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Observation on ornithofauna of Kocaeli-Yuvacik dam watershed in Turkey

Akif Keten*[1], Vedat Beskardes[2] and Zeynel Arslangündogdu[3]

[1]Faculty of Forestry, Konuralp Campus, Düzce University - 81620, Düzce, Turkey
[2]Faculty of Forestry, Forestry Junior College, Istanbul University, Program of Game and Wildlife - 34473 Bahcekoy, Sariyer, Istanbul, Turkey
[3]Faculty of Forestry, Bahcekoy Campus, Istanbul University - 34473, Istanbul, Turkey

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Abstract: *The objective of this study was to determine the bird species in the Yuvacik Dam watershed in the province of Kocaeli. The total area of the study site was 25800 ha, and was subdivided to 60 plots (the size of each plot, 2×2 km). Observations and inventory for each species were carried out. A total of 130 species belonging to 38 genus of 16 orders were identified. Eighty-seven were classified as Passeriformes. Forty two species breed in the region. A total of 21223 birds were counted. According to IUCN criteria, two species, (Ficedula semitorquata (Von H., 1885) and Sitta krueperi (Pelzeln, 1863), were categorized as near threatened (NT).*

Key words: *Yuvacik watershed, Bird species, Forest, Threatened species*
PDF of full length paper is available online
* **Corresponding author:** akifketen@yahoo.com

Introduction

Birds play an important role in ecosystem by controlling the number of insects, rodents and reptiles, helping pollination and spreading seeds of different plant species and being a prey to larger predator species. That's why their contribution to properly functioning ecosystems cannot be underestimated (Marquis and Whelan, 1994). In addition, they are regarded as a viable indicator for biological biodiversity and changes in environmental conditions (Furness and Greenwood, 1993; Gregory *et al.*, 2003). Especially in habitat degradation (O'dea and Whittaker, 2007), in declining forests (Antrobus *et al.*, 2000) and in different silvicultural interventions imposed on forest, birds are likely to have problems in wintering and nestling. Their healthy stable numbers are thus inadvertently affected (King and Degraaf, 2000; Augenfeld *et al.*, 2008). While much about a bird's ecology might be studied directly in terms of its diet, foraging behavior or population dynamics, important knowledge of habitats can be gleaned from good census studies (Bibby *et al.*, 1998).

Kasperek and Bilgin (1996) reported 450 bird species belonging to 69 genuses of 18 orders in Turkey. Bird observations was started as early as 1877-1878 with Danford, have kept a steady momentum due to many native and international researchers dedication on the subject (Roselaar, 1995). Forested regions in some instances were the perfect scenes for undergoing different habitat studies (Baris *et al.*, 1984; Baskaya, 1995; Jetz, 1995; Kaya *et al.*, 1999; Sert and Erdogan, 2004; Çopur, 2001; Kaçar, 2001; Gündogdu, 2002; Arslangündogdu, 2005; Albayrak and Erdogan, 2005; Arslangündogdu and Keten, 2007).

The main objective of this study was to identify bird species living in the Yuvacik Dam watershed in Kocaeli. Additionally, the distribution of the birds during different months, their breeding status were examined in the area. Species status was categorized according to IUCN criteria.

Materials and Methods

Study area: This study was conducted behind the dam wall located at 40°40' N and 29°58' E. Yuvacik dam was constructed to supply drinking water to the province of Kocaeli. Numerous creeks flow into three major streams feeding the entire 25 800 ha watershed area. Huseyinli pond, located at an altitude of 730 m and used for irrigation purposes is also within the watershed. Average elevation of the study area ranges from 170 to 1300 m. In the study area, 16 settlement sites, 12 villages and 4 plateau camping ground are located. There are also lands set aside for agricultural and livestock grazing purposes and scrub and forest areas. Beech (*Fagus orientalis* Lipsky), oak (*Quercus* spp.), hornbeam (*Carpinus betulus* L.), torch pine (*Pinus nigra* Arnold.), scots pine (*P. sylvestris* L.) and uludag fir (*Abies bormülleriana* Mattf.) are the predominant forest tree species in the watershed. Forests are made up with pure as well as mixed stands of these particular species. Zengin *et al.*, (2005) reported the mean annual precipitation as 1038.7 mm and the mean annual temperature as 9.5°C. The region, according to Thornthwaite methodology, has a climate pattern reflecting somewhat similar oceanic climate parameters, such as humidity, temperate warmth and no water shortage ($B_3B'_1rb'_3$).

Methodology: The study was conducted between February 2006 and January 2008. No observation was carried out in April and January of 2006 due to some constraints. Observations were done once every month from early in the morning till sun down. Night observations were also conducted to listen and identify the owl species. Observations were recorded, using 10x50 Nikon binocular

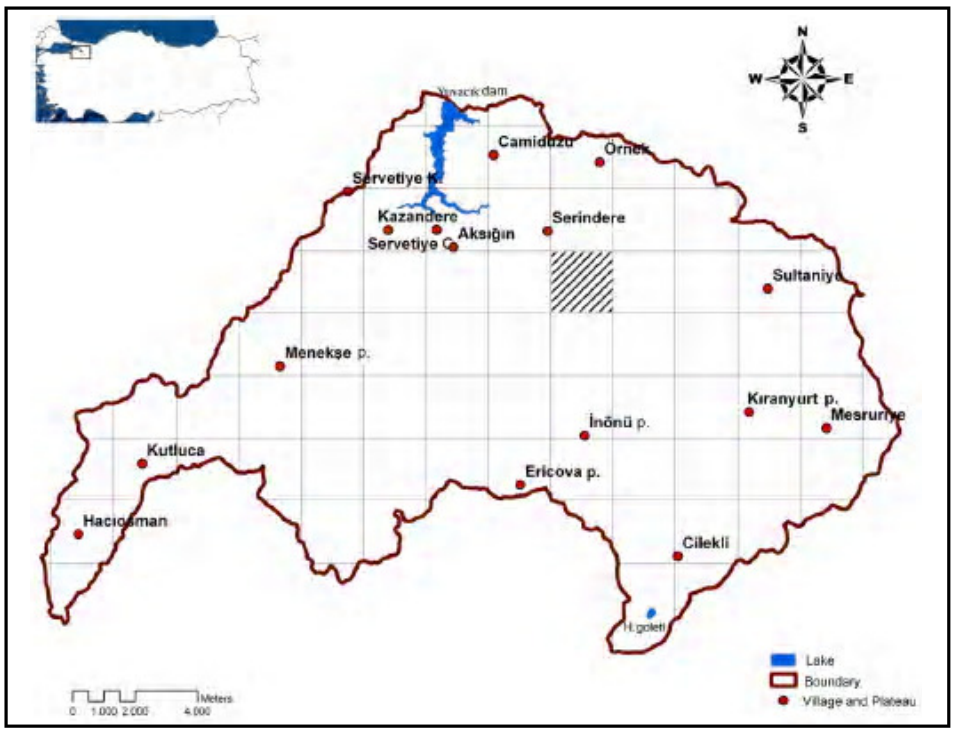

Fig. 1: Yuvacik dam whatershed and sampling plots

and 15x45x60 Nikon scope. For species identification, several guide studies were used (Heinzel *et al.*, 1995; Beaman and Madge, 1998; Mullarney *et al.*, 1999).

Study area (Fig. 1) was subdivided into 60 plots. The size of each plot was 2×2 km . Of these 60, whole of 46 and more than half the size of the remaining 14 plots were accepted within the boundary of study area. In these plots, observations were carried out by point counts method (Bibby *et al.*, 1992; Gregory *et al.*, 2004). Hatched area represents the inaccessible treacherous ground where no observation was recorded. Random point selection was applied. No studies were carried out during the heavy snow conditions due to inaccessibility to certain sites such as Inönü plateau, Menekþe plateau, *etc.* in the study area.

Results and Discussion

A total of 130 species belonging to 16 orders and 38 families were determined. Eighty-seven of this were classified as songbirds (Passiformes). Trushes (Turdidae: Passeriformes) with 16 identified species were the biggest contributor in terms of identified species number among 16 orders. A total of 21 223 birds were counted during the study period. Nine waterbird species were identified. Forty-two species were resident, while 46 species were migratory coming to the region only during summer months. While 21 bird species are winter visitors, the others are passage migrants. Forty-two species breeded and raised their young as the study progressed. Although 10 bird species are little known about their breeding, they are thought to breed in the area. On the other hand, 31 native and summer migrant birds haven't observed to breed. White stork (*Ciconia ciconia* L., 1758) was reported in the region

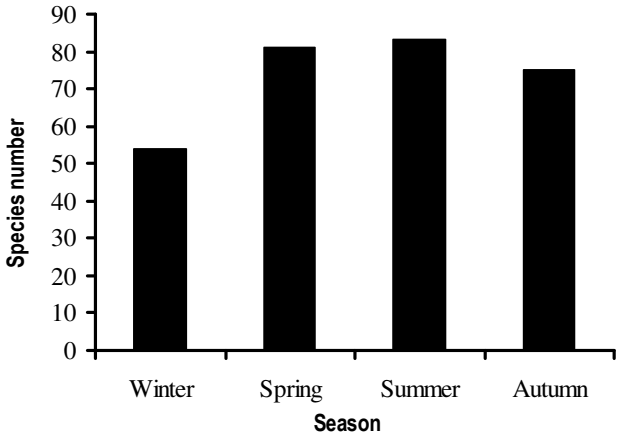

Fig. 2: Dispersion of bird species for each season

during its migratory journey. The highest number of species gathering (52 species) occurred in April 2007 and the lowest number of species (13 species) was observed in February 2006 (Table 1).

Two species, Semi-collered flycatcher (*Ficedula semitorquata* Von H., 1885) and Krüper's nuthatch (*Sitta krueperi* Pelzeln, 1863) are in the near threatened category according to 2008 IUCN (The International Union for the Conservation of Nature and Natural Resources) criteria. *S. krueperi* polulates in the region.

A total of 191 of the known 450 bird species (42%) in Turkey are songbirds (Passeriformes) (Kasperek and Bilgin, 1996). This ratio was recorded as 67% in our study area. Dreyer and Dreyer (1999) stated that songbirds account at about 61% of all

Table - 1: List of birds recorded in the study area with threatened status, numbers counted each month, regional status and breeding status

Species name	Jan.		Feb.		March		April	May		June		July		Aug.		Sep.		Oct.		Dec.		Nov.		Regional status	IUCN Criteria	Breeding
	2007	2008	2006	2007	2006	2007	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2007			
Tachybaptus ruficollis (Pal., 1764)	-	1	2	-	-	2	-	-	-	-	-	-	-	-	-	1	-	2	-	-	1	11	WV	LC	
Podiceps cristatus (L., 1758)	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Phalocrocorax carbo (L., 1758)	1	3	1	1	1	2	-	-	-	-	-	3	12	-	1	5	11	-	4	-	-	2	R	LC	
Ardea cinerea (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	WV	LC	
Ciconia ciconia (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4200	500	-	-	-	-	-	-	PM	LC	
C. nigra (L., 1758)	-	-	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	PM	LC	
Anas penelope (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	WV	LC	
A. plathyrincus (L., 1758)	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Aythya ferina (L., 1758)	-	-	17	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Accipiter brevipes (Sev., 1850)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PM	LC	
A. nisus (L., 1758)	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	1	2	PM	LC	
Circus cyaneus (L., 1766)	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Circaetus gallicus (Gmel., 1788)	-	-	-	-	-	3	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	PM	LC	
Buteo buteo (L., 1758)	6	4	3	9	1	8	3	1	6	6	1	4	2	1	6	3	1	35	2	-	6	6	PM, R	LC	+
B. lagopus (Pont., 1763)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	WV	LC	
Aquila chrysaetos (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	PM	LC	
A. pomarina Brehm, 1831	-	-	-	-	-	1	-	1	-	1	-	2	-	-	-	-	-	-	-	-	-	-	PM	LC	
Falco tinninculus L., 1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	PM	LC	
Alectoris chukar (Gray, 1830)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R	LC	?
Gallinago gallinago (L., 1758)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Lymnocryptes minimus (Brün., 1764)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Scolopax rusticola L., 1758	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Larus cachinnans (Pal., 1811)	-	-	-	-	-	1	10	-	12	500	370	2000	2250	15	-	3	415	17	15	-	-	-	R	LC	
L. canus L., 1758	-	-	-	-	-	-	-	25	-	10	-	-	-	-	-	-	-	-	-	-	-	-	R	LC	
Columba livia Gmel., 1789	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	R	LC	?
C. palumbus L., 1758	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	5	5	-	SM	LC	?
Streptopelia senegalensis (L., 1766)	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	SM	LC	?
S. decaocto (Frivald., 1838)	-	-	-	-	-	-	2	-	-	-	-	4	2	-	-	-	-	-	-	-	3	-	SM	LC	?
S. turtur (L., 1758)	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
Cuculus canorus L., 1758	-	-	-	-	-	-	13	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
Athene noctua (Scop., 1769)	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	R	LC	+?
Strix aluco L., 1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	R	LC	+?
Caprimulgus europaeus L., 1758	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	SM	LC	?
Apus apus (L., 1758)	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
A. melba (L., 1758)	-	-	-	-	-	-	5	-	-	-	1	-	-	14	260	-	-	-	-	-	-	-	SM	LC	?
Merops apiaster L., 1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	PM	LC	
Upupa epops L., 1758	-	-	-	-	-	-	1	-	2	1	-	1	2	-	-	-	-	-	-	-	-	-	SM	LC	+
Dendrocopos major (L., 1758)	-	-	-	1	-	1	1	-	2	-	-	-	-	-	1	-	1	-	-	-	2	-	R	LC	+
D. leucotus (Bech., 1803)	-	-	-	-	-	1	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	R	LC	+
D. medius (L., 1758)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	R	LC	+?

D. syriacus (Hemp. & Ehr.,1833)	-	2	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	R	LC	+?
Picus canus Gmel., 1788	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	R	LC	+?
P. viridis L., 1758	-	-	-	-	-	2	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	R	LC	+?
Galerida cristata (L., 1758)	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	PM	LC	
Lullula arborea (L., 1758)	-	-	-	12	-	7	5	-	5	-	-	-	7	-	-	-	1	-	6	-	-	-	SM	LC	+
Delichon urbica (L., 1758)	-	-	-	-	-	-	-	46	-	-	-	35	4	-	345	-	-	-	-	-	-	-	SM	LC	+
Ptyonoprogne rupestris Scop., 1769	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	SM	LC	?
Hirundo rustica L., 1758	-	-	-	-	-	-	70	-	11	20	23	11	89	61	285	29	-	-	-	-	-	-	SM	LC	+
H. duarica L., 1771	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	SM	LC	?
Anthus campestris (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	PM	LC	
A. pratensis (L., 1758)	-	-	-	-	-	-	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	PM, SM	LC	
A. spinoletta (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-	1	-	-	-	-	-	PM, SM	LC	
A. trivialis (L., 1758)	-	-	-	-	-	-	4	-	-	3	-	-	-	-	-	-	2	-	-	-	-	-	PM	LC	
Motacilla alba L., 1758	-	-	2	-	5	62	14	33	8	30	18	47	26	17	-	59	30	20	31	-	-	-	SM	LC	+
M. cinerea Tunst., 1771	-	-	-	-	-	-	-	2	2	-	2	1	-	1	-	1	-	-	-	-	-	-	SM	LC	+
M. flava L., 1758	-	-	-	-	-	-	1	-	-	-	-	4	2	-	1	2	-	-	-	-	-	-	SM	LC	+
Cinclus cinclus (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	1	-	R	LC	+?
Troglodytes troglodytes (L., 1758)	-	6	-	2	-	4	1	-	-	-	-	-	3	-	-	-	-	-	-	-	2	4	R	LC	+
Prunella modularis (L., 1758)	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Erithacus rubecula (L., 1758)	2	10	-	10	3	45	38	4	7	6	1	2	6	2	11	18	21	15	13	1	13	23	R, PM	LC	+
Cercotrichas galactotes (Temm., 1820)	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PM		
Luscinia megarhynchos (Brehm, 1831)	-	-	-	2	-	2	11	2	4	-	-	-	-	-	-	-	-	1	-	-	-	-	SM	LC	+
Phoenicurus ochrurus (Gmel., 1774)	-	-	-	4	1	3	2	-	-	-	-	2	-	-	-	-	1	17	2	-	-	-	SM	LC	+
P. phoenicurus (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	PM	LC	
Saxicola rubetra (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	-	-	-	-	-	PM	LC	
S. torquata (L., 1766)	-	-	-	1	3	7	11	12	14	4	-	12	17	3	13	16	13	18	1	-	-	-	SM	LC	+
Oenanthe hispanica (L., 1758)	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
O. isabellina (Temm., 1829)	-	-	-	-	-	-	-	-	3	-	-	-	2	1	11	-	3	-	-	-	-	-	SM	LC	?
O. oenanthe (L., 1758)	-	-	-	-	1	1	3	5	5	6	4	3	4	2	5	-	-	-	-	-	-	1	SM	LC	+
Turdus iliacus L., 1766	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
T. merula L., 1758	11	71	3	64	9	40	33	4	11	11	3	10	29	6	24	15	17	20	7	36	6	65	R	LC	+
T. obscurus Gmel., 1789	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PM	LC	
T. philomelos Brehm, 1831	-	31	-	4	-	51	16	-	3	-	2	1	-	-	5	-	1	-	-	5	3	1	R	LC	+
T. pilaris L., 1758	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	-	-	WV	LC	
T. viscivorus L., 1758	1	1	-	9	-	6	4	-	5	-	-	-	4	-	-	1	-	2	12	2	8	32	R, WV	LC	+
Acrocephalus aedon (Pal., 1776)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
A. arundinaceus (L., 1758)	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
Hippolais. icterina (Vieil., 1817)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	PM	LC	
H. pallida (Hemp. & Ehr.,1833)	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	SM	LC	?
Sylvia atricapilla (L., 1758)	-	-	-	-	-	-	5	-	2	-	-	-	-	-	3	17	18	-	-	-	-	-	SM	LC	?
S. borin (Bodd., 1783)	-	-	-	-	-	1	1	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	SM	LC	?
S. communis Lath., 1787	-	-	-	-	-	-	6	-	1	-	-	-	1	-	-	1	-	-	-	-	-	-	SM	LC	?
S. curruca (L., 1758)	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	SM	LC	?
S. melanocephala (Gmel., 1789)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	PM	LC	
Phylloscopus collybita (Vieil., 1817)	-	-	-	-	1	27	11	-	5	-	-	2	1	-	10	14	20	11	3	-	-	1	SM	LC	+
P. bonelli (Vieil., 1819)	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PM	LC	
Regulus regulus (L., 1758)	-	-	-	-	-	-	-	3	-	-	-	-	5	-	-	-	2	-	-	-	-	2	R	LC	+?

Ficedula hypoleuca (Pal., 1764)	-	-	-	-	-	-	-	-	-	-	-	-	2	3	1	-	2	-	-	-	-	-	SM	LC	?
F. parva (Bech., 1794)	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PM	LC	
F. semitorquata (Von H., 1885)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	SM	NT	?
Muscicapa striata (Pal., 1764)	-	-	-	-	-	-	-	-	-	-	-	6	12	25	91	32	13	-	-	-	-	-	SM	LC	+
Aegithalos caudatus (L., 1758)	4	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	11	-	-	7	R	LC	+
Parus ater L., 1758	5	8	-	10	-	42	34	1	20	-	3	-	7	-	10	4	13	-	45	12	45	43	R	LC	+
P.careleous L., 1758	7	1	-	4	-	15	28	-	5	-	-	2	8	2	3	2	3	-	3	8	5	30	R	LC	+
P. major L., 1758	29	33	5	28	9	38	37	7	21	10	1	20	25	-	2	4	14	11	9	71	41	29	R	LC	+
P. palustris L., 1758	-	3	1	3	-	4	23	-	8	4	-	2	-	3	2	1	8	2	1	11	13	5	R	LC	+
Sitta europea L., 1758	5	1	-	7	-	1	3	-	-	-	-	-	-	-	3	-	4	-	-	-	6	2	R	LC	+
S. krueperi Pelzeln, 1863	2	-	-	2	-	-	-	-	-	2	-	-	2	-	1	1	3	-	-	-	3	-	R	NT	+
Certhia familiaris L., 1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	R	LC	?
C.brachydactyla Brehm, 1820	-	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	1	-	R	LC	?
Oriolus oriolus (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	SM	LC	?
Lanius collurio L., 1758	-	-	-	-	-	-	-	12	10	8	1	11	12	11	13	2	-	-	-	-	-	-	SM	LC	+
L. senator L., 1758	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	SM	LC	?
Garullus glandarius (L., 1758)	13	12	5	15	6	28	4	-	5	11	1	8	9	10	17	23	17	24	17	31	12	22	R	LC	+
Corvus corax L., 1758	-	1	3	2	2	3	3	1	3	1	-	7	4	3	4	-	-	1	4	8	5	1	R	LC	+
C. corone L., 1758	1	12	-	-	-	1	8	-	-	-	10	-	-	4	-	-	-	-	5	3	-	2	R	LC	+
C. frugilecus L., 1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	WV	LC	
C. monedula L., 1758	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	WV	LC	
Pica pica (L., 1758)	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	R	LC	?
Sturnus vulgaris L., 1758	-	-	-	-	-	-	-	-	-	-	90	-	-	-	-	-	-	-	-	-	-	-	PM	LC	
Passer domesticus (L., 1758)	5	30	12	30	22	42	29	20	10	34	60	38	61	2	25	20	43	21	19	30	20	10	R	LC	+
P. montanus (L., 1758)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	WV	LC	
Petronia petronia (L., 1766)	-	10	-	14	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	R	LC	?
Fringilla coelebs L., 1758	89	330	-	265	22	249	227	24	76	67	10	40	57	31	91	38	96	51	82	437	373	403	R, PM	LC	+
F. montifringilla L., 1758	11	35	-	25	-	1	3	-	-	-	-	-	-	-	-	2	-	-	-	28	22	77	WV	LC	
Carduelis carduelis (L., 1758)	27	32	7	101	6	70	152	50	82	53	81	48	31	10	50	-	46	13	42	28	1	103	R	LC	+
C. chloris (L., 1758)	2	1	-	-	-	9	2	-	3	3	4	-	-	-	2	-	1	-	-	-	-	14	R	LC	+
C. spinus (L., 1758)	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	3	-	2	-	-	SM	LC	?
Loxia corvirostra L., 1758	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	R	LC	+?
Coccoth. coccothraustes (L., 1758)	-	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	20	18	2	R, WV	LC	?
Carpodacus erythrinus (Pal., 1770)	-	-	-	-	-	-	-	3	5	3	1	4	-	-	-	-	-	-	-	-	-	-	SM	LC	+?
Acanthis cannabina (L., 1758)	-	-	-	2	-	-	-	-	2	1	2	2	-	2	-	-	1	-	-	-	-	-	SM	LC	+
Pyrrhula pyrrhula (L., 1758)	-	-	-	1	-	2	1	2	-	2	-	5	-	-	-	-	-	-	-	3	-	-	R	LC	+
Emberiza cia L., 1766	-	-	-	2	-	1	2	2	-	-	-	4	-	-	-	-	-	-	-	-	-	2	R	LC	+
E.cirlus L., 1766	-	1	-	11	-	2	6	-	2	-	-	4	2	-	1	-	1	11	-	2	9	16	R	LC	+
E. citrinella L., 1758	-	-	-	7	-	-	-	-	5	-	-	3	-	6	-	-	5	-	-	16	-	-	SM	LC	+
E.hortulana L., 1758	-	-	-	-	-	-	-	-	2	-	-	1	1	-	-	-	-	-	-	-	-	-	SM	LC	?
E. melanocephala Scop., 1769	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	SM	LC	?
E. schoeniclus (L., 1758)	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	WV	LC	
Miliaria calandra (L., 1758)					14	1	2		6	20	5	19	7	9	8	19		2	8	10	19	-	SM	LC	+
Specimens	225	669	69	661	107	802	856	275	381	842	698	2384	2725	248	5512	842	843	297	345	862	648	932	21223		
Species	21	31	13	37	17	50	52	29	41	33	25	43	44	28	36	35	39	21	25	29	30	33			

Abbreviations: R = Resident; SM = Summer migrant; WV = Winter visitor; PM = Passage migrant. + = Breeding. +?= High breeding possiblity. ?= Unknown. Globally, threatened status, (IUCN, 2004): NT= Near Threatened, LC = Least Concern

identified species in forest ecosystems, while Gooders (2001) puts the figure at 64%. Since forests are considered as refuges for small songbirds (Dreyer and Dreyer, 1999) and, in our study, waterbird numbers were less than expected inside study area, thus it was resulted in high concentration of songbirds. in the area, 29 of 42 native bird species (69%) belong to songbirds. However, 38 of 42 breeding bird species (90%) are also songbirds. The other species breeding in the area are *Upupo epops*, *Dendrocopus major, D. leucotus* and *Buteo buteo*.

The presence of the dam and pond in the study area create a reasonable habitat for 9 species of waterbirds. This addition of waterbirds to the overall numbers favorably contributed to the bird diversification in the area. It is assumed that these particular species are temporarily coming to the study area after a 15 to 20 min flight from the bay of Izmit or Sapanca lake. These birds generally feed upon planktons, fishes, amphibians, invertebrates and organic residues from plants. They come here not only for feeding, but they also search for suitable nestling sites (Weller, 1987). The main purpose of this particular dam in our study is to supply drinking water to the province of Izmit. This objective, on the other hand, does not suit well to the needs of waterbirds.

Study area lay under the extension of the major migration routes passing through Istanbul Bosphorus (Bilgin, 2000; Arslangündogdu, 2005). Due to these migration routes,, many winter and summer migratory species were reported on the area on top of 21 transit migratory species, that makes the region particularly important. *C. ciconia* was reported on the area during its' migration and 4700 individual birds were counted. This number accounted for 22% of the overall bird numbers recorded in the area.

There is a fluctuation in the number of species throughout a year. Species numbers increase during warm spring and summer months and decrease during cooler fall and winter months (Fig. 2). This fluctuation in the number of bird species may be explained by transit passing and summer migration of birds in the region.

S. krueperi, one of the near threatened species, according to IUCN 2008 criteria, natively populates in the area, whereas the other one *F. semitorquata* is a summer migratory bird. *S. krueperi* can be considered as endemic to Anatolia. This particular species, besides Anatolia, lives only in Caucasia and Greek islands in small flocks (Heinzel *et al.*, 1995; Albayrak and Erdogan, 2005).

This is the first exclusive study conducted in this area to determine the bird species. It was hoped the results of this study will positively contribute to the ongoing bird fauna research.

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