

Received: 23.11.2023

Accepted: 13.02.2024

Published: 23.04.2024

### Research Article



**Abstract** – Birds, which are important elements of biodiversity, are also an indicator of an ecosystem. However, this is only possible by knowing the bird species living in each region and their population densities. For this purpose, this study that we did, have based on two years of field observations. As a result of the observations and field studies carried out by point counting and line counting methods on nine different test routes, the species identified were identified, and their densities and their status in the area were determined. Guidebooks were used to determine the species obtained of from the observations. As a result of the study, 53 different bird species belonging to 11 orders and 23 families were identified in the study area. Among the bird species identified, the Passeriformes order is the most common order in the area, with 34 different species, followed by the Falconiformes order, with five different species. They were identified species from Muscicapidae 8, Fringillidae 5, Paridae 4, Turdidae 4, Corvidae 3, Motacillidae 2, Sylviidae 2 and other families 1 in the Passeriformes order. In addition, 34 species identified in the area were native, 13 were summer migrants, 3 were winter migrants, and the remaining 3 were transit birds. Although it is a protected area, the intensive use of this area for wood production and the high hunter pressure in the area has been identified as the most important problems affecting the populations of bird species in the region. Determining the bird species of the Sökü Wildlife Development Area, where large mammal wild animals were previously identified, will contribute to other biodiversity studies to be carried out in the region.

**Keywords** – Sökü Wildlife Development Area, bird, ornithofauna, biodiversity

## Bartın Sökü Yaban Hayatı Geliştirme Sahasının Ornitofaunası

<sup>1</sup> Amasya Orman Bölge Müdürlüğü, Alaçam Orman İşletme Müdürlüğü, Kuruçay Orman İşletme Şefliği, 55800, Samsun, Türkiye

<sup>2,\*</sup> Bartın Üniversitesi, Bartın Orman Fakültesi, Orman Mühendisliği Bölümü, 74100, Bartın, Türkiye

### Makale Tarihi

Gönderim: 23.11.2023

Kabül: 13.02.2024

Yayın: 23.04.2024

### Araştırma Makalesi

**Özet** – Biyolojik çeşitliliğin önemli unsurlarından olan kuşlar aynı zamanda bir ekosistemin göstergesidir. Ancak bu durum her bölgede yaşayan kuş türleri ve onların popülasyon yoğunluklarının bilinmesi ile mümkün olmaktadır. Bu amaçla yaptığımız bu çalışma yaklaşık 2 yıllık arazi gözlemlerine dayanmaktadır. Dokuz farklı deneme güzergahta nokta sayım ve hat boyu sayım yöntemleri yapılan gözlem ve arazi çalışmaları sonucunda tespit edilen türlerin teşhisleri yapılmış, alandaki yoğunlukları ile yine alandaki statüleri belirlenmiştir. Gözlem sonucunda elde edilen türlerin belirlenmesinde rehber niteliği taşıyan kitaplardan yararlanılmıştır. Yapılan çalışma sonucunda çalışma alanında 11 takıma bağlı, 23 familyaya dahil 53 farklı kuş türü tespit edilmiştir. Tespit edilen kuş türlerinden Passeriformes takımı 34 farklı tür ile alandaki en yaygın takımı oluştururken, bunu 5 farklı türün tespit edildiği Falconiformes takımı izlemektedir. Passeriformes takımında ise sırası ile Muscicapidae familyası 8, Fringillidae 5, Paridae 4, Turdidae 4, Corvidae 3, Motacillidae ve Sylviidae familyaları 2 diğeri ise 1'er tür olarak belirlenmiştir. Ayrıca alanda tespit edilen türlerin 34'ü yerli, 13'ü yaz göçmeni, 3'ü tür kış göçmeni ve kalan 3'ü ise transit geçiş kuşu olarak gözlemlenmiştir. Bir korunan alan olmasına rağmen bu sahanın aynı zamanda odun üretimi açısından çok yoğun olarak kullanılması ve saha da avcı baskısının çok olmasının bölgedeki kuş türlerinin popülasyonlarını etkileyen en önemli problem olarak tespit edilmiştir. Daha öncesinde büyük memeli yaban hayvanlarının tespit edildiği Sökü Yaban Hayatı Geliştirme Sahası'nın kuş türlerinin belirlenmesi bölgede yapılacak olan diğer biyolojik çeşitlilik çalışmalarına katkı sağlayacaktır.

**Anahtar Kelimeler**– Sökü Yaban Hayatı Geliştirme Sahası, kuş, ornitofauna, biyolojik çeşitlilik

<sup>1</sup>  kalkanilk@hotmail.com

<sup>2</sup>  nozkazanc@bartin.edu.tr

\*Corresponding Author / Sorumlu Yazar

## 1. Introduction

It is estimated that there are approximately 18,000 species of birds, which constitute an important class of the living world (Synider, 2016), and that the world population of these species is approximately between 200 billion and 400 billion (Gaston and Blackburn, 1997). However, it is reported that about 95% of today's birds have been identified, and many new species or subspecies may emerge in some studies conducted by examining bird feathers (Synider, 2016). Birds are part of the world's species diversity and have some ecological functions such as pest control and natural seed transportation (Tabur and Ayvaz, 2010). It is possible to list the benefits of birds for the ecosystem as cleaning carrion and waste, controlling the populations of harmful species, pollination, and seed dispersal (Şekercioğlu, 2006). In particular, the return of many fruit seeds eaten by birds to the soil with feces and their germination is very effective in plant geographical distribution and spread (Tabur and Ayvaz, 2010). In addition, it is also known that some bird species bury plant seeds in the soil for different purposes and contribute to the growth of many trees in forests (Çanakçıoğlu and Mol, 1996). Species change in birds, a crucial ecosystem indicator, differentiation of migrations, and changes in populations provide us with information about ecosystem changes (Şekercioğlu et al., 2007).

With its different geographical structure and ecosystem characteristics, Türkiye has a biodiversity that stands out in the Palearctic region. Özay and Özkazanç (2022) reported the number of bird species in Türkiye as 491, it has now reached 500, with 9 species added to the fauna today (URL1). However, 38 of these species have not been seen in Türkiye for a long time. The Türkiye high number of species in Türkiye is because two bird migration routes from Europe to Africa pass through Anatolia, which is the most important (Dizdaroğlu, 2015). However, despite the high species diversity, the low population levels of many species are seen as an essential problem for our country. On a global scale, nearly 200 bird species have been negatively affected for different reasons in the last three hundred years (Tabur and Ayvaz, 2010). In the 20th century, the causes of this increasing extinction (Turan, 1990) were listed by Özkazanç and Özay (2019) as human activities, increased natural enemies, abnormal climatic conditions, and natural disasters.

It is possible to observe birds which with a wide range of life areas and habitat preference characteristics between 0-6,000 meters altitude. These values can sometimes reach up to 11,500 meters during migration (Özay and Özkazanç, 2022). Wordatlas (2019) lists the highest altitudes that some species can reach during migration as follows; stork 4,800 m., coastal mud snipe 6,000 m., mallard duck 6,500 m., bearded vulture 7,300 m., mountain crow 8,000 m., swan 8,200 m., red vulture 11,300 m.

Birds, which have adapted to many different ecosystems, from poles to deserts, from dunes to wetlands, from steppes to forests, can increase both their species diversity and their populations in that area depending on the habitat quality (Özay and Özkazanç, 2022). Forested areas have a very important place among the birds' habitats due to their size and the different life characteristics they harbor.

Observing and studying birds, which are in integrity with human beings in many moments of life, has become the passion of many people from past to present. Birdwatching, which started to spread in the early 1800s, is based on watching and observing birds in their natural habitat. This activity, which has gradually increased over time, has become an ecotourism activity that even governments support (Lee et al., 2010). The birdwatching activity, which is carried out with two different methods, consists of the point count method, which is done by hiding at specific points, and the transect or along-line count method, which is done by walking on designated routes (Bibby et al., 2000; Buckland, 2006; Hamel et al., 1996; Ralph et al., 1997).

In this context, to determine the spatial and temporal analysis of bird species in our country, bird species and population sizes living in many different ecosystems have been investigated, and different data belonging to the birds of that region have been obtained. Some of these studies conducted in the last ten years are given in Table 1.

Table 1

In the last ten years, some ornithofauna studies have been conducted at the provincial level in Türkiye.

Autor	Year	Provincial	R	SM	WM	T	Total
Kızılkaya et al.	2013	Denizli	49	39	29	35	162
Topal	2014	Kocaeli	28	13	3		44
Kızılkaya	2014	Denizli	50	39	23	20	132
			51	35	18	23	127
Aslan	2015	Kastamonu					54
İliker et al.	2015	Kırıkkale	93	82	51	37	263
Kaya	2015	Edirne	47	37	17		101
Yaşa	2015	Kocaeli	42	21	22	8	93
Uğış et al.	2016	Kastamonu	8	8		1	17
			9	10	1	2	22
Uysal	2016	Çanakkale	60	59	55	52	226
Avcı et al..	2017	Muş	55	68	14	11	144
Aksan and Mert	2016	Isparta	47	5	4	43	99
Özkazanç	2016	Bartın	13	27		10	50
Azizoğlu and Adızel	2017	Hakkari	29	61	8	26	124
Çelik and Durmuş	2017	Van	32	49	4	6	91
Türnüklü	2017	Afyonkarahisar	56	51	13	25	145
Barış	2017	Mardin	49	52	14	26	111
Günay	2017	Çanakkale	38	1	1	59	99
Ünal	2017	Hatay				29	45
Şirin and Kızılocak	2017	Tekirdağ	45	31	3	6	98
Tunç	2017	Antalya	69	73	31	26	199
Cenger	2018	Muş	59	74	21	18	172
Acar	2018	Bitlis-Muş	51	22	92	8	173
Atabey	2018	Diyarbakır	28	12	23	9	73
Azizoğlu	2018	İstanbul	38	32	74	55	199
Süel et al.	2018	Burdur	42	18	11	1	72
Çelik	2018	Batman	98	64	17	9	188
Simsar	2019	Afyon	49	25	17	17	108
Alar and Nergiz	2019	Artvin	34	32	3	19	88
Büyük	2019	Adıyaman	35	16	15	6	73
Keten et al..	2019	Düzce	39	33	18	39	129
Albağ	2019	İstanbul	53			115	171
Fındık	2019	İzmir	36	25	17	12	90
Yılmaz	2019	İstanbul	41	20	12	35	108
Baykan	2019	Çankırı	115	56	6	5	182
Özkazanç et al.	2019	Eskişehir	103	78	24	5	210
Yaşa	2020	Kocaeli	29	8	4	2	43
Doğan	2020	Tekirdağ	43	25	22	28	118
Bağrıaçık	2020	Van	34	45	2	8	89
Öztemel	2021	Balıkesir	26	7	4	14	51
		Hatay	26	15	4	9	54
		Kırklareli	19	13	10	25	67
Aydın	2021	Bolu	81	49	8	19	165
Uysal and Uysal	2021	Çanakkale	35	30	43	46	154
Çelik	2021	İzmir	83	81	57	48	269
Çoban and Özmen	2022	Giresun	51	36	34	56	181
Gök and Adıgüzel	2022	Van	42	64	7	28	141
Doğan	2022	Çanakkale					83
Gökşen	2022	Adıyaman	24	41		7	72
Zehiroğlu	2022	İstanbul					94
Buruk	2022	Trabzon	24	51	15	42	132
Özten	2022	Burdur	38	21	20	26	105
Özay and Özkazanç	2022	Eskişehir	100	76	21	6	206
Urhan et al.	2022	Denizli	58	35	16	34	143
Mengen	2023	Trabzon	42	29	23	26	120
Oran	2023	Sakarya	44	15	12		88
Atille	2023	Van	10	59	9	11	89

R: Resistant, SM: Summer migration, WM: Winter migration T: Transit

As can be seen, bird species identified in studies conducted in different regions differ in number and status. In this context, Bartın-Ulus Sökü Wildlife Development Area, where the study was conducted, is in a very important position in terms of both habitat and wildlife diversity. Previously, Özkazanç et al. (2017) investigated the mammalian wild animals in the area and identified 12 large mammals at the end of the study. However, a study to determine the bird species in the area, which is a very important protected area for our country and the Western Black Sea region, has not been conducted before. In this context, this study was conducted to determine the bird species distributed in the area.

## 2. Material and Method

### 2.1. Material

In the field studies conducted to identify bird species in the study area, 10x42 binoculars, x60 bird telescope, digital cameras, 150-600 mm and 400 mm tele objective lenses, hiding tents, and nets were used to observe, identify and document the species. GPS was used to determine the observation points and paths along the lines, and a notebook was used to record field data, weather, time, and other information about the observation day. Bird identification guides were used to identify and verify the observed birds such as Turan (1990), Svensson et al. (2016), Porter et al. (1996), Furtun (2021), Kiziroğlu (2009).

### 2.2. Study area

Sökü Wildlife Development Area, which was declared as a wildlife development area with the decision of the Council of Ministers published in the Official Gazette dated 26.10.2005 and numbered 26310, covers an area of 6374,31 hectares within the administrative borders of Bartın and Karabük provinces. In terms of forest management, approximately 95% of the area, which is located within the service area of Ulus Forest Management Directorate, consists of beech and fir forests and yellow pine, larch, oak, hornbeam, ash, poplar, yew, maple, plane, and walnut trees are also encountered. Although it is located in the Black Sea climate zone, winters in the study area are very harsh, and snow thickness reaches 2-3 meters. The site's highest point, where the average elevation is 1400 m, is Erenler Hill, with an altitude of 1700 m (Özkazanç et al., 2017) (Figure 1).

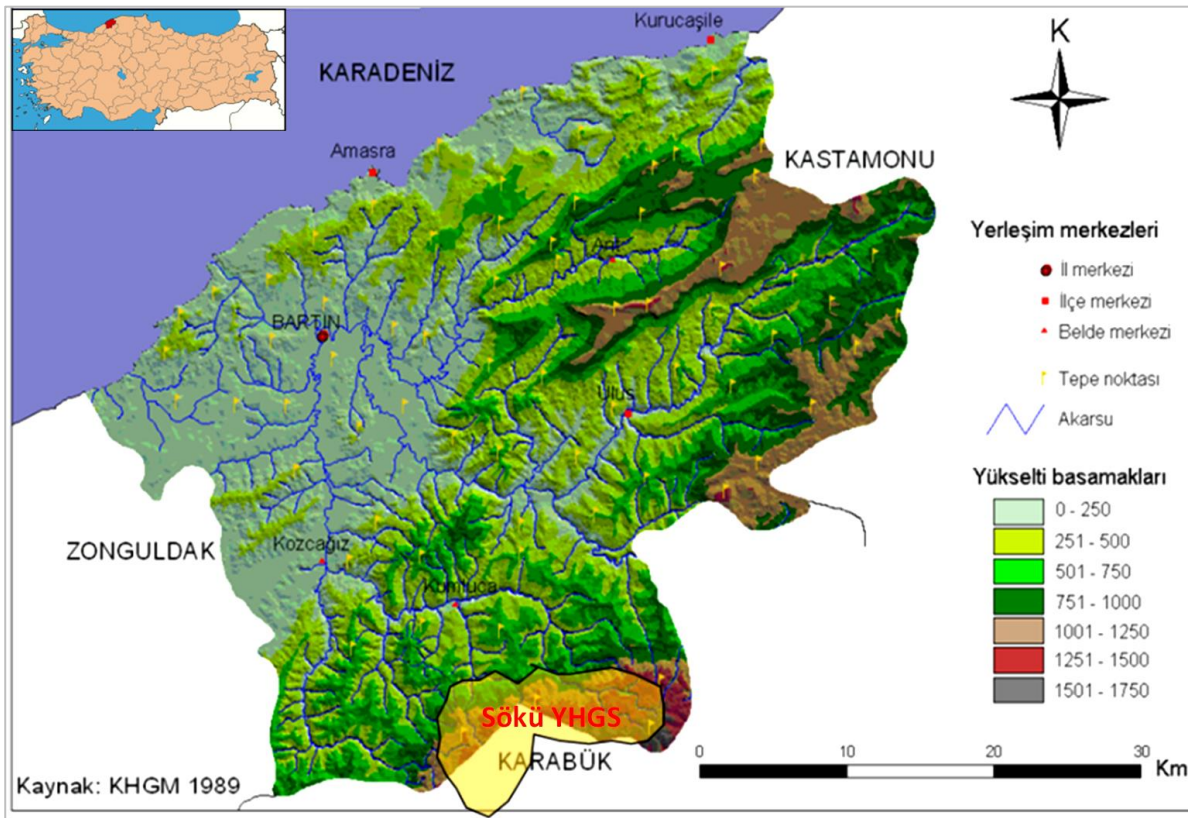
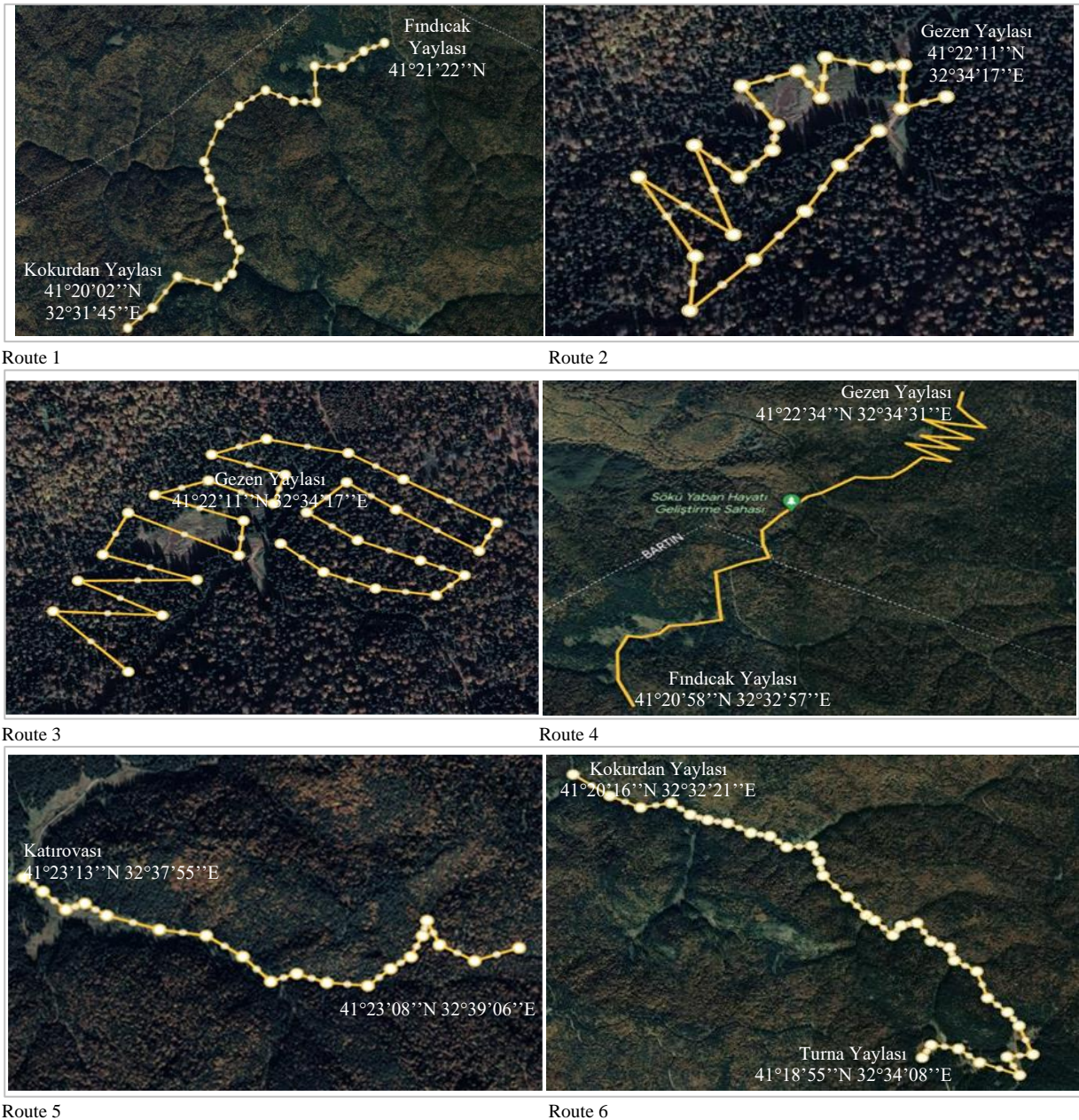


Figure 1. Sökü Wildlife Development Area geographical location.

### 2.3. Method

Two different methods were used to identify bird species in the study area: point count and along-the-lines count. These methods were defined according to the same principles by Ralph et al., 1997, Hamel et al., 1996, Bibby et al., 2000, and Buckland, 2006. The point count method is applied by waiting under camouflage tents or nets at predetermined points in the area. Depending on the characteristics of the area, not only the species but also the characteristics of the use of the area by birds are determined during the observations made by waiting for one or several hours. In the transect or line count method, birds were observed walking briskly from a point or, where applicable, moving vehicle. When this method was applied, species were stopped when they were seen, and information about the species seen was recorded in the field notebook. Depending on the nature of the terrain and the weather conditions, short-term point counting methods were also applied by stopping every 1/2, 1, or 1.5 hours or every 1, 2, or 3 km and taking breaks of 30-45 or 60 minutes. Photographs were taken to document the bird species observed in both methods.

Line length counting method was performed on nine different routes in the study area, and these routes are given in Figure 2.



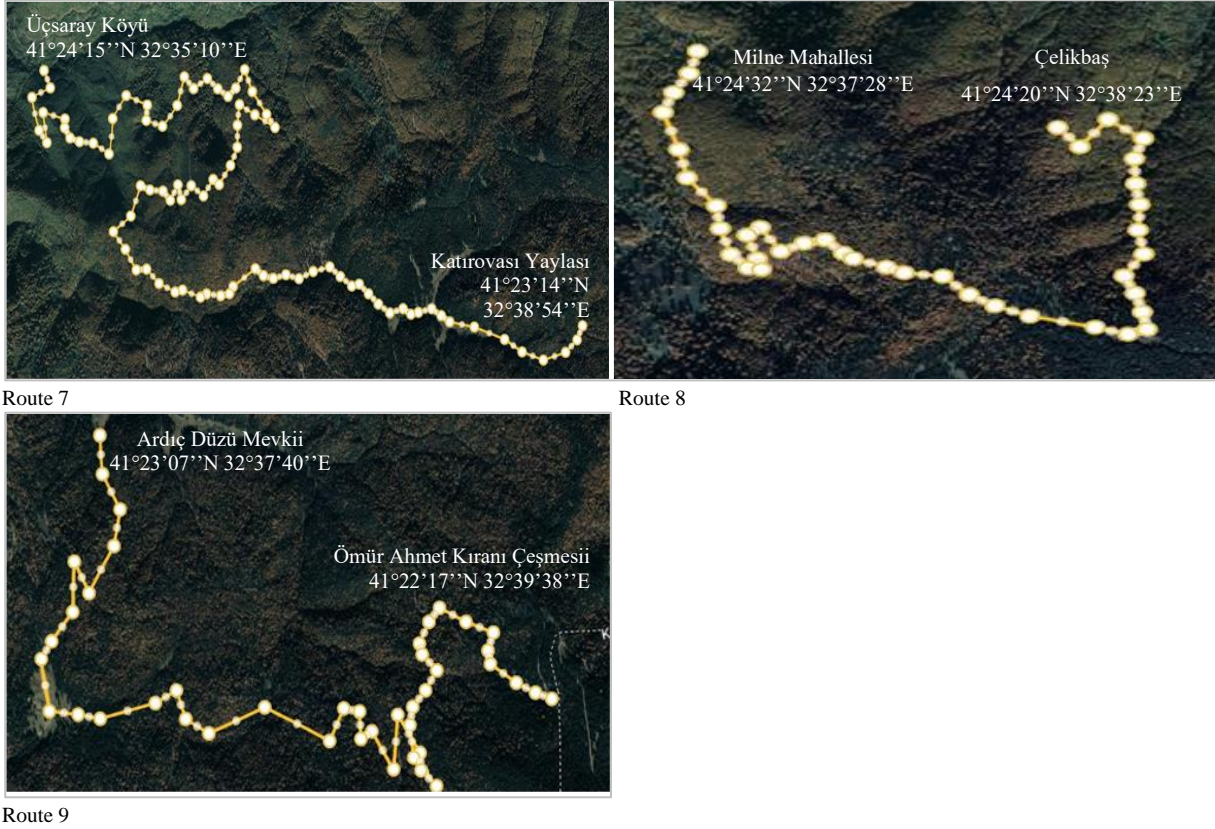


Figure 2. Routes used in the line length counting method.

### 3. 3. Results and Discussion

As a result of the field studies and bird observations in Sökü Wildlife Development Area, 53 different bird species from 23 families belonging to 11 orders were identified. The observation information of the identified bird species, their characteristics in the area, and their global scale status are given in Table 2.

Table 2

Bird species detected in Sökü Wildlife Conservation Area and their status

Ordo	Family	Latin	Common name	IUCN*	Cites	Route	Status*
APODIFORMES	Apodidae	<i>Apus melba</i> (L.)	Alpine Swift	LC	-	1	SM
CHARADRIIFORMES	Scolopacidae	<i>Scolopax rusticola</i> L.	Eurasian Woodcock	LC	-	1	WM
CICONIIFORMES	Ardeidae	<i>Ardea cinerea</i> L.	Grey Heron	LC	-	9	R
		<i>Ciconia nigra</i> (L.)	Black Stork	LC	List II	7-9	SM
COLUMBIFORMES	Columbidae	<i>Columba livia</i> Gmelin,	Rock Dove	LC	-	1	R
		<i>Columba palumbus</i> L.	Common Wood Pigeon	LC	-	1-2	R
		<i>Streptopelia turtur</i> (L.)	European Turtle Dove	LC	-	1-2	SM
CORACIIFORMES	Upupidae	<i>Upupa epops</i> (L.)	Eurasian Hoopoe	LC	-	2-9	SM
CUCULIFORMES	Cuculidae	<i>Cuculus canorus</i> L.	Common Cuckoo	LC	-	1-2-4	SM
		<i>Accipiter gentilis</i> (L.)	Northern Goshawk	LC	List II	1	R
		<i>Accipiter nisus</i> (L.)	Eurasian Sparrowhawk	LC	List II	1	R
FALCONIFORMES	Accipitridae	<i>Buteo buteo</i> (L.)	Common Buzzard	LC	List II	1-2-3-4-5-6-7-8-9	R
		<i>Falco peregrinus</i> Tunstall	Peregrine Falcon	LC	List I R	1	R
		<i>Falco subbuteo</i> L.	Eurasian Hobby	LC	List II	1	SM

Table 2  
(continues)

Ordo	Family	Latin	Common name	IUCN*	Cites	Route	Status*	
GRUIFORMES	Gruidae	<i>Grus grus</i> (L.)	Common Crane	LC	List II	1	T	
	Aegithalidae	<i>Aegithalos caudatus</i> (L.)	Long-tailed Tit	LC	-	2-3-4	R	
	Corvidae		<i>Corvus corax</i> L.	Northern Raven	LC	-	1-2-3- 4-5-6- 7-8-9	R
			<i>Corvus corone</i> L.	Hooded Crow	LC	-	1-3-4- 8	R
			<i>Garrulus glandarius</i> (L.)	Eurasian Jay	LC	-	1-2-4- 8	R
			<i>Carduelis carduelis</i> (L.)	European Goldfinch	LC	-	1-2	R
			<i>Carduelis chloris</i> (L.)	European Greenfinch	LC	-	1-2-4	R
	Fringillidae		<i>Pyrrhula pyrrhula</i> (L.)	Eurasian Bullfinch	LC	-	1	R
			<i>Fringilla coelebs</i> L.	Common Chaffinch	LC	-	1-2-3- 4-5-6- 7-8-9	R
			<i>Fringilla montifringilla</i> (L.)	Brambling	LC	-	3-8	WM
			<i>Hirundo rustica</i> L.	Barn Swallow	LC	-	1-2-4- 6-7-9	SM
	Laniidae		<i>Lanius collurio</i> L.	Red-backed Shrike	LC	-	1-2	SM
			<i>Motacilla alba</i> L.	White Wagtail	LC	-	1-2-6- 7-9	R
	Motacillidae		<i>Motacilla cinerea</i> Tunstall	Grey Wagtail	LC	-	1-2-7- 9	R
			<i>Erithacus rubecula</i> (L.)	European Robin	LC	-	1-2-9	R
			<i>Ficedula semitorquata</i> (Homeyer)	Semicollared Flycatcher	LC	-	1	SM
			<i>Ficedula albicollis</i> (Temminck)	Collared Flycatcher	LC	-	1	T
			<i>Luscinia megarhynchos</i> Chr. L. Brehm;	Common Nightingale	LC	-	1	SM
	Muscicapidae		<i>Muscicapa striata</i> (Pallas)	Spotted Flycatcher	LC	-	1-2	SM
			<i>Phoenicurus ochruros</i> (Gmelin)	Black Redstart	LC	-	1	R
		<i>Phoenicurus phoenicurus</i> (L.)	Common Redstart	LC	-	1	SM	
		<i>Saxicola rubetra</i> (L.)	Whinchat	LC	-	5	T	
		<i>Parus ater</i> L.	Coal Tit	LC	-	3-8	R	
Paridae			<i>Parus caeruleus</i> L.	Eurasian Blue Tit	LC	-	1-2	R
			<i>Parus major</i> L.	Great Tit	LC	-	1-2	R
			<i>Parus palustris</i> L.	Marsh Tit	LC	-	1	R
Passeridae			<i>Passer domesticus</i> (L.)	House Sparrow	LC	-	1-2-9	R
Sittidae			<i>Sitta europaea</i> L.	Eurasian Nuthatch	LC	-	9	R
Sylviidae		<i>Phylloscopus collybita</i> (Vieillot)	Common Chiffchaff	LC	-	1-2	SM	
		<i>Regulus regulus</i> (L.)	Goldcrest	LC	-	1-2-4	R	
Troglodytidae		<i>Troglodytes troglodytes</i> L.	Eurasian Wren	LC	-	1-2	R	
		<i>Turdus merula</i> L.	Common Blackbird	LC	-	1-2-3- 4-5-6- 7-8-9	R	
Turdidae		<i>Turdus philomelos</i> Chr. L. Brehm	Song Thrush	LC	-	1-2-4- 9	R	
		<i>Turdus pilaris</i> L.	Fieldfare	LC	-	1	WM	
		<i>Turdus viscivorus</i> L.	Mistle Thrush	LC	-	1-2-4- 5-6-7- 9	R	

Table 2  
(continues)

Ordo	Family	Latin	Common name	IUCN*	Cites	Route	Status*
PICIFORMES		<i>Dendrocopos major</i> (L.)	Great Spotted Woodpecker	LC	-	1-2-9	R
	Picidae	<i>Dendrocopos minor</i> (L.)	Lesser Spotted Woodpecker	LC	-	1	R
		<i>Picus viridis</i> L.	European Green Woodpecker	LC	-	1-2	R
STRIGIFORMES	Strigidae	<i>Strix aluco</i> L.	Tawny Owl	LC	List II	1-2-9	R

LC: Least concern, R: Resistant, SM: Summer migration, WM: Winter migration T: Transit

At the end of the studies, 34 of the 53 bird species identified in the area are members of the Passeriformes order. With five different species, Falconiformes order ranked second, while Columbiformes 3, Ciconiiformes 2, and Piciformes 2 were represented respectively in the area with species. Only one species was identified from the other orders (Figure 3). The distribution of the species in Passeriformes, where most species were found, according to families, is as follows. Muscicapidae 8, Fringillidae 5, Paridae 4, Turdidae 4, Corvidae 3, Motacillidae and Sylviidae 2, others 1 species.

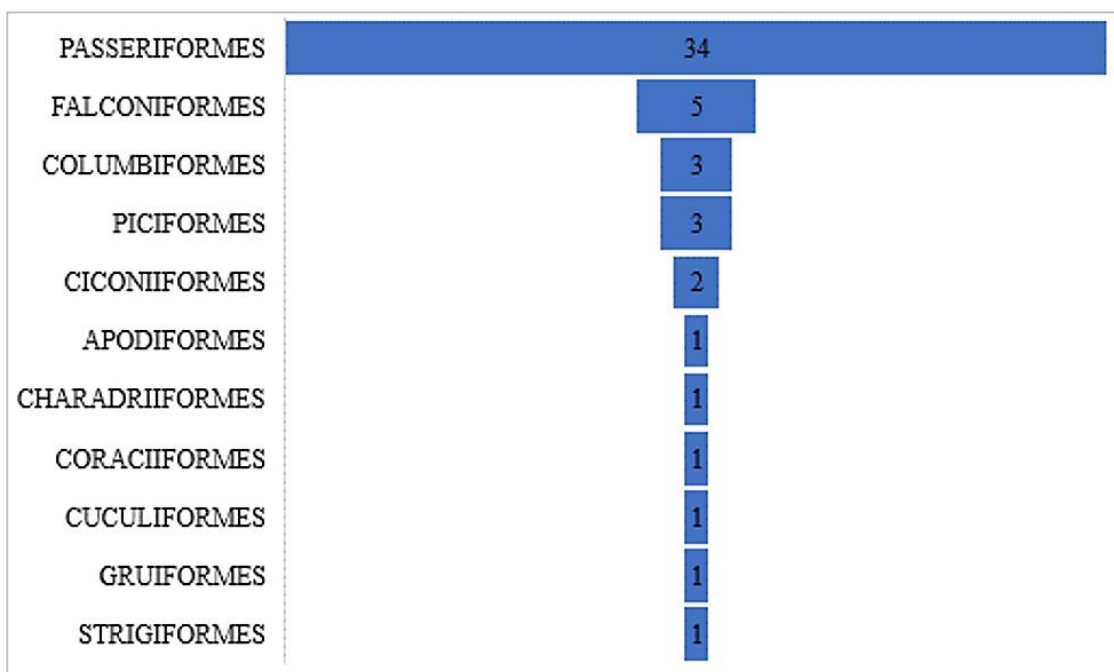


Figure 3. Distribution of the species identified in the study area according to orders

Among the species detected during the study, *Buteo buteo* (L.), *Corvus corax* L., *Fringilla coelebs* L., and *Turdus merula* L. were the most common species seen at all locations. *Corvus corone* L., *Garrulus glandarius* (L.), *Hirundo rustica* L., *Motacilla alba* L., *Motacilla cinerea* Tunstall, *Turdus philomelos* Chr. L. Brehm and *Turdus viscivorus* L. are common species in at least four and at most eight different routes. Other species were seen in 1-3 additional and are relatively rarely observed in the area.

In the studies conducted, it is seen that each different route and observation point differ in terms of species diversity. Route 1, where 45 other bird species were observed, was the route with the most species. This route was followed by Route 2, where 29 species were observed; Route 9, where 17 species were observed; and Route 4, where 13 species were observed. Route 5, where six different bird species were observed, was the route with the least number of species.

Although all bird species detected are at LC, i.e., low-risk level in the IUCN red list, it is also reported in the IUCN data that the world populations of these species are scale declining globally. The field status of the bird species identified in the Sökü Wildlife Development Area is 34 species as native, 13 species as summer migrants, three species as winter migrants, and three species as transit species. However, the most important



record for the region is that *Ciconia nigra*, which is included in the species protection and monitoring program in many areas, is breeding in the area (Figure 4).



*Apus melba* (L.)



*Scolopax rusticola* L.



*Ardea cinerea* L.



*Ciconia nigra* (L.)



*Columba livia* Gmelin,



*Columba palumbus* L.



*Streptopelia turtur* (L.)



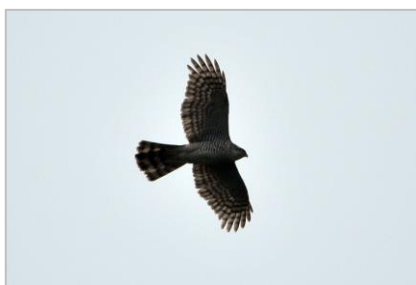
*Upupa epops* (L.)



*Cuculus canorus* L.



*Accipiter gentilis* (L.)



*Accipiter nisus* (L.)



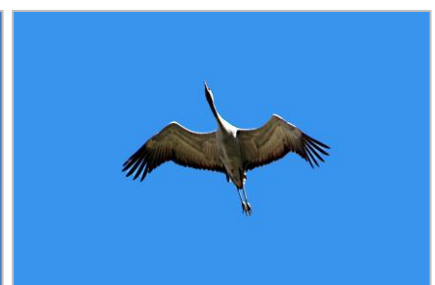
*Buteo buteo* (L.)



*Falco peregrinus* Tunstall



*Falco subbuteo* L.



*Grus grus* (L.)



*Aegithalos caudatus* (L.)



*Corvus corax* L.



*Corvus corone* L.



*Garrulus glandarius* (L.)



*Carduelis carduelis* (L.)



*Carduelis chloris* (L.)



*Pyrrhula pyrrhula* (L.)



*Fringilla coelebs* L.



*Fringilla montifringilla* (L.)



*Hirundo rustica* L.



*Lanius collurio* L.



*Motacilla alba* L.



*Motacilla cinerea* Tunstall



*Erithacus rubecula* (L.)



*Ficedula semitorquata* (Homeyer)



*Ficedula albicollis* (Temminck)



*Luscinia megarhynchos* Chr. L. Brehm;



*Muscicapa striata* (Pallas)



*Phoenicurus ochruros* (Gmelin)



*Phoenicurus phoenicurus* (L.)



*Saxicola rubetra* (L.)



*Parus ater* L.



*Parus caeruleus* L.



*Parus major* L.



*Parus palustris* L.



*Passer domesticus* (L.)



*Sitta europaea* L.



*Phylloscopus collybita* (Vieillot)



*Regulus regulus* (L.)



*Troglodytes troglodytes* L.

*Turdus merula* L.*Turdus philomelos* Chr. L. Brehm*Turdus pilaris* L.*Turdus viscivorus* L.*Dendrocopos major* (L.)*Dendrocopos minor* (L.)*Picus viridis* L.*Strix aluco* L.

Figure 4. Photographs of the detected birds

#### 4. Results

Sökü Wildlife Development Area, which is a very important protected area in terms of fauna richness in the Western Black Sea region, has shown its importance with 53 different bird species identified by us, apart from the 12 large mammal species (Özkazanç et al., 2017). During the field studies, line and point count methods were used to identify bird species. As a result of our studies, the most common group among 53 bird species from 23 families belonging to 11 orders was Passeriformes, with 34 other species. Of the bird species identified, 34 were native, 13 were summer migrants, 3 were winter migrants, and 3 were transit species. However, the most important record for the region is that *Ciconia nigra*, which is included in the species protection and monitoring program in many areas, is breeding in the area. In addition, *Buteo buteo* (L.), *Corvus corax* L., *Fringilla coelebs* L., and *Turdus merula* L. are the most common species of the area as the species detected at all observation points.

However, although Sökü Wildlife Development Area is an important protected area and a bird sanctuary for the region; it is under tremendous pressure due to intensive forest use and human activities. Increasing pollution and environmental degradation, poaching, and excessive wood production are among this area's most critical problems. In addition to environmental degradation due to excessive wood production, the continuation of forest cutting in April and May, which coincides with the breeding period of many bird species, the temporary accommodation of forest workers in the area, the high noise emitted by motorized vehicles and tools used in tree cutting and transportation significantly prevent these activities of birds and mammalian wild animals that enter the breeding period in this area. In addition, the felling of trees causes severe damage to potential nesting sites for many bird species.

Another critical factor threatening the wildlife in the area is poaching. Poachers, who mostly come to the area to hunt roe deer or deer, threaten the bird species in the area, especially the species' nesting or mating activities, especially the species' nesting or mating activities in the breeding period, which are significantly reduced.

To protect the birds and other wild animals distributed in the area and to carry out the area in a systematic control mechanism, a permanent protection center should be established, and sufficient personnel should be provided. Also:

- Forestry activities in the area should be limited and controlled,
- Increase incentives for non-forestry work in the region, opening different income opportunities for the local people,
- Prevention of temporary and permanent constructions by slaughter workers and the so-called say van,
- Establishing wildlife observation towers and permanent stations at different points in the region and carrying out its principal activities in the area,
- Controlling illegal hunting and increasing the frequency of inspections are some of the practices that need to be done for the protection and sustainability of the area and the increase in bird and mammal populations.

### **Acknowledgements**

This study was produced from the project numbered 1919B012104037 supported within the scope of TÜBİTAK 2209-A projects. We would like to thank TUBITAK for their support for the realization of the study and the project.

### **Author Contribution**

N. Kaan Özkazanç: Literature review, field studies, photography, species identification, interpretation of results and writing.

İlkan Kalkan: Literature review, field studies, photography and writing.

### **Conflict of Interest**

The authors declare no conflict of interest.

### **References**

- Acar, Ş. (2015). İron sazlığının (Bitlis-Muş) ornitolojik potansiyelinin belirlenmesi. (Yayınlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi, Van, Türkiye.
- Aksan, Ş., Mert, A. (2016). Isparta Atabey Ovası'nın kuş türleri. Türkiye Ormancılık Dergisi 17(2), 153-157.
- Alar, M.M., Nergiz, H. (2019). Artvin Borçka Karagöl Tabiat Parkı'nın Ornitofaunası. BEÜ Fen Bilimleri Dergisi 8(3), 883-888.
- Albağ, N. (2019) İstanbul Küçükçekmece gölünün ornitofaunası (Yayınlanmamış yüksek lisans tezi). Aydın Adnan Menderes Üniversitesi, Aydın, Türkiye.
- Aslan, F., (2015) Ilgaz Dağı Milli Parkı'nın kuş faunası (Yayınlanmamış yüksek lisans tezi). Kastamonu Üniversitesi, Kastamonu, Türkiye
- Atabey, A., (2018) Ergani ilçesi Zülküf (Makam) Dağı ve yakın çevresinin kuş çeşitliliğinin belirlenmesi ve koruma önerilerinin geliştirilmesi (Yayınlanmamış yüksek lisans tezi). Dicle Üniversitesi, Diyarbakır, Türkiye.
- Atille, S., (2023) Değirmi sulak alanı (Van-Saray) ornitofaunası üzerine bir araştırma (Yayınlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi, Van, Türkiye.
- Avcı, F., Adızel, Ö., Azizoglu, E., (2017) A Study on ornithofauna of Muş Plain. ADYUTAYAM 5(1); 20-32.
- Aydın, T. (2021) Bazı ekolojik ve orografik değişkenlere göre Köroğlu dağları avifaunası üzerine araştırmalar

- (Yayınlanmamış yüksek lisans tezi). Bolu Abant İzzet Baysal Üniversitesi, Bolu, Türkiye.
- Azizoğlu E., Adızel Ö. (2017) Determination of seasonal habitat usage and population distributions of bird species detected in and around of Yüksekova Nehil Reed (Hakkari -Türkiye). *ADYUTAYAM* 5(1), 10-19.
- Azizoğlu, E. (2018) İstanbul Terkos (Durusu) Gölü'nün ornitolojik potansiyeli ve kullanım alanlarının coğrafi bilgi sistemleri (CBS) kullanılarak belirlenmesi (Yayınlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi, Van, Türkiye.
- Bağrıaçık, B. (2020) Sarımeşmet barajı ornitofaunası (Van) (Yayınlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi, Van, Türkiye.
- Barış, S., (2017) Mardin ornitofaunası (Yayınlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi, Van, Türkiye
- Baykan, M.O. (2019) Çankırı ilinin avifaunası (Yayınlanmamış yüksek lisans tezi). Çankırı Karatekin Üniversitesi, Çankırı, Türkiye.
- Bibby, C.J., Burgess, N.D., Hill, D.A., Mustoe, S.H. (2000) Bird census techniques. 2nd Edition. Academic Press, London.
- Buckland, S.T. (2006) Point transect surveys for songbirds: Robust methodologies. *The Auk* 123(2), 345-357.
- Buruk, M., (2022) Sera Gölü Tabiat Parkı avifaunası üzerine ekolojik bir değerlendirme (Yayınlanmamış yüksek lisans tezi). Bolu Abant İzzet Baysal Üniversitesi, Bolu, Türkiye.
- Büyük, G., (2019) Adıyaman Gölbaşı gölleri (İnekli, Azaplı ve Gölbaşı gölü) ile yakın çevresinin avifaunası üzerine araştırmalar (Yayınlanmamış yüksek lisans tezi). Dicle Üniversitesi, Diyarbakır, Türkiye.
- Cenger, D. (2018) Bulanık Ovası (Muş) ornitofaunası üzerine bir araştırma (Yayınlanmamış yüksek lisans tezi). Van Yüzüncü Yıl Üniversitesi, Van, Türkiye.
- Çanakçıoğlu, H., Mol, T. (1996) Yaban Hayvanları Bilgisi. İÜ No: 3948, Fakülte No: 440. İstanbul Üniversitesi Basımevi ve Film Merkezi Müdürlüğü, İstanbul.
- Çelik, A. (2021) Gediz deltası kuş türlerinin ekoturizm potansiyeli (Yayınlanmamış yüksek lisans tezi). Bolu Abant İzzet Baysal Üniversitesi, Bolu, Türkiye.
- Çelik, E. (2018). Batman ili ornitofaunası. *Doğu Fen Bilimleri Dergisi* 1(2), 1-10.
- Çelik, E., Durmuş, A. (2017) Determining the Seasonal Ornithological Potential of the Dönemeç (Engil) Delta and Generate the Digital Maps Using Geographical Information Systems (GIS). *Iğdır Univ. J. Inst. Sci. & Tech.* 7(3),73-78.
- Çoban, M., Özmen, M. (2022) Investigation on Karakaya Basin Ornithofauna. 1st International Symposium of Biodiversity Studies (pp.99). Ankara, Türkiye.
- Dizdaroğlu, E. (2015) Avrupa Kuşları Kırmızı Listesi. Doğa Araştırmaları Derneği Yayınları, Lüksemburg Avrupa Toplulukları Resmi Yayın Ofisi, Ankara.
- Doğan, A. (2020) Tekirdağ Balabanlı rüzgar enerji santrali ve çevresinde süzülen göçmen kuş türlerinin göç hareketlerinin belirlenmesi (Yayınlanmamış yüksek lisans tezi). Akdeniz Üniversitesi, Antalya, Türkiye.
- Doğan, K. (2022) Karadağ dağı (Çanakkale-Çan) bölgesindeki kuşların bolluğunun uzaktan örnekleme metodu ile araştırılması (Yayınlanmamış yüksek lisans tezi). Gazi Üniversitesi, Ankara, Türkiye.
- Fındık, C. (2019) Bergama'da yer alan Berges rüzgar enerji santrali ve çevresindeki kuş göç hareketliliğinin araştırılması. Akdeniz Üniversitesi, Antalya, Türkiye.
- Furtun, Ö.L. (2021) Trakuş Türkiye'ni Kuşları. Türkiye İş Bankası Kültür Yayınları Sertifika No:40077 ISBN: 978-625-405-476-1 Genel Yayın: 5178 Golden Medya Matbaacılık ve Tic. A.Ş. İstanbul.
- Gaston, K.J., Blackburn, T.M., (1997) How many birds are there? *Biodiversity and Conservation* 6, 615-625.
- Gök, G., Adızel, Ö. (2022) Koçköprü Barajının Ornitofaunası (Erciş / Van). *Yüzüncü Yıl Üniversitesi Fen Bilimleri Enstitüsü Dergisi* 27(2), 206-218.
- Gökşen, İ. (2022) Nemrut Kalderası Tabiat Anıtı'nın Kuş Faunası (Yayınlanmamış yüksek lisans tezi). Bitlis Eren Üniversitesi, Bitlis, Türkiye.
- Günay, U.K., (2017) Troya tarihi milli parkı çevresindeki amfibi ve kuş popülasyonları üzerine ekolojik araştırmalar (Yayınlanmamış yüksek lisans tezi). Çanakkale Onsekiz Mart Üniversitesi, Çanakkale, Türkiye.
- Hamel, P.B., Smith, W.P., Twedt, D.J., Woehr, J.R., Morris, E., Hamilton, R.B., Cooper, R.J. (1996) A Land Manager's Guide to Point Counts of Birds in The Southeast. General Technical Report SO-I 20. U.S.

- Department of Agriculture, Forest Service, Southern Research Station, Asheville.
- İlker, A., Albayrak A., Tabur, M.A. (2015) Kızılırmak vadisinde kuşları etkileyen olumsuz faktörler. Suleyman Demirel University Journal of Natural and Applied Science 19(1), 98-102.
- Kaya, M., (2015) Süloğlu baraj gölü ve çevresinin (Edirne) kuşları üzerine bir araştırma. Trakya University Journal of Natural Sciences 16(1), 1-7.
- Keten, A., Arslangündoğdu, Z., Selmi, E. (2012) Düzce-Efteni Gölü Kuş Türleri. Düzce Üniversitesi Orman Fakültesi Ormancılık Dergisi 8(1), 10-18.
- Kızılkaya, E., (2014) Adıgüzel ve Cindere baraj gölleri (Denizli)'nin ornitofaunası (Yayınlanmamış yüksek lisans tezi). Pamukkale Üniversitesi, Denizli, Türkiye.
- Kızılkaya, E., Karaca, M., Urhan, R. (2013). Investigations on ornitofauna of Sarayköy district (Denizli/Türkiye) Journal of Selcuk University Natural and Applied Science 2, 405-413
- Kızıroğlu, İ. (1989) Türkiye Kuşları. OGM Eğitim Daire Başkanlığı, Yayın ve Tanıtma Şube Müdürlüğü 314s. Ankara
- Lee, C.K., Lee, J.H., Kim, T.K., Mjelde, J.W. (2010) Preferences and willingness to pay for bird-watching tour and interpretive services using a choice experiment. Journal of Sustainable Tourism 18(5), 695-708.
- Mengen, M.Y. (2023) Kuşların Trabzon havalimanı'nda mevsimsel alan kullanımı ve kuşlarla mücadelede ses sistemlerinin etkinliğinin denemesi (Yayınlanmamış yüksek lisans tezi). Karadeniz Teknik Üniversitesi Trabzon, Türkiye.
- Oran, K. Y. (2023) Poyrazlar gölü ornitofaunası (Yayınlanmamış yüksek lisans tezi). Sakarya Üniversitesi, Sakarya, Türkiye.
- Özay E., Özkazanç, N.K. (2022) Bird Fauna of Kavuncu Pond in Eskisehir. Bartın Orman Fakültesi Dergisi 24(2), 235-246.
- Özkazanç N.K. Horasana, M., Ateşoğlu, İ. (2017) Bartın-Sökü Yaban Hayatı Geliştirme Sahasında Fotokapan ile tespit edilen büyük memeli yaban hayvanları. Journal of Bartın Faculty of Forestry 19(1), 290-300.
- Özkazanç, N.K. (1999) Bartın İli ve Yakın Çevresindeki Av Kuşları. Bartın Orman Fakültesi Dergisi 1(2), 15-33.
- Özkazanç, N.K. (2016) The importance of birds in biological control and insectivorous bird species determined in Bartın. International Journal of Bartın Faculty of Forestry 18(2), 55- 64.
- Özkazanç, N.K., Özay, E. (2019) Göçmen kuşları tehdit eden faktörler. Bartın University International Journal of Natural and Applied Sciences 2(1), 77-89.
- Özkazanç, N.K., Özay, E., Özcan, A.U. (2019) Balıkdamı Yaban Hayatı Geliştirme Sahası kuş türleri. Turkish Journal of Forestry 20(4), 341-351.
- Öztemel, Y. (2021) Kuş göç yolları üzerinde bulunan rüzgar enerji santrallerinin (res) kuş popülasyonu üzerine etkileri (Yayınlanmamış yüksek lisans tezi). Aydın Adnan Menderes Üniversitesi, Aydın, Türkiye.
- Özten, U. (2022) Güneş enerji santrallerinin kuşlara olan etkisinin fernas-4 güneş enerji santrali üzerinden araştırılması (Yayınlanmamış yüksek lisans tezi). Akdeniz Üniversitesi, Antalya, Türkiye.
- Porter, R.F., Christensen S., Shiermacker-Hansen P. (1996) Birds of the Middle East. T&AD Poyster, London.
- Ralph, C.J., Sauer, J.R., Droege, S. (1997) Monitoring Bird Populations by Point Counts. Gen. Tech. Rep. PSW-GTR-149. US. Department of Agriculture Forest Service, Pacific Southwest Research Station, Albany, California.
- Simsar, H. (2018) Dinar İncesu rüzgar enerji santrali ve çevresindeki kuş göç hareketliliğinin araştırılması (Yayınlanmamış yüksek lisans tezi). Akdeniz Üniversitesi, Antalya, Türkiye.
- Süel, H., Oğurlu, İ., Ertuğrul, E.T. (2018). Karacaören I baraj gölünün kuş faunası. Mehmet Akif Ersoy Üniversitesi Fen Bilimleri Enstitüsü Dergisi 9(1), 22-28.
- Svensson, L., Mullarney, K., Zetterström, D. (2016) Collins Bird Guide-The Most Complete Guide to the Birds of Britain and Europe. Hatper Collins Publisher, London.
- Synider, K. (2016) New study doubles the estimate of bird species worldwide. American Museum of Natural History. www.amnh.org, New York.
- Şekercioğlu, Ç.H. (2006) Increasing awareness of avian ecological function. Trends in Ecology and Evolution 21(8), 465-471.
- Şekercioğlu, Ç.H., Schneider, T.H., Fay, J.P., Loarie, S.R. (2007) Climate change, elevational range shifts, and bird extinctions. Conservation Biology 22(1), 140-150.
- Şirin, D., Kızılocak, D.H. (2017) Tekirdağ Ganos dağı'nın kuşları üzerine bir araştırma. Tabiat ve İnsan s.18-

25

- Tabur, M.A., Ayvaz, Y. (2010) Kuşların ekolojik önemi. Conference: Second International Symposium on Sustainable Development, June 8-9, Sarajevo, Bosnia and Herzegovina, pp. 560-565.
- Topal, T. (2014) Kocaeli kent ormanı ve Kocaeli Üniversitesi Umuttepe kampüs alanının kuş faunası (Yayınlanmamış yüksek lisans tezi). Süleyman Demirel Üniversitesi, Isparta, Türkiye.
- Tunç, M.R., (2017) Phaselis Antik Kenti ve Beydağları (Olympos) Sahil Milli Parkının Kuşları. Phaselis 3;197-314.
- Turan, N. (1990) Türkiye'nin Av ve Yaban Hayvanları-Kuşlar. Orman Genel Müdürlüğü, Eğitim Daire Başkanlığı, Yayın ve Tanıtma Şube Müdürlüğü, Ankara.
- Türnüklü, V. (2017) Eber Gölü (Afyonkarahisar) kuş faunası (Yayınlanmamış yüksek lisans tezi). Afyon Kocatepe Üniversitesi, Afyonkarahisar, Türkiye.
- Uğış, A., Akkuzu, E., Evcin, Ö. (2016) Kastamonu yöresi Beyler ve Karaçomak Barajı gölü sucul kuşları. Kastamonu Uni., Orman Fakültesi Dergisi 16 (2), 447-462.
- Urhan, R., Kızılkaya, S., Karaca, M. (2022) Çameli ilçesinin ornitofaunası (Kuş çeşitliliği). I. Çameli Sempozyumu 05-08 Ekim s: 589-596.
- URL 1. Trakus. [https://www.trakus.org/kods\\_bird/uye/?fsx=@](https://www.trakus.org/kods_bird/uye/?fsx=@)
- Uysal, İ., Uysal İ. (2021) Suvla Tuz Gölü (Çanakkale/Türkiye)'nün ornithofaunası ve su kuşları çeşitlilik göstergeleri'nin aylık değişimi. Environmental Toxicology and Ecology 1(1), 14-26.
- Uysal, İ. (2016) Gelibolu Yarımadası'ndaki (Çanakkale-Türkiye) kuş göç rotalarının incelenmesi ve rüzgar enerji santrallerinin (RES) kuş popülasyonları üzerine etkileri (Yayınlanmamış yüksek lisans tezi). Çanakkale Onsekiz Mart Üniversitesi, Çanakkale, Türkiye.
- Ünal, M. (2017) Hatay-Belen 2015 ilkbahar dönemi süzülen kuş göçü (Yayınlanmamış yüksek lisans tezi). Niğde Üniversitesi, Niğde, Türkiye.
- Wordatlas (2019) Highest Flying Birds. <https://www.worldatlas.com/articles/highest-flying-birds.html> Accessed: 26.09.2019.
- Yaşa, B. (2020) Rüzgar enerjisi santrallerinin (res) faaliyet gösterdiği bölgedeki (Kocaeli-Kandıra) ornitofauna üzerine etkileri (Yayınlanmamış yüksek lisans tezi). Sakarya Üniversitesi, Sakarya, Türkiye.
- Yaşar, B. (2015) Körfez Sulakalanı (Kocaeli) ornitofaunası (Yayınlanmamış yüksek lisans tezi). Sakarya Üniversitesi, Sakarya, Türkiye.
- Yılmaz, E. (2019) İstanbul Aydos ormanının kuş çeşitliliği (Yayınlanmamış yüksek lisans tezi). Çanakkale Onsekiz Mart Üniversitesi, Çanakkale, Türkiye.
- Zehiroğlu, M. E. (2022) Şile rüzgar enerji santralinin kuşlar üzerine etkileri (Yayınlanmamış yüksek lisans tezi). Karadeniz Teknik Üniversitesi, Trabzon, Türkiye.