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Dedicated to Dear Ornithologist Prof.Dr.İlhami Kiziroğlu's Sixtieth Birthday…

Who is Prof.Dr.İlhami Kiziroğlu?

Kiziroglu, who is professor in Hacettepe University, was born in Elazığ (Harput) in 1944. He had got his BSc in İstanbul University, than had got his PhD. in Germany, in Munchen Ludwigs – Maximillian University. After than, he come back to Turkey in 1976, and begun to work for Dicle University. In 1977 he transferred to Hacettepe University and he had got his Associated Professor degree with an ornithological investigation in Animal Ecology and Zoogeography branch in 1982, and had got his professor degree in 1988, at the same university in Department of Science. He had carried out different scientific investigations, with scholarships from Alexander von Humboldt and DAAD, in various universities in Germany. He is one of the two Professors who had been awarded with "Award of Superior Success in Science" by Hacettepe University Senate. He had organized six scientific meetings. He published totally 201 investigations, about Environmental protection, and -Education, Threatened-, extinct Species, Biological Diversity, Behavior and mainly of these is Ornitho-Ecolgy. 60 of these articles are in foreign language. His studies have got 30 cited. He has done publisher of 7 books. Most of his original investigations have been given as abstract in Biological Abstract, Zoological Abstract and Ornithologishe Schriftenschau. He is editor of some foreign and Turkish magazines. He works for lots of national and international NGO's as director. He is very good in German- and good in English language. He is married and has two sons.

HIS MAIN SCIENTIFIC PUBLICATIONS (BOOKS):

General Biology (Fourth Edition), 2000.
Short Biography of A.v.Humboldt. 1994
The Birds Of Türkiye (Species List in Red Data Books), 1993
Biological Structure of Beytepe and it's Environment (Turkish, English and German), 1992
Allgemein Biologisches Grund Praktikum Bd. I.,1992
Allgemein Biologisches Grund Praktikum Bd. II.,1991
Birds of Turkey (Colored pictured) ,1989
The Maps for Turkish Resident and Migrant Birds. Published in Atlas (1994) and Tempo (1995) Magazines.

CONTENTS

HISTORICAL DEVELOPMENT OF THE ORNITHOLOGICAL STUDIES IN TURKEY

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SUMMARY

Turkey attracts attention with its vast and various biogeographically features. It has an ecosystem totality which attracts attention especially with its various bird species. Therefore, it has been an exploration area of many foreign ornithologists and ecologists for centuries. From 16th century up to now, many studies on bird fauna in Turkey has been carried out by foreigners. Among these studies, the works of S. Ergene and H. Kumerloeve are the first of the most basic ones.

Foreigners' interest in Turkey's birds is being followed by contemporary Turkish scientists and scientific studies on birds are being carried out in about 16 universities.

In this paper, among the studies relating to the bird fauna in Turkey only the most important ones are mentioned. Moreover the number and status of the bird species which have been determined in Turkey are revealed.

Key Words: Bird fauna of Turkey, local bird species, ecosystem, natural creature collectors

INTRODUCTION

In all around the world especially in Europe, it is known that ornithological studies were carried out long before. For example, a scientific journal Journal für Ornithologie has been going on its publication for about 150 years. Scientific studies about birds carried out in the borders of Germany are published in it. Although there are many scientific journals in which ornithological studies are published in many other European countries, the fact that there is not any journal in Turkey in which ornithological studies are published shows that ornithology is not attached enough importance in there.

First Ornithological Studies in Turkey

Records (probably the first written by Turks) about ornithological richness of Turkey belongs to Evliya Çelebi. The first Turkish person who collected the earliest ornithological data in Anatolian was Evliya Çelebi. Evliya Çelebi who lived between 1611- 1682 under the reign of Ottoman Empire gathered information those places' biological features during his explorations. Evaluating important data about bird species living in certain places, Evliya Çelebi handled them in his famous work SEYAHATNAME. Those information are regarded as the first records relating to ornithology in Turkey. No other records concerning these periods and written down by Turks have been found yet. However, some information which foreign researchers have got in their ornithological observations is given below.

Ornithological observations in Anatolia in the 16th century

Pierre Belon, in 1548, over Jeruselam, Damascus and Lebanon went to Haleb then to Antakya and to Anik Lake. Later passing over the Amanuses he went to Adana and over the

Middle Taurus Mountains he headed towards Konya. P. Belon got the first zoological data (though few) peculiar to these places. By recording ornithological explorations relating to the Bosphorus and its surroundings, he gathered perhaps the first ornithological exploration data.

Ornithological observations in Anatolia in the 17th century

While Johann Bastisten Taverniers was writting down his forty years of expoloration notes, he mentioned that he had gone to Birecik/Urfa Region and had gathered ornithological data.

Ornithological observations in Anatolia in the 18th century

At his explorations in İzmir Region, W. Sherald (1720) sent a bird which he saw accidentally and got interested to Linné and wanted this species to be identified. Linné evaluated the material which had come from Anatolia and he named it as İzmir Kingfisher (*Alcedo smyrnensis*). J. Siphorp and F. Bauer (1786), recorded ornithological information peculiar to İzmir-Uludağ and İstanbul in Turkey's West Region.

Ornithological observations in Anatolia in the 19th century

Between the years 1835 and 1837 Fırat/Dicle exploration was carried out under the control of F.R. Chesney and as a result it was determined that Taurus Mountains had a great importance for ferocious birds and vultures. P.de Tchihatcheff visited different parts of Taurus Mountains during his six explorations in Anatolia in the years 1848, 1849 and 1853. He mentions about these explorations in his work titled Asia Mineure" but his ornithological records are very rare. Also the same writer mentions about the studies of R. Curson on birds of Erzurum. In the same period, R, Curson published a list about the bird fauna of Erzurum and its surroundings. Similarly, while an Austrian botanist Th. Kotschy was carrying out his exploration in Kilikya Region in the years 1836 and 1853, he made a lot of bird preperats. By bringing them to Vienna Nature History Museum, he studied the variation of local plants and animal species (especially birds and mammals) depending on their heights. It seems that information about birds is given occasionally as a result of these explorations.

H. E. Strickland (November 1835- February and April 1836) listed bird fauna of Izmir and West Anatolia Shore Region. (Except for exploration records above, the earliest scientific ornithological observations belong to Danford (1877/78:1877 and 1880).In his works, Danford recorded mostly about ornithological features of Southeast Anatolia and Taurus Mountains. Danford carried out two explorations in South and Middle Anatolia Regions and studied bird fauna in there. Moreover, he observed the ornitho-fauna of West Shores, Bosphorus and Erzurum –Trabzon Region. Danford made his first trip to Tarsus-Gozna, Bolklar Mountains and Zebil over İzmir on 3th December 1875. It continued till 26th February 1876 and a lot of bird materials were gathered. Afterwards, he went to Anaş passing by Gülek River between 13th March and 18th April, and then he went to Gavur Köyü that is on foot of Karanfil Mountain between the dates 19th and 29th April. Later he went towards North direction, Middle Anatolia. After he went to Çorum on 15th May and to Merzifon on 22nd May, he finished his observations.

Danford detected 217 bird species (163 from Taurus Region, 54 from further North Region) in his first exploration.

The Second Destination of Ch. G. Danford:

1st- 23rd January 1879: East of Mersin- Adana- Misis- Osmaniye (anti-Taurus): he came Gavur River- Gaziantep- Nizip- Birecik- Fırat Shores over Bahçe and he investigated kahlibises on 19th February from there he arrived in Maraş- Ahır Mountain- Elbistan-

Yarbuz- Aziziye- Erciyes Mountain- Kayseri between 8th March and 29th March, then he passed to Eymir River- Ankara8in April)- Sivrihisar- Eskişehir- Bursa- Mudanya. This travel ended in Istanbul in the end of April. Danford did not give any number of bird species in that travel.

G. C. Taylor (1864) and l.Rigler(1852) observed bird fauna of Gelibolu-Çanakkale Strait. C. Fellowers (1874)carried out ornithological explorations in South Anatolia Region. H. J. Elves(1874) made some observations in various regions of Anatolia and gathered bird samples. H. B. Tristan (May/June 1881), passed to Antik River over Syria then he observed birds throughout Gaziantep-Birecik-Besni-Nacar. G.Schraders (15th October 1875-10th June 1885) carried out ornithological excursions in Mersin- Bolgar Mountains and in Aydın Region. He detected 206 bird species in this region. This study is among the first studies concerning the number of the bird species in the region.

Universal importance of the Bosporus for migratory birds attracted the attention of the ornithologists of the 16th century. A. Alleon (1869/80) was one of them. He recorded migration of ferocious birds and storks for the first time.(his friends J. Vian and J. Robson have private collections specific to this region).

K. E. Abott made avifaunistic observations in Trabzon and Erzurum and he collected materials from this region in the years 1833, 1835 and 1837.

E. Chantre (April, August 1881) went to Van Lake over Antakya- Birecik- Diyarbakır and he carried out ornithological explorations in Ağrı Mountain. Chantre collected 235 samples of 92 bird species at his explorations.

Ornithological observations in Anatolia in the 20th century

Although ornitho-faunistic habitat was studied well enough in many European countries, the fact that it was a deficiency in Turkey was understood only in thirties. Following that, Hans Kumerloeve and G. Niethammer carried out ornithological explorations in Middle and North Anatolia in 1933. Those studies were published under the tittle of W. Neuhauser&H. Kummerloeve, 1939: Bibliographie der zoologischen Arbeiten über Türkei and ihre Grenzgebiete, Leipzig, p.10. The numbers of bird species detected both through Turkey and just in South Regions with their recording years are given in Table 1.

Table 1.The numbers of bird species and their status detected in the studies of various researchers

Researchers	The Number of Bird Species and Their Status
Danford(1875/76; 1879)	163*+54**=217***
Schrader (1875/76,1882/85)	206**
Weigold(1911); Tristram(1882)	116**
Rockinger 1917/18;Korf 1931; Neuhaeuser 1934	152*
Bird 1935	87*
Ergene, 1945;	230**+270*=400
Kasparyan(1955)	398****
Kumerloeve 1961): 238 species incubate.156 of them were detected in East Anatolia Region and 82 of them were detected out of this region. The rest 128 species pass directly,they are winter visitors	366****+31*****= 397****

Kiziroğlu, 1989; 1993; 416(147 species are summer immigrants,186 species are native,61species are winter visitors(2 species have become extinct)	426****
Kirwan, 2002	451 ****

*=The number of bird species recorded in South East Anatolia and Taurus Mountain
**= The number bird species from Middle Anatolia to Samsun
***= The number of bird species which can be valid for %70 of Turkey
****= The number of bird species which can be valid for whole Turkey
*****= The number of bird species which are likely to be in Turkey

Ord. Prof. Dr. Kurt Kosswig promoted scientific studies by taking a leader role in ornithological studies in Turkey. He published Associate Professorship Study Türkiye Kuşları (Birds of Turkey) of Saadet Ergene ,which she finished in 1945.This work was the first book on ornithology that was written by a Turkish scientist until that time. In the foreword of this book, Kosswig stresses what important roles birds have in people's life by stating "no other animal species is as close to the nature lovers as birds". And by saying "Birds easily take attention and that is why in all the civilized countries there are a great interest in birds among various animal species", he draws attention to the importance of the subject. Kosswig states that "No other animal species is allocated a jargon on a vast scale as birds, and no other branch of zoology can be as proud of as ornithology from the point of view of producing a firm, conscious and successful cooperation between scientific studies and the nature love. Kosswig emphasizes that Dr. Ergene's book is the first work written about the birds in Turkey and he states by praising them that the bird pictures of Cemil Aldısan describe bird features very well.

In the foreword of his book titled Türkiye Kuşları (Birds of Turkey) Prof. Dr. Saadet Ergene mentions about the birds which incubate and about the ones which pass thorough Turkey during their migration. Another important reality which Dr.Ergene states are the answers to the question "which collections did he benefit from while she was writing this book"?. While all the foreign high schools in Istanbul have the opportunity to benefit from bird collections, for other domestic high schools we cannot say that. As is the case these days. Nowadays, we know that even universities do not show the necessary care and interest in the bird collections they have. Dr. Ergene served to fill up another gap by naming many bird species with local and their current names. With a great modesty, Dr. Ergene states that he is so pleased to have given such a work in a world in which a war had just ended. She made a great contribution to ornithology in Turkey. We, in the name of all ornithologists, want to thank to her and to our teacher Turkofil Dr. Kosswig for that they gave us such a valuable work in those bad conditions. In the next periods, Dr. Kumerloeve(1961) came up with the work which contributed a lot to the identification of ornitho-fauna of Anatolia and he filled a great scientific gap, too. Bird Reports (1966-67; 1968-69;1970-73 ;1974-75 and 1978)published by Ornithological Society of Turkey together with the records and publications of Ornithological Society of the Middle East about the birds of Turkey had a great importance in the next years. Studies on the bird fauna of Turkey and Middle East Countries are published in the journal Sandgrouse, which has two volume in a year prepared by this institution. It is seemed that more ornithological studies were carried out in 20th century. Records of studies in that period and where and by whom (some of them) they were carried out are seen in Table2 below.

Table 2. Records of ornithological studies carried out in Anatolia in 20th century and in which region and by whom they were carried out

No	Name-Surname	Years	Regions
1	C. Hilgert and P. Niedlieck	1907/08):	Middle Taurus-Ereğli
2	Stresemannn	(1928):	Ereğli
3	L.N.G.Ramsey	18th May-8th July 1907):	Middle Anatolia Tour. Bozüyük-Eskişehir-Konya-Bozdağ-Karadağ
4	D.Carruthers and G.Fenwick-Owen	1913	Various Regions of Anatolia-Taurus-North Syria
5	J.Vebzmer; O.Koehler; P. Rockinger O. Antonius	1917/18	Pozantı-Çamalan-Gülek Strait And Anakara Surroundings(106 species and for Ankara 57 species(in Münih Museum))
6	H.Weigold	March 1911	Bird migration in İzmir
7	F.Russel	15th March-14th April 1911	Sart-Soma-Bergama (75 SP.)
8	P.J.C.Mc Gregor	January 1910-April 1912	Erzurum Bird Fauna
9	K.M.Derjugin	1899/1900	Birds of Çoruh-Trabzon Region
10	H.Kumerloeve&G.Niethammer	1933:	Ankara-Çorum-Samsun
11	H.Rössner&O.Koller	1934	Bolu Region
	E.Lindner	June 1934	Akşehir
12	C.G.Bird	February-End of June 1935	Mersin-Adana-Misis-Soğukpınar-Uludağ-Gaziantep-Malatya-Besni
13	L.Hoberlandt,K.Taborsky		Orta Toros-Amanos-Osmaniye-Karataş-Adana-Mersin-Silifke
14	P.A.D.Hallom	4th-18th May 1951	Shotes between Silifke-Karakaş;Middle Taurus-Pozantı-Karanfil Mountain-Ereğli
15	Ömer K.Gülen	1951/53	Haruniye birds for Düziçi İlköğretmen School
16	C.Kosswig	1955	Hakkari ;
17	M. Başoğlu&W. Hellmich	1957	Ornitho-fauna of Van Lake Surroundings
18	W.Makatsch	(15th-20th May 1957	Adana civarı-Seyhan Deltası
19	H.Kumerloeve	1956 spring	Savaştepe-Soma-Bergama)

20	A.Kasparyan	1954-1956 and 1957	Studied The Bird species of Bursa-Karacabey-Bandırma and Manyas River (Towads South İzmir-Aydın-Muğla)
21	N.J.P.Wadley	February 1943-May 1944 and November 1944-May 1946	Middle Anatolia-Abant Lake-Niğde-Neighbour Regions of Taurus
22	A.Lambert,	“”	Ankara’
23	J.H.Ogilvie	End of 1946 -mid 1948	Çatalağzı-Zonguldak-Dorukhan-Abant Lake
24	C.Kosswig	End of fourties	İn the end of fourties,incubating bird species were observed. Studies of classification of birds were started.
25	H.P.Maas	28th April-2nd July 1951)	On a plateau till Bor
26	J.H.Mc Neile	1951 and 1954	studied Anatolian cherry bird(*Emberiza cineracea*)after passing İzmir-Bornava from Cyprus
27	S.Ergene	1945	Pulished a book with pictures on bird in Turkey
28	A.Kasparyan	1956	Made a temporary systematic list of about the birds in Turkey .
30	G.E.Watson	1957	İstanbul-Bolu-Ankara-Konya-İçel-One part of Taurus -Mersin-Tarsus-Pozanti-Silifke-Gülnar-Anamur-Manavgat-Antalya-Elmalı-Ak Dağ-Kohu Mountain-Fethiye-Köyceğiz Gölü-Muğla-Boz Dağ-İzmir and Uludağ (603 bird samples were gathered)
31	O.Epping	6th April-16th June 1960	Between Burdur-Yeşilova (80 samples and 28 species)
32	: W.Kunz	1960/61(19-29 September)	Northwest Anatolia
33	W.Erz(	1960/61(28th August 14th September)	İstanbul-Ankara-Konya-Southwest Shores-Aydın-Muğla
34	T. Macke	1960/61 (28th August-22nd September)	West-, Central- and South Anatolia.
35	J. Vielliard	1968	Birds in Turkey

36	I. Kiziroğlu	1978	Ankara
37	I. Kiziroğlu	1982	Ankara/Beynam
38	M. Kasparek	1986	Sultansazlığı
39	M. Beaman	1986	Birds in Turkey
40	I. Kiziroğlu	1988	Birds in Turkey (426 bird species)
41	M.Sıkı	1988	Çamaltı Tuzlası-Homa Dalyan
42	R. P . Martins	1989	Birds in Turkey (174 Bird species)
43	M. Kazparek	1992	Birds in Turkey
44	Y. Ayvaz	1993	Elazığ Region
45	A. Kılıç	1999	Birds in Karapınar
47	Kirwan et al.	1999	Birds in Turkey
46	Karakaş & Kılıç	2002	Diyarbakır
48	L. Turan et al.	2002	Birds of Ankara
49	A. Erdoğan et al.	2004	Birds of Demre

Although it is not stated in the table above, after sixties, there were many scientific studies concerning Turkey's Avi-fauna. Among them publications of Omit Society of Turkey of Bird Report (1996-67; 1970; 73; 1974-75) are very important. Other literature Kiziroğlu,İ, (1989) can be found in Türkiye Kuşları)(OGM Pub. pp. 314). Scientific studies of 1990's and 2000's about Turkey's Ornithofauna have been published in Sandgrouse. The most important one of them is of Kirwan (2002).

Bird report peculiar to the dates 1997-2001 were published in Sandgrouse, too .25 (1): 2003: 8-31 (Kirwan et al.). New records are mentioned in this work and also 83 bird species are stated.

NATURAL CREATURE COLLECTORS

Marchese O Antinori (1850-60) He was a bird collector in west Anatolia in that period.
J.G.V. Gonzenbach tried to bring together ornithological collection in 1840's.
L.Zohrab used to have similar collection
Th. Krüper was in İzmir in the years 1863/64 ; 1871/72 ; 1892/1894 and he named Sitta klüperi (Anatolian Plasterer)
The symbol of this meeting is *Sitta krüperi*, too.
F.C Selous (1899) made the collection of the birds in İzmir –Menderes Delta.

DISSCUSSION

Anatolia is a geography which has a very different ecosystem and important plants and so, has a continental property. However, the number of ornitho-faunistic studies in our region has been so limited. Studies concerning the bird fauna of Turkey are mostly seen in the end of 1970's. In the previous periods, ornitho-faunistic studies were carried out by foreigners. It is known that in eighties and nineties some bird observation clubs which studied in the name of Civilian Society Organizations and observers became common throughout Turkey and scientific studies were being carried out at least in sixteen universities. Those scientific studies were carried out with the financial support of Research Fund Departments of Universities and TUBITAK. In addition, ornitho-fauna of many regions have been detected with the projects carried out by the related chairs of Ministry of Environment and various universities. Except for all of them, many scientific studies on birds are carried out with the association of various international organizations. Since mentioning about all of these studies one by one would have increased the extensiveness of this study, It was avoided.

The studies of domestic scientists ornitho-fauna of Turkey which Prof. Saadet Ergene initiated has been carried out by some associations and scientists from universities. These are not enough but if carried out at this speed, an important development in ornitho-fauna will be succeeded.

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DISTRIBUTION AND CALENDAR OF SWIFT SPECIES IN TURKEY

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ABSTRACT

There are four Swift species have been recorded in Turkey. These are Swift (*Apus apus*), Alpine Swift (*Apus melba*), Little Swift (*A. affinis*) and Pallid Swift (*Apus pallidus*). All these species are summer visitors in Turkey. Also, they go through Turkey at the time of north-south migration.

Swift and Alpine Swift are seen, in Turkey, more often, than the other Swift species, and the number of individuals is higher than the other two species. Distribution of Swift species in Turkey and visiting dates are different from each other.

Key words: Swift species, distribution, calendar, Turkey.

INTRODUCTION

Apodidae family is the most sky dependent terrestrial bird family. According to the reference is named Handbook of the Birds of the World, belong to this family, and involves 98 species and 17 genera. One of this species is Apus (Scopoli 1777). On the landscape there are 19 species belongs to this species. Among these species Swift (*Apus apus* Linneaus 1758), Alpine Swift (*A. melba* Linneaus 1758), Little Swift (*A. affinis* Grey 1830) ve Pallid Swift (*Apus pallidus* Shelley 1870) are the Swift species recorded in Turkey (Kiziroğlu 1989).

Swifts has an important status among the bird species, with their living style and behavioral characteristics. That's why, in Europe observations, on Swift species calendar, have been realizing and systematic records have been getting since 18 century. On the other hand, there is no systematic study on 4 different Swift species recorded in Turkey, is. Studies on distribution of any bird species in Turkey are quite little also. A study, only by Turan (1992) about distribution of Quail (*Coturnix c. coturnix*) in Turkey, been realized. With starting this sort of study, it was also aimed to provide a contribution to Turkey about this subject and also the studies (Hintz, 1857) in Western Palearctic has been carried on almost for 2 century.

METHODS

In the scope of this study, with examining movements of 4 Swift species recorded in Turkey, the time of arriving in spring, leaving time and where and which Swift species were seen in Turkey, been investigated in 2001-2003. As this, 324 observations realized in 2001; 409 observations realized in 2002 and 430 observation realized in 2003 records have been used (Table 1). A part of the data used in this evaluation have been gathered from the observations realized, the time mentioned above, by the author, the other part of data has

been taken different birdwatcher and researcher's observation records are presented in internet (Toygar, 2001-2003). In Table 1 numerical data belong to observations in year 2001-2003 and the reference of these data were shown. As the result of the evaluation of these observations, scattering map of these species has been started.

Table 1. Ornithological observations concerning with the Swift species in Turkey between 2001 and 2003.

Years	2001	2002	2003
Author	45	36	37
Others	279	373	393
Total	324	409	430

Table 2. Earliest and latest recording dates of Swift species in Turkey between 2001 and 2003.

Species	2001		Num.	2002		Number	2003	
	early	latest		early	latest		early	latest
Apus apus	29.03	07.10	36	13.03	21.09	54	20.03	24.11
Apus melba	19.03	15.09	13	31.03	31.10	14	07.03	25.10
Apus affinis	11.04	30.09	5	12.05	26.09	1	--	24.09
Apus pallidis	--	24.09	--	02.04	20.09	3	--	05.10

Various numerical data about Swift species obtained with the observations realized by either the author or the other birdwatchers. As the result of these observations evaluations it was seen that the number of individual of some Swift species identified as thousands of. Although usually Swift s is seen as groups, while they are migrating, their number can be rise to quite high numbers.

Among the data on Swift species which have been gathered during the 3 years study period the resources of numerical data and observations, has high individual numbers, were given in Table 3.

Table 3. Some interesting numerical records on Swift species in Turkey.

Datum	Location	Species	Number of Individuals	References
29.09.2001	Mersin	A. affinis	85	Turan
02.06.2002	İzmir Karine Lake	A. apus	200	Toygar, 2002
06.06.2002	Konya-Kulu	A. apus	500	Toygar, 2002
08.06.2002	Ankara-Çeltikçi	A. apus	500	Toygar, 2002
09.06.2002	Konya-Bolluk Lake	A. apus	500	Toygar, 2002
12.06.2002	Mersin	A. apus	100	Toygar, 2002
15.06.2002	Niğde Aladağlar	A. apus	80	Toygar, 2002
19.06.2002	Adıyaman-Nemrut	A. melba	300	H., J. Eriksen, 2003
20.06.2002	Van-Erçek Lake	A. apus	400	H., J. Eriksen, 2003
21.06.2002	Ağrı-Doğubayazıt	A. apus	500	H., J. Eriksen, 2003
27.08.2003	Muğla- Ortaca	A. apus	150	Toygar, 2003
13.09.2003	İstanbul	A. apus	100 +	Toygar, 2003
25.10.2003	İstanbul	A. melba	1600+500	Toygar, 2003

I-The Results of Observations on Swift

It is the most widespread (Map 1) and has the highest individual number Swift species in Turkey. Its status in Turkey is summer visitor and transit. Usually, it breeds in buildings and ruined, more rarely in caves and high rocky area. 36 of 324 ornithological observations realized in 2001 datum about Swift species have been seen. The earliest arriving date of this species is 29 March 2001; the latest date seen, while migration is 7.10.2001.

According to 309 ornithological observations, on Swift species realized different localities in at 1 January 2001 -.31 December 2002, the number of recorded Swift species is 54. The earliest date is 13 March 2002 and the latest date is 21 September 2002 Swift was been recorded during this observations.

As the result of evaluations of 430 ornithological observations realized in 2003, the results given below obtained: Swift has been recorded in 2003, the earliest at 20 March 2003 and the latest at 24 November 2003.

II- The Results of Observations on Alpine Swift

It is common widespread and its individual number is quite high especially in south and south-west of Turkey. This species has been recorded in high numbers locally in the other part of the country (Map 2).

As the results of evaluations of 2001 records, from 13 of the observations datum about Alpine Swift was been obtained. According this datum Alpine Swift were seen the earliest at 19 March 2001, the latest time in the same year were seen at 15 September 2001.

As the results of 2002 datum evaluations, this species, has been recorded in total 14 observations, were seen within Turkey borders the earliest at 31 March 2002, and the latest at 31 October 2002.

As the result of datum belongs to the year of 2003, Alpine Swift was seen, the earliest at 3 March 2003 and the latest at 25 October 2003 in Turkey.

III- Results of Observations on Little Swift

They are summer visitor in Turkey. They have been recorded in little numbered locals in south and west part of the country (Map 3) and determined that this species been represented with individuals in little number. Only 5 of the observations in 2001 Little Swift has been encountered. In these observations, the earliest recording date of Little Swift 4 April 2001 and the latest date is 29 September 2001.

According to 2002 observations it was seen the earliest at 12 May 2002. The latest record in this year is 26 September 2002.

When the records of 2003 has been examined, it will be seen that, Little Swift individuals were observed only once at 24 September 2003.

If we have a look on the results of observations realized during 3 years, it will be seen that the species, is the summer visitor, records especially in spring are lack or insufficient.

III- Results of Observations on Pallid Swift

This Swift species is very scarce and summer visitor in Turkey. It breeds in North-Western Anatolia and the other a few localities (see Map 4.). It has been recorded in limited numbers and in limited locations. It may be transit in here.

When having a look on the results of the observations, there is no Pallid Swift recorded in 324 observations in the year of 2001.

3 of investigations in 2002, Pallid Swift were observed the earliest at 2 April 2002 and the latest at 20 September 2002.

According to the observation records of 2003 Pallid Swift were recorded the latest at 5 October 2003. These species is not recorded in the spring of 2003.

Threats on the Swift Species in Turkey

The most important, known, death reason of Swift species is, losing the young because of the starvation. Bad weather conditions are effective on this.

Death is almost can't be avoided for the individuals leaved from the nest. Because the Swifts feed the young only in the nest.

One of the greatest threats for the Swift species is changed of the breeding habitats with any

reason. The most common example for this is in south-east Anatolian (Gaziantep-Araban) because of the dam construction, to breeding habitats, belongs to Little Swift, the threats faced to.

To ruin the old buildings and construct unroofed-flat terraced buildings is also one of the decreasing factors on probability of nesting.

The physical factors, on these species spends most of their life on air, can me the reason of being injured or death while flying between the builds.

Crashes are one of the point must be investigate.

CONCLUSION

According to observations realized in the years of 2001-2003 frequency of the Swift species seen is: Swift, Alpine Swift, Pallid Swift and Little Swift.

As the results of our evaluations, it has been seen that Swift species, wintering in Africa and they are arriving in the borders of Turkey in spring almost the near dates. These dates are usually, although it may be distributed in the last week of march, may be in first week of March. In the north latitude of Europe these dates are delayed. For example; Hintz (1857) mentioned that, in the observations realized in 1829-1851, Swifts have arrived at north of Poland at 29April, 26 May, and most of them have leaved here.

Tigges (2000) mentioned the date of coming of Swift to Berlin, Germany at 7th May and approximate leaving date is 11 August.

On more south latitude, this calendar realizes naturally earlier. Cornfeld (2002a) mentioned as the time of arriving Swift species at Jerusalem (Israel) in 2001, the earliest 19 February. The same person mentioned that, in 2001, Swifts arrived at Israel, Jerusalem 26 February and stayed here until the beginning of the June.

Geron (2002) said, that he saw the Swifts migrating in middle of August, and domestics begun to leave Tel Aviv in beginning of June.

When we have a look on observation results, it is seen that, beginning of autumn migration date (end of September-beginning of November) of Swifts, join into breeding activities, can be different. According to the study, realized in Germany, during 25 years, it was mentioned that this delay as the result of air conditions and changes in 17 days can be occur (Tigges,2000).

According to Tigges (2001) Swifts arrive to Europe in 4 waves similar to the situation in the Middle East. First groups of these are alone individuals or little groups with 3-5 individuals. Approximately 12-14 days after reached groups, in the form of 2nd wave, in a great possibility, individuals don't join into breeding activities. Swifts have breeding ability at the end of second years old. 3rd waves, is quite heavy, formed out breeding individuals and arrives 2-3 days after 2nd group. Approximately 4-6 weeks after 4th and the last group arrives. These are individuals don't join into breeding activities. As, the studies on this subject, in Turkey, are not insufficient no evaluation on this characteristic movements could be possible. It is thought reaching data, will make up blanks on this point, as realizing of the studies in having more embrace.

Glutz von Blotzheim and Mauer (1980) mentioned that 2 subspecies of Swift and 3 of 10 known subspecies of Alpine Swift exist in Palearctic. There are enough knowledge about calendar and scattering of these taxa in Palearctic. Besides of this, there is no enough

knowledge about the situation in Russian Federation, Middle-, South- and South-East Asian except the limited knowledge in Middle East and a few Arabic countries. A risk on confusing the species as, there are four Swift species in Turkey, they can be seen on ascend while flying with high speed, esc.70-150 km/h (Glutz von Blotzheim and Mauer 1980), and they are very similar. May be for this reason, getting details about the subspecies of this species could not possible until now.

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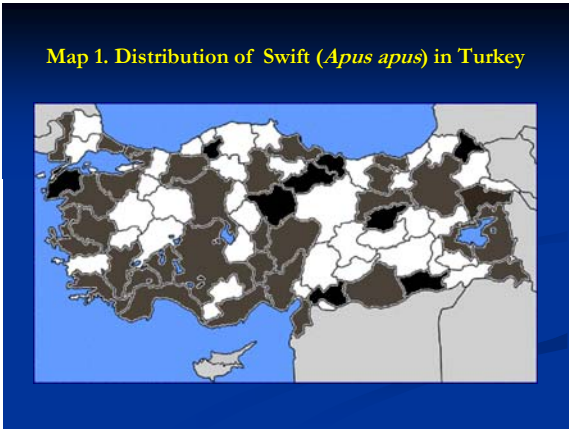
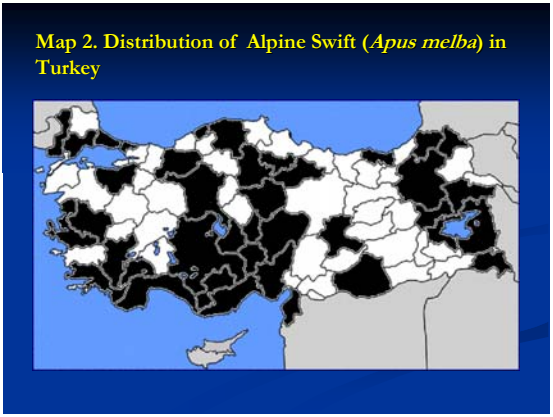
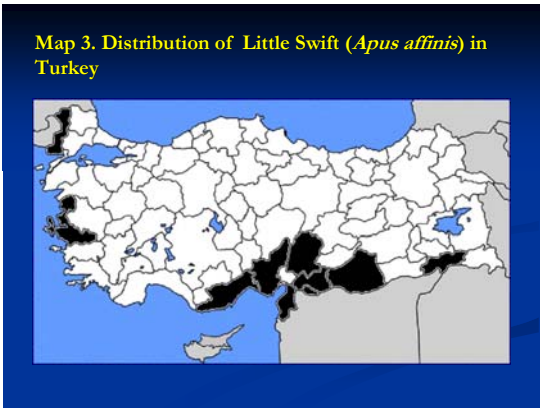


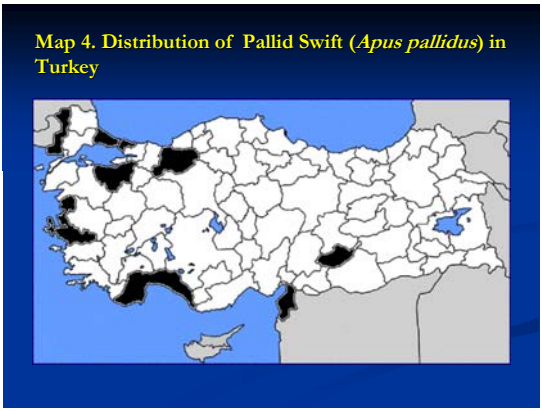
MAP 1. Distribution of Apus apus….



MAP 2. Distribution of Apus melba….



MAP 3. Distribution of Apus affinis….



MAP 3. Distribution of Apus pallidus….

WINTERING WATERFOWL OF SERBIAN PORTION OF DANUBE RIVER: COUNTS 1999-2003

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IWC (International Water Bird Census) represents the greatest survey program of biodiversity in the world that deals with the birds of wetland habitats. Information that is gathered by census method of IWC in six Eurasian regions is used in order to estimate the size of winter populations of wetland birds, also changes in size and distribution of these populations. Danube represents an important economic and trade connection of Eastern and Middle Europe. Besides, Danube freezes over either not at all or very rarely, and as such represents an important stop for the winter migrants, as during the winter it provides them food and shelter. Natural History Museum in Belgrade counts birds on the Serbian part of Danube since 1982. The results processed for this report were collected in the standardized period 1999-2003. Most birds were recorded on 1999, 203635 individuals from 36 species (least recorded number). The greatest number of species (43) was recorded in 2003. During the administering of IWC, on the Serbian part of the Danube most ducks were recorded, both diving ducks and surface feeding ducks. In last several years there is a recorded increase in numbers of Eurasian Coots (*Fulica atra*) and Mute Swans (*Cignus olor*).

Key words: Danube, IWC, count, waterfowl

INTRODUCTION

The main goal of this paper is to estimate the sizes of winter bird populations at Danube, but also it is a try to valorise birds of wetland habitats on European level, that is, determination of importance of Danube as an important wintering area for birds of water habitats not only on national but primarily on international level. It is important to note that gathered results might be used to better protect the river itself, the species that breed or winter along the river, as assets of inestimable value for all eight countries through which the Danube flows.

Birds of wetland habitats are good indicators of present state of a certain wetland ecosystem, its richness and diversity. Their monitoring and follow-up enables better understanding of regional as well as intercontinental changes and processes. Therefore, since 1967, within the International Water Bird Census (IWC), information is collected on winter movements of birds of water habitats. In former Yugoslavia and nowadays in Serbia and Montenegro this has been done since 1982 on all larger water surfaces. Especially important are data from Danube (Puzović et al 1988; Paunović et al 1994), as this river is the most important wetland system for Serbia. Danube has a wide flood area, dominated by swamps and marshes, which are during the summer period important for breeding of a large number of birds. Besides, the Danube as a rule extremely rarely freezes during the winter,

and therefore it represents an important station for winter migrants, as during cold months it provides food and shelter.

MATERIAL AND METHODS

The main method used in this paper is matched with standards of IWC, recommended by Wetlands International, as a rule between January 10th and January 25th (1999-2003).

The winter census includes almost all length of Danube's flow through Serbia (within the international boundaries with Hungary and Romania), 539 km out of a total of 588 km. Counting begins from the 1434th river kilometer (Bezdan) and finishes at the 863rd kilometer, at the Hydroelectric Plant Djerdap II. According to the characteristics of habitats along the Danube itself, the river is divided in seven equal-sized sectors, with length of about 80 km (Fig 1). Starting with the boundary with Hungary, sectors are as following: Sector I Bezdan-Vukovar; sector II Vukovar-Novi Sad; sector III Novi Sad-Belgrade; sector IV Belgrade-Morava; sector V Morava-Golubac; sector VI Golubac-Hydroelectric Plant Djerdap I; sector VII Hydroelectric Plant Djerdap I- Hydroelectric Plant Djerdap II.

In January 1999 and 2000, birds were counted from IV to VII sector, in January 2001 in sectors I, II, IV and V, and in 2002 in sectors I, III, IV and V. Only in 2003 were the birds counted in all seven sectors.

The team participating in IWC is composed of four members, who travel by boat, down the river. Counting is done in such a way that each member of the ream records each present species and estimates its abundance. During the winter bird census on the Serbian part of Danube, participants are employees of Natural History Museum in Belgrade and Institute for Biological Research «Dr Siniša Stanković» as well as undergraduate biology students.

RESULTS

Although the winter census of birds in Serbia is administered since 1982, this paper deals with the results from last five years. Within this period, 40 species were recorded altogether, and 22 of these species belong to Waterfowl (Anatidae and Fulica atra): Mute Swan (*Cygnus olor*), Red-breasted Goose (*Branta ruficollis*), Graylag Goose (*Anser anser*), White-fronted Goose (*Anser albifrons*), Bean Goose (*Anser fabalis*), Mallard (*Anas platyrhynchos*), Gadwall (*Anas strepera*), Pintail (*Anas acuta*), Wigeon (*Anas penelope*), Teal (*Anas crecca*), Shoveler (*Anas clypeata*), Shelduck (*Tadorna tadorna*) Tufted Duck (*Aythya fuligula*), Pochard (*Aythya ferina*), Ferruginous Duck (*Aythya nyroca*), Goldeneye (*Bucephala clangula*), Velvet Scoter (*Melanitta fusca*), Eider (*Somateria mollissima*) Red-breasted Merganser (*Mergus serrator*), Goosander (*Mergus merganser*), Smew (*Mergus abellus*) and Coot (*Fulica atra*). A certain number of geese could not be identified at a species level.

Total number of individuals and species for each studied year is presented in Table 1.

Finally, medium value of number of species was calculated (21) as well as total average number of individuals (214897) for the whole studied period.

Table 1. Number of species and individuals by sectors

Year	Number	Sector							Total
		1	2	3	4	5	6	7	
1999	Indiv				8658	135949	45465	13563	203635
	Species				19	27	16	22	30
2000	Indiv				15295	96247	22654	18821	153017
	Species				18	26	19	25	30
2001	Indiv	14152	10000		16808	24533			65439
	Species	19	19		15	25			28
2002	Indiv	57972		38647	25133	34462			152658
	Species	23		23	18	25			30
2003	Indiv	12523	7357	33229	9255	104942	17082	25844	210232
	Species	22	17	23	19	30	23	28	35
Mean average	Indiv	28215	8678	35938	15030	79227	28400	19409	214897
	Species	21	18	23	18	27	19	25	21

Greatest number of species was recorded in sector V, and smallest in sector II (Figure 1). It is also important to stress that number of species increases from sector I to sector V, reaching its maximum in sector V. This sector includes up to 37% of total medium value (214897) of counted individuals.

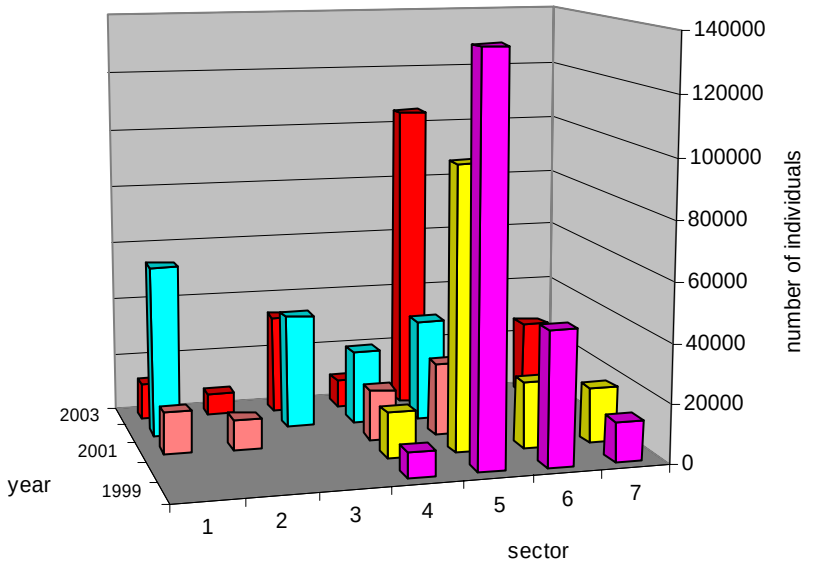

Figure 1. Total number of species by sectors during the five-year study.

Out of the total number of recorded individuals, percentage of *Anas platyrhynchos* in sector V during the five-year census was 9.35%. *Aythya ferina* is in this part of Danube in January present with 11.83%, *Aythya fuligula* with 2.7%, and *Buccephala clangula* with 6.53%. This sector also has a large number of individuals of *Fulica atra* that represent 7.79% out of total number of individuals. *Phalacrocorax carbo* is a species that does not belong to Waterfowl sensu stricto, but its number increases significantly. It is represented with 1.32%, recorded in sectors III and I. Species such as *Mergus albellus* and *Mergus merganser* have been recorded only in sectors V and VI. Other Waterfowl species are equally distributed throughout all sectors, with a tendency for their number to increase in sectors I, III and V.

Analysis of results gathered through IWC can be used to evaluate the capacity of Danube considering the birds of wetland habitats on regional level, especially based on criterion 3c of Ramsar Convention (Gilissen et al., 2002). Out of all 40 recorded species in Danube flow through Serbia, only seven species are considered to be of great importance by the criterion 3c (Table 2). According to our results, all 75% of winter population of *Mergus albellus* from the region Eastern Mediterranean/Black Sea winters on Danube, and that increases the great value of this river. Also we should not neglect the second most abundant species, *Bucephala clangula,* whose percent value on Danube is all 56% out of whole population within the region. *Anas platyrhynchos* is represented with 13.9%, which is also a piece of data that should not be forgot.

Table 2. Species that are considered to be of great importance by the criterion 3c

Species	POP	Prag 1%	%
Phalacrocorax carbo	6.800	680	9.8
Anas platyrhynchos	50.000	5.000	13.9
Aythya ferina	28.000	1.400	9.9
Aythya fuligula	7.200	720	7.0
Bucephala clangula	13.600	1.360	56
Mergus albelus	4.800	480	75
Fulica atra	20.000	2.000	2.1

DISCUSSION

Distribution of species by sectors is changeable and most probably depends on characteristics of habitats within the given sector, as it is correlated with differences in depth of Danube, width of its flood zone, speed of water flow, presence or absence of emergent vegetation, presence of tributaries and other effects.

Within the upper part of Danube (sectors I-III), width of the river is not great, but from the mouth of Tisza River width of Danube slowly increases. In the region of sector V (down river from Belgrade), the river is widest, and the surrounding area is rich in swamps, marshes, fishponds, river islands and flooded forests, so due to the suitable feeding conditions in this sector the greatest number and diversity of birds are recorded. Flow of Danube in sector V is greatly slowed down, which is also suitable for appearance of a large number of individuals. In this sector, important are the presence of *Anas platyrhynchos* and *Fulica atra*, followed by *Phalacrocorax carbo*, *Phalacrocorax pygmaeus, Aythya ferina*, *Aythya fuligula* and *Bucephala clangula*. In this sector three species of geese were regularly recorded: *Anser anser, Anser albirfons* and *Anser fabalis*.

Comparison with results of Paunović et al. (1994) in the same locality for the period 1988-1992 shows that the number of individuals as well as number of species in this period is greater both in average values and absolute values. However, there is matching with the greatest average abundance of individuals in sector V. Divergence is recorded in sectors with smallest average number of individuals. In period 1988-1992 that was sector VI, while during the newest studies it was sector II.

It is very important to notice that sectors that include mouths of tributaries (I-Drava; III-Tisza; V-Morava) show significant increase in number of individuals. Large aggregations of

birds in these areas is caused by presence of sufficient quantity of nutritive matter coming through mentioned watercourses, numerous shallows, but also by presence of aquatic vegetation that presents a good shelter to a large number of individuals of Waterfowl. In contrast to these, in sectors II, IV and VII the smallest number of individuals is recorded. Besides, in sectors II and IV in last several years a hunting pressure was increased on a large number of species of ducks and geese, which is certainly a reason why in these regions there are few birds. Also, in sector IV where Belgrade is situated, as an administrative but also industrial city with majority of country's citizens, there is a great pollution as well as increased water traffic, so these are also possible reasons for lack of larger number of individuals in this region.

Depth of river increases from sector I toward sector VII, and maximum depth is reached in sector VI in Djerdap Gorge, that is, at the exit from this sector, where the Hydroelectric Plant Djerdap II is situated. In this sector, Danube is squeezed between steep mountain cliffs, and the width of river itself is not very big, so birds do not have a place to hide, and food is also more difficult to reach. A small number of species and individuals are recorded, and the only noticeable ones are *Mergus albellus* and *Mergus merganser*, and in lesser scope few species of diving ducks. Greatest number of these species of ducks was counted in sector VII, where Danube once again becomes wide, slow and much shallower that is sector VI. Also, shores of Danube here abound with aquatic vegetation, which presents a good shelter and protection for many species, primarily *Anas penelope*, *Anas acuta*, *Anas strepera*, *Anas crecca*, and somewhat less for *Anas platyrhynchos*.

Analysis of data of IWC shows that a large number of species of Waterfowl, especially ducks, during the winter migrates and overwinters in Eastern Europe, that is, in region Eastern Mediterranean/Black Sea, which also includes Serbia and Montenegro. Our results show that on Danube, during the winter census in period 1999-2003, 16 species of ducks were recorded. For some species that migrate from northwest of Europe, Danube represents the only refuge.

It is important to note that number of individuals increases every year, so our estimate of abundance of mentioned species, when compared with the period 1997-1999, presented by IWC, must be much higher. However, these results match the analysis and estimate of IWC that the largest number of individuals of those Western Palearctic species that we presented here winters exactly in this region.

CONCLUSIONS

Having in mind all presented data and facts; we may conclude that the Serbian part of Danube represents an important station for wintering of many waterfowl of Western Palaearctic. Due to numerous swamps, marshes and fishponds that especially appear in its middle flow; the Danube represents an important refuge center during the cold winter months, especially for species *Anas platyrhynchos*, *Aythya ferina*, *Aythya fuligula, Buccephala clangula, Mergus albelus* and *Fulica atra*. This is especially pronounced in sectors V and III, where a large number of species reaches their maximum. Sectors where number of species is small may be a signal that something is wrong, that the river is greatly polluted or that the hunting pressure is increased.

Therefore the Serbian part of Danube, as a winter station for many species of Waterfowl is of incalculable value not only for Serbia, but also for whole Europe. Therefore, it is necessary to understand its importance and role in life of birds that come in winter to our region looking for shelter and food, in order to decrease hunting pressure, implement better measurements of protection of the river itself, environment, as well as numerous rare and threatened bird species that visit us in winter.

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HABITAT REQUIREMENTS FOR THE NEST PREFERENCE AND THE DISTRIBUTION OF KRUEPER'S NUTHATCH (*Sitta krueperi*) IN ANTALYA

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Habitat requirement on the nest preference and distribution of the Krueper's nuthatch (*Sitta krueperi*), which is locally distributed mostly on Anatolia and few individuals on Lesvos and Caucasians, have been investigated in Antalya. Distribution of Kruper's nuthatch is found in natural forests, non-planted, middle or old aged conifer forests, red pine, black pine, cedar, and juniper, and nearly these trees maquis (especially *Querqus sp.*), and broad-leaved trees like maple,(*Acer sp*.), poplar (*Populus sp*.), and plane tree (*Platanus* sp.) Krueper's nuthatch uses hollowed-out nest hole by woodpeckers or making itself in a dryed tree, died thick branch or wooden power pole. We have found totally 18 nest holes, which were 9 nest holes in Red pine, 5 nest holes in Black pine, 3 nest holes in Cedar, and one nest hole in power pole, in Antalya between 2000 and 2003. Nest areas have been calculated in average 974, 44±125,33m altitude, and 26.94^0±$4,68^0$ slope, 4 of them in flat area and 13 of them northwest, north and east face of the hillside. Nest holes determined on average 11, 84±1,62m from the ground and it looks south, southeast and east direction in usually middle old aged trees.

Key words: Krueper's nuthatch, *Sitta krueperi*, nesting, distribution, Antalya

INTRODUCTION

Krueper's nuthatch *Sitta krueperi* Pelzeln, 1863, was originally described in Izmir (Western Anatolia, Turkey). Krüper's nuthatch is not a well-known bird (Cramps and Perrins 1993, Harrap and Quinn, 1996) and a small fraction of its world population lives in the near neighborhoods of Turkey, e.g. the Greek Islands and the Caucasus (200 – 700 individuals) (Handrinos and Akriotis 1997), whereas the greatest number of them are seen in Anatolia (10000 – 100000 individuals) (Hagemeijer and Blair 1997). In this context, an account of their endemic distribution in Anatolia, on the one hand, and a lack of sufficient data on the other, the need for such a study arose. Krüper's nuthatch belongs to SPEC 4 (Species of European Conservation Concern) whose global population is concentrated in Europe, therefore it is secure (S), in the sense of European Protection Status (Tucker and Heath 1994). However, this situation could change in the future. Furthermore it is classified to belong to Rare species in Red Data Book of Greece (Karandinos and Paraschi 1992).

Antalya, where has a rich fauna, and lies main migration route due to a variety of geographical details, is located in the west of the Mediterranean region.

MATERIALS AND METHODS

Krüper's nuthatch is studied between January 2000 and November 2003 in the natural forests in the surroundings of Antalya, particularly the Red pine (*Pinus brutia)* forest in BAO (Lütfi Büyükyıldırım Research Forest), Black pine (*Pinus nigra)* forest in Köprülü Canyon National Park, and the Cedar (*Cedrus libani)* forest of Elmalı Cedar Research Forests (ESAO). During the observations, a 10x50 Soligor binocular, and for the detailed observations, Canon EOS10 camera, Soligor objectives (500mm f: 8 and 28-200mm f: 3, 5-5, 6), and Garmin GPS are used. For the tree ages fife scales were used, 1: young, 2: young-middle, 3: middle, 4: middle-old and 5: old aged trees.

Antalya is located in the west of the Mediterranean region. The climate of the province is typical to the Mediterranean: hot and dry in summers and temperate and rainy in winters. The humidity is about 64%, and the average water temperature is 21.5 °C.

RESULTS AND DISCUSSION

Habitat requirements on the nest preference and distribution of Krueper's nuthatch (*Sitta krueperi*) were investigated in the natural forests of Antalya. An important factor of its distribution was determined as Red pine (*Pinus brutia*) by Frankis (1991). In addition the distribution of Kruper's nuthatch is found in natural forests, non-planted, middle or old aged conifer forests, red pine, black pine, cedar, and juniper, and nearly these trees maquis (especially *Querqus sp.*), and broad-leaved trees like maple,(*Acer* sp.), poplar (*Populus* sp.), and plane tree (*Platanus* sp.) (Albayrak 2002).

Tree age is an important factor for its choosing habitat so it is better that the tree is old and some part of it is dried. The trees have been found to be middle-old aged in average (average 4, 12±0, 24). Krueper's nuthatch uses hollowed-out nest hole by woodpeckers or making itself in a dried tree, died thick branch or wooden power pole. It has been found totally 18 nest holes occupied by Krueper's nuthatch, which were 9 nest holes(50,0%) in Red pine, 5 nest holes(27, 8%) in Black pine, 3 nest holes(16, 7%) in Cedar, and one nest hole(5, 5%) in power pole, in this study.
Nest holes determined on average 11, 84±1,62m from the ground and it looks to the south, southeast and east in usually middle old aged trees.

Nest areas have been calculated in average to be at 974, 44±125,33m altitude, and 26.940±4,680 slope, 4 of them in flat area and 13 of them northwest, north and east face of the hillside.

Positive correlation (r: 0,745; p<0, 05) was found between altitude and tree ages . The tree ages are seen to increase with increasing altitude. it is also found that a similar correlation, between the nest height and the tree age(r: 0,680; p<0, 05).

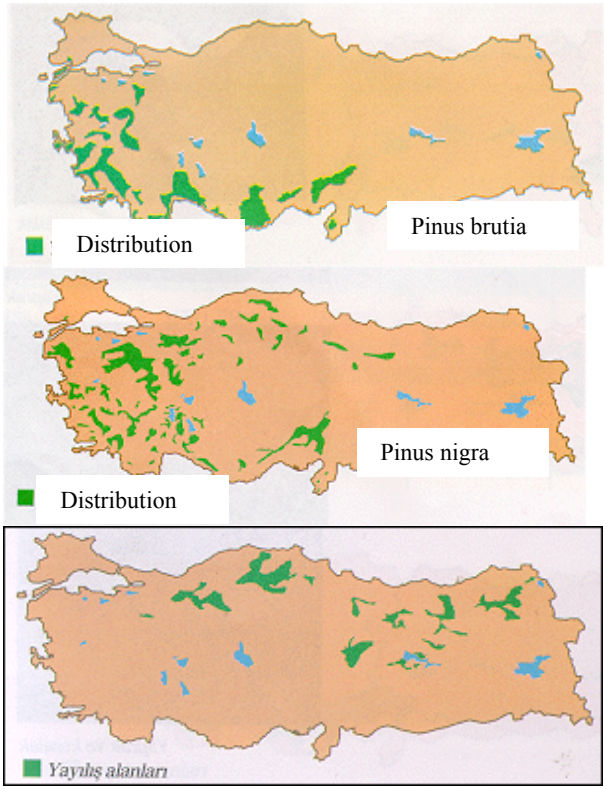
There is a statistical distinction between the average slope of the ground, for the nested Black pine and Red pine areas (t: 2,425; p<0, 05), namely, the former lying on higher (44, 00) and the latter lying on lower (23, 90) slopes. It has also been calculated between Black

pine and Cedar areas (t: 3,086; p=0, 05), namely, the former lying on higher (44, 00) and the latter lying on lower (13, 30) slopes.

Krüper's Nuthatch is mostly sedentary with some post-breeding dispersal and seasonal altitudinal movements (Cramp & Perrins 1993, Harrap & Quinn 1996, Handrinos & Akriotis 1997).

It has been noted that incubation is carried out only by females, whereas the male and female have worked together in the feeding of young birds (Löhrl, 1988; Polivanov and Polivanova, 1986). The food of Corsican Nuthatch (*Sitta whiteheadi*) for the young is collected by both sexes, perhaps more by male (Cramp and Perrins, 1993).

Although it has been noted that the distribution of Krueper's Nuthatch is all costal regions in the Anatolia (Cramp and Perrins, 1993, Frankis 1991). the distribution of pine habitats in Anatolia is patchy (Figure1), and large-scale habitat destruction and fragmentation due to forestry is increasing patchiness of these habitats.



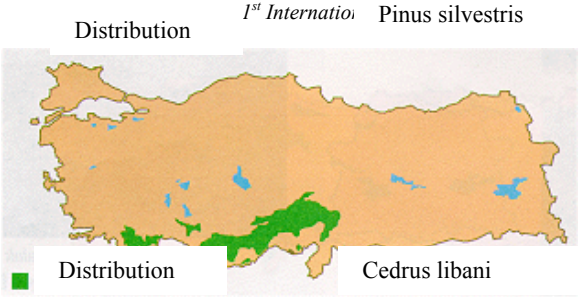


Figure1: Distribution of pines and cedar in Anatolia.

Because of the strong dependency of Krüper's Nuthatch on old pine habitats, its high residency (Harrap & Quinn 1996), and due to the patchiness of its preferred habitats the Krüper's Nuthatch population in Turkey may be already isolated into separated subpopulations, and the extent of isolation may increase with ongoing fragmentation of the breeding habitats in the near future. Thus, the species may become under conservation concern and it may need conservation actions.

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TURKISH BREEDING BIRD ATLAS PROJECT: PALAS (TUZLA) LAKE AND KAYSERI REGION

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The goal of this project was to create a Breeding Bird Atlas for the region surrounding Palas Lake and city of Kayseri in central Turkey. For the Breeding Bird Atlas of Turkey Project the whole country has been divided into 50×50 km UTM squares. The coordinates of the 50×50 km square we surveyed are from 700,000-750,000 m E and 4,300,000-4,350,000 m N in UTM Grid Zone 36S. Study area was divided into 25 10×10 km squares. Each 10×10 km square was visited twice during the breeding season, once early (between May 10 and June 1, 2003) and once late in the season (between June 14 and July 1, 2003). For each survey the altitude, UTM coordinates, time of day, habitat types, and the bird species that were seen and/or heard were noted along with their breeding code. Distribution maps for each bird species were made. In the 50×50 km UTM square a total of 99 bird species were seen. The bird species that were seen frequently in the study region were: Emberiza melanocephala Black-headed Bunting: (recorded on 66 bird atlas forms), Sturnus vulgaris Starling (56), Pica pica Magpie (53). Of these 99 species , 61 are Species of Europen Conservation Concern (SPEC) that have an unfavorable conservation status.

Key words: Breeding Bird Atlas, Palas Lake, SPEC

INTRODUCTION

The goal of this project was to create a Breeding Bird Atlas for the region surrounding Palas Lake and the city of Kayseri in central Turkey. There are previous scattered bird records for parts of this area but this is the first systematic breeding bird atlas. This region was one of three regions chosen as a pilot project for the Breeding Bird Atlas of Turkey project which is planned to be completed in the next five years.

STUDY AREA

For the Breeding Bird Atlas of Turkey project the whole country has been divided into 50x50 km UTM squares. The coordinates of the 50x50 km square we surveyed are from 700,000-750,000 m E and 4,300,000-4,350,000 m N in UTM Grid Zone 36S. The study area is located in the central Anatolian region of Turkey and includes Palas Lake and the city of Kayseri (Figure 1). The city of Kayseri, with a population of 525,000 and at an elevation of 1041 m, is situated in the northwest part of the study area. Besides the large city of Kayseri there are many smaller towns and villages located throughout the study area. The climate of

the area consists of cold snowy winters with an average temperature of -2° C. Summers are hot and dry. The most rain is seen in the spring months.

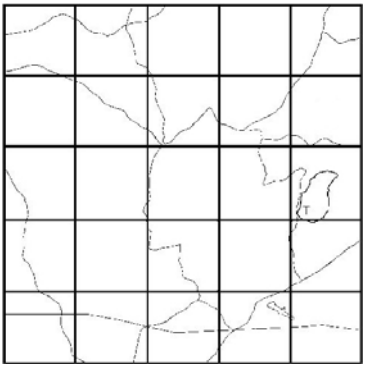


Figure 1. Map of the study area showing Palas Lake.

METHODS

The bird atlas data was collected from May 10, 2003 through July 1, 2003. The 50x50 km UTM square in the Palas Lake and Kayseri study area was divided into 25 10x10 km squares. Each 10x10 km square was visited twice during the breeding season, once early (between May 10 and June 1, 2003) and once late in the season (between June 14 and July 1, 2003). For each visit in a square at least one group of two people completed a one hour breeding bird survey. In many of the squares more than one group completed a survey. For each survey the altitude, UTM coordinates, time of day, habitat types, and the bird species that were seen and/or heard were noted along with their breeding code. The breeding code was noted from 1 to 16 depending on the breeding evidence (EBCC Atlas 1997).

The project two half hour forms were completed. And done in order to gather more information on bird abundance. During this time the atlas workers noted each bird that was seen and/or heard together with the breeding bird code. Apart from the bird atlas form recording times, birds seen and/or heard and their breeding codes were noted on casual record forms. All the breeding bird atlas work was done during daylight hours so nocturnal species were not recorded.

All the bird atlas forms and casual record forms were input into a computer spreadsheet. From this data, the total number of bird species seen in each 10x10 km square was determined. For every square the total number of bird species seen on one hour forms, half hour forms and casual record forms was found along with the total number of hours of atlas work.

Distribution maps for each bird species were made. Dots were placed in the center of each square which had record(s) of the species, with the size of the dot related to the species' relative abundance in that square. The relative abundance in each square was calculated as the fraction of bird atlas forms where the bird was noted divided by the total number of bird

atlas forms for that square. An open dot indicated that the bird was recorded only on a casual record form and not during the breeding bird atlas survey work.

For every bird species we found the maximum breeding code (1-16) noted in the 50x50 km square. We calculated the overall abundance of a species in the 50x50 km square as the number of forms where the bird was recorded divided by the total number of forms in all the bird atlas work. The number of times a habitat was noted during the bird atlas work was recorded for each habitat type. For each bird species, the percentage of each habitat type that it was seen in was calculated as the number of times each habitat was recorded for the species divided by the total number of habitats recorded for the species. The habitat types with percentages over 10% where the bird was seen were reported. For each habitat where the bird was seen over 10% of the time, a chi-square test was performed to determine if the bird was seen in these habitat types more than would be expected by chance. If the p-value was less than 0.05, it was reported as being statistically significant. For every bird species seen the average, minimum and maximum altitude where the species was seen were determined.

RESULTS

In total 101 bird atlas record forms were completed for a total of 50,5 hours of bird atlas work. The number of bird atlas record 4 forms completed in one square.

Table 1 shows the habitat types noted in the 50x50 km study area during the bird atlas surveys together with the percentage of forms where the habitat type was noted. The most common habitat types, which were noted on more than 10% of the forms during bird atlas survey work, were: farmland, arable (dry); salt steppe; woodland (unspecified); bare rock faces/inland cliffs; river or stream (fast flowing).

Table 1. Habitat types noted in the 50x50 km square and their overall percentage (number of forms where habitat type was noted divided by 101 total forms).

Habitat type	% of total forms
farmland, arable (dry)	30.6
bare sediment/rock (montane)	1.0
orchards, poplar plantations	10.6
woodland (unspecified)	35.5
bare rock faces/inland cliffs	14.4
scrub/grass (unspecified)	8.7
river or stream (slow flowing)	5.9
marsh, fen, or water fringe vegetation	3.0
reed-bed	4.4
canal or ditch	0.9
Canyon	16.7
broad-leaved woodland	0.7
Puddle	1.9

barrage	4.1
water-bed (dry)	2.5
river or stream (fast flowing)	21.0
Lake	3.6
urban green space	6.1
Poplar	12.5
Oak	4.8
Willow	8.0
farmland, rice/cotton (wet)	3.3
salt steppe	19.8

In the 50x50 km square in total 99 bird species were seen. Of the 99 bird species seen, 5 species were noted only on casual record forms and not on the breeding bird atlas survey forms. Of the 99 bird species, 18 bird species were seen only once. The total number of birds species seen in each 10x10 km square both during bird atlas work and on casual record forms is shown in Figure 2. The number of bird species seen varies from 15 to 36 with an average of 24.2 ± 5.1 (std. dev). The most bird species were seen in squares with farmland, arable (dry), river or stream (fast flowing), salt steppe.

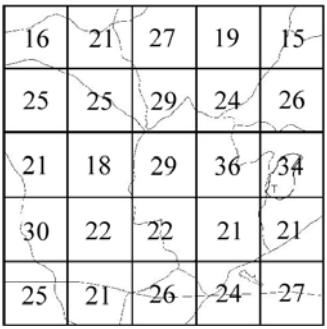
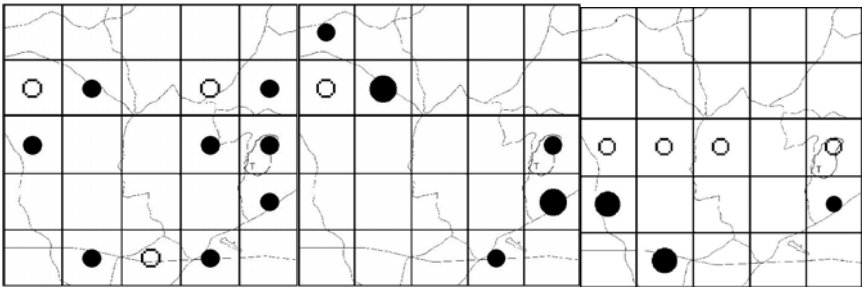


Figure 2. The total number of bird species recorded in each 10x10 km square including those recorded on casual record forms.

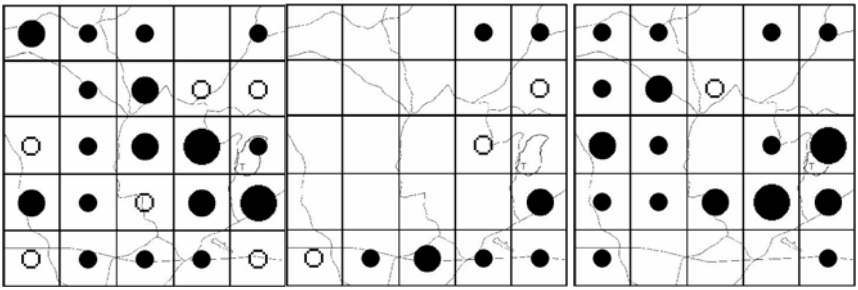
The bird species that were seen most frequently in the study region were: *Emberiza melanocephala* (recorded on 66 bird atlas forms), *Sturnus vulgaris* (56), *Pica pica* (53), *Oenanthe isabellina* (45), *Buteo rufinus* (43), *Apus apus* (40), *Milaria calandra*(40), *Luscinia megarhynchos* (39), *Passer domesticus* (38), *Melanocorypha calandra*(33), *Hirundo rustica* (27). These species were all noted on more than 25% of the total 101 bird atlas forms.

Distribution maps for 99 of the bird species were made. Some examples from the 99 maps are shown in Figure 3.

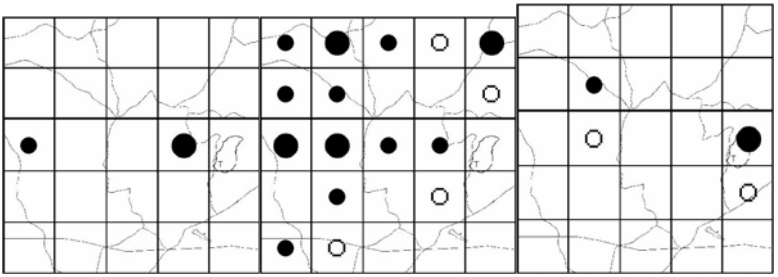
Figure 3. Distribution and abundance maps for some of the bird species noted.



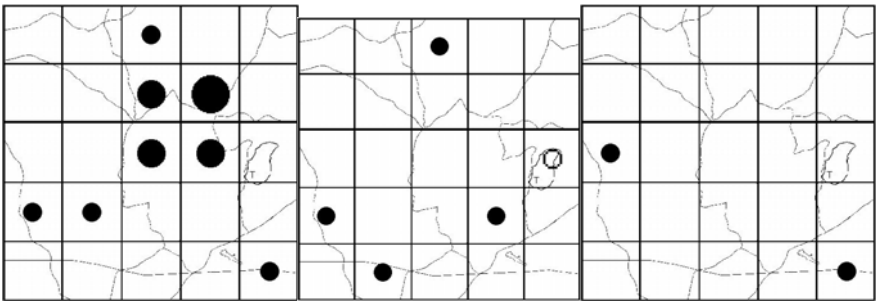
Ciconia ciconia Tadorna ferruginea Neophron percnopterus



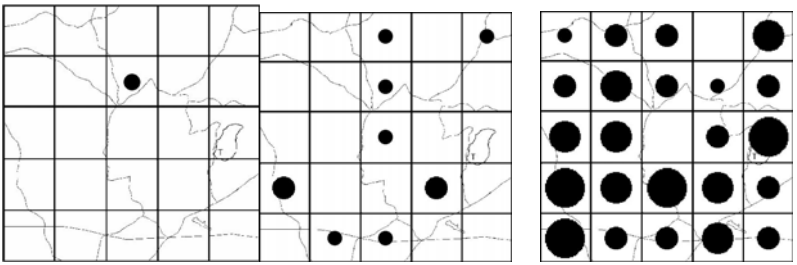
Buteo rufinus Upupa epops Melanocorypha calandra



Melanocorypha bimaculata Calandrella brachydactyla Calandrella rufescens



Sylvia curruca Sitta neumayer Passer montanus



Emberiza cia Emberiza hortulana Emberiza melanocephala

In the Appendix, all the bird species seen in the study area are listed by their numerical codes from Voous (1977), Latin names, English names, SPEC category if applicable (Tucker and Heath 1994), overall abundance, highest breeding evidence, major habitat types and altitudes (minimum, maximum and mean) where the bird was seen.

CONCLUSION

With 99 breeding bird species Palas Lake and the surrounding region hosts a very rich biodiversity. There were in total 35 Species of European Conservation Concern (SPECs) (Tucker and Heath 1994) noted during atlas work in the study region. Of these 35 species 6 were in SPEC category 2, 23 were in SPEC category 3.

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THE IMPORTANCE OF MOSQUITO CONTROL ON THE WAY OF BIRD MIGRATION

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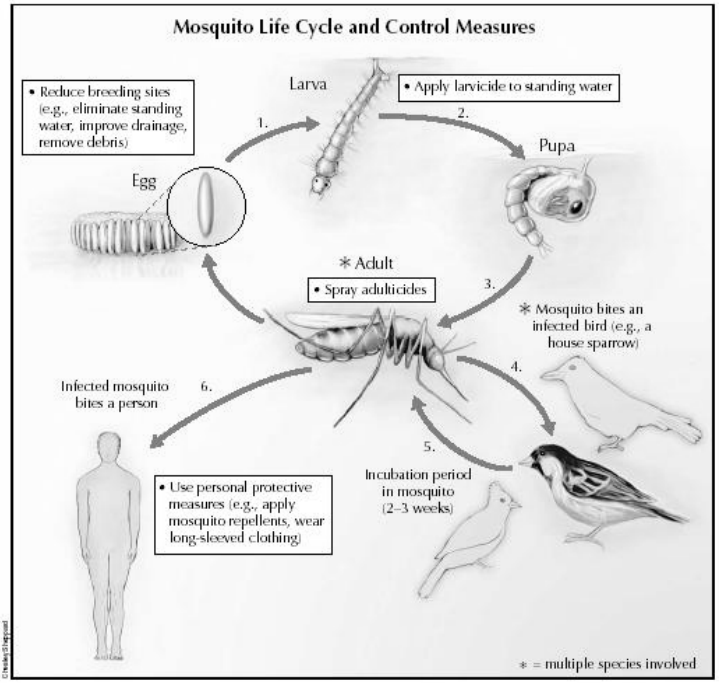
The principal hosts of arboviruses (arthropod borne viruses) are wild birds, and the principal vectors are mosquitoes. Many arboviral diseases namely, St. Louis Encephalitis, Western Equine Encephalitis, West Nile Virus, Eastern Equine Encephalitis, are transmitted from mosquito species to birds and humans. The infected mosquitoes transmit the virus when feeding on human and bird hosts and in some conditions caused of deaths. The studies in Israel, Czech Republic, and Romania have implicated wild birds as important vertebrae hosts for arboviruses. Turkey is located on major migration routes of birds, and many birds species are using different aquatic areas (e.g. lakes, ponds) for the resting, wintering and breeding, and also these areas have different habitats for mosquito reproduction. The aim of this poster presentation is what methods of mosquito control would be most useful in resting, wintering and breeding areas on the way of migratory birds

Key words: Mosquito control, bird migrations, arboviruses, Turkey

MOSQUITO'S LIFE CYCLE AND ARBOVIRUSES

Mosquitoes are flies that have four distinct life stages: egg, larva (four stages), pupa, and adult. The larval and pupil stages are found only in water. Eggs are laid on the water or at the edge of the water depending on species. Most female mosquitoes feed on humans, birds and other animals to get sufficient blood to develop eggs.



Arboviruses (arthropod-borne viruses) are a large group of viruses that are spread by certain invertebrate animals (arthropods), most commonly blood-sucking insects. The natural life cycle of many arboviruses involves migratory birds and the mosquitoes that feed on them. Many mosquito species transmit the arboviruses between the migratory birds, and can pass it on to animals and non-migratory birds. The viruses are carried in the mosquito's salivary glands.

Mosquitoes that have become infected with arboviruses by feeding on an infected bird sometimes transmit arboviruses to other birds. Migratory birds are likely a key means by which the virus is transported to new areas along their migratory routes. High antibody rates were found in wild birds and viremic levels in experimentally infected birds are high enough to infect mosquitoes. Ernek *et al*. (1977) reported that many viruses (e.g. Tick-borne encephalitis, West Nile virus) were isolated from the blood, brain and liver of migrating birds in Slovakia. Recent studies in the USA found infection in 146 species of bird and 29 species of mosquitoes (Solomon *et al*. 2003). The studies in Israel, Czech Republic, and Romania have implicated wild birds as important vertebrae hosts for arboviruses (Nir *et al.* 1967; Tsai *et al*. 1998; Hubalek *et al.* 1999).

ARBOVIRUSES SYMPTOMS IN HUMAN

Most infected people have no symptoms. Symptoms of human arboviral infections typically

begin within 14 days following the insect bite and consist of fever, chills, headache, rash, muscle and joint aches, listlessness, and possibly encephalitis (swelling of the brain which is the most dangerous symptom) (Selden and Cameron 1996).

ARBOVIRUSES SYMPTOMS IN BIRDS

Wild birds infected with arboviruses are most often found dead, so descriptions of clinical signs are not available. Infected birds may show neurological symptoms, anorexia, depression, paralysis and blood in urine, weight loss, tremors, weakness, disorientation, etc. (Kramer & Bernard 2001; Malkinson 2001).

WETLANDS OF TURKEY AND BIRD RINGING STUDIES

Turkey is surrounded at north Black Sea, at south Mediterranean and Syrian desert, at west Aegean sea and at east mountainous and steppe areas, where is located at the corner of west palearctic region. Many of the birds which migrate between Europe and Africa each year, choose to fly via Turkey. Some of these, stay and breed here whilst many more just pass through. The surface area of Turkey is 780.566 km² (including the lakes is 814,578 km²) and presently has 9 sites designated as Wetlands of International Importance, with a surface area of 159,300 hectares. Total 2444 considerable birds area are determinated after result of research on the whole of European 39 country including 10 islands, which are dependant these countries (Turan 2002).

The list of Wetlands of International Importance in Turkey (Anonymous 1995)

Name	Province	Surface area (ha)	Ramsar site no
Akyatan Lagoon	Adana	14,700	943
Gediz Delta	Gulf of Izmir	14,900	945
Göksu Delta	Silifke	15,000	657
Kizilırmak Delta	Samsun	21,700	942
Lake Burdur	Burdur	24.800	658
Lake Kus (Manyas)	Balıkesir	20,400	660
Lake Uluabat	Bursa	19,900	944
Lake Seyfe	Kirsehir	10,700	659
Sultan Marshes	Kayseri	17,200	661

Although Turkey is for many bird species on the very important migration way, until the year of 2002 didn't regular and extensive ringing studies realized. Between 1950-2000 years firstly Kızılırmak, Göksu and Çukurova Deltas and different areas in short time and irregular studies were realized. The other countries rings were used at mostly from strange researcher

executed these studies. In these studies more than 17.000 birds of 166 species were ringed.

The Turkish National Ringing Scheme was jointly launched in March 2002. In Spring 2002, 15.487 birds of 107 species, and in Autumn 2002, 12.340 birds of 99 species were ringed. Ringing was carried out at Manyas Kuş Cenneti (by KAD-MPG), Cernek (by On Dokuz Mayıs University), Manavgat/Titreyengöl (by Akdeniz University, Reinhard Vohwinkel and Werner Pruemte) and ODTU (by KAD). In 2003, two new pilot stations (Akyatan and Diyarbakır) were included.

The rate of ringing birds from some sitations in Turkey (Yarar and Magnin 1997)

Name of station	2002 Spring	2002 Autumn	2003 Spring	2003 Autumn	Total
Manavgat/Titreyengöl	12.085	156	12.837	498	25.576
Manyas Kuş Cenneti			1.382	2.672	4.054
Cernek			1.749	5.865	7.614
Akyatan			494	1.546	2.040
					39.284

Up to now there is no research about arboviruses in birds of Wetlands in the Turkey!!!!! May be in the future bird ringing researches and monitoring birds for arboviruses should be made simultaneously. Further studies are necessary on the arbovirus that is transmitted by mosquitoes to birds in Turkey.

MONITORING BIRDS FOR ARBOVIRUSES (CWBO, 2004)

Dead birds might be an indicator of arboviruses activity in the area. Peoples should report dead birds to the local health unit, so that pick-up or delivery and testing of dead birds can be arranged.

Bird species are caught and carefully removed from the mist nets, then identified and measured.

Each bird receives a serially numbered metal band. This will serve to identify this individual each time it is caught, and allows the scientists to follow the infection cycle in individual birds throughout the summer season.

Blood samples are taken from birds, and prepared for a laboratory analysis to detect the presence and amount of the arbovirus. The birds are then released unharmed.

If the birds in an area are found to be infective, health warnings are issued through the local news media to advise residents to make special efforts to avoid being bitten by mosquitoes.

What can we do to reduce mosquito populations in Wetlands?

Control of mosquitoes in wetlands can be very difficult. Chemicals may kill vegetation and predators, and possibly the current mosquito population, but mosquitoes are likely to reestablish more quickly than the predators. When mosquito populations are large and virus is detected, mosquito control activities are increased.

Mosquito larvae can be controlled by non-pesticide means or by pesticides means. Non-chemical means such as water management and source reduction (improved drainage, filling and levelling in areas, improved sanitation, and habitat modification) are the most effective and economical means of providing long-term mosquito control. Wetland restoration decreases mosquito populations in two ways: by providing proper habitat for the natural enemies of mosquitoes, and by preventing or reducing flooding (in areas that aren't normally wet and thus support mosquitoes but not their predators). Periodic draining and flooding can effectively interrupt mosquito production. Open Marsh Water Management systems provide long-term biological control of mosquitoes.

* Vegetation protects mosquito larvae from physical disturbance and predators, and enhances food resources. Periodic harvesting or culling of plants can be undertaken to provide increased water movement and predator access. Reducing vegetation density can have a positive effect on mosquito fish (*Gambusia affini*s) density and mosquito control.

* Eliminating temporary standing water in plastic containers, discarded tires, or other water holding containers around one's property can greatly reduce breeding areas.

Natural predators: In nature, there are many predators that eat adult mosquitoes or mosquito larvae. These include fish, frogs, dragonflies, and other such animals in ponds and wetlands, birds such as swallows, and bats. Small populations of natural predators can help control numbers and keep the number of mosquito bites down.

Mosquito Fish, *Gambusia affini*s. These fish are used to control mosquito larvae in closed water bodies. *Gambusia* are more effective in some situations than others. According to different research, a pair of half-grown *Gambusia* can consume 5000 mosquito larvae in 11 weeks. An adult female can devour several hundred larvae per day (Rupp 1997).

Native birds (swallows, warblers, purple martins, vireos, etc.) eat adult mosquitoes. Normally, birds do not specialize solely on one pest species and their impact on mosquito population is small.

BIOLOGICAL INSECTICIDES

Methoprene is an IGR (insect growth regulator) used in pest control. Methoprene is non-toxic to humans and other mammals and virtually non-toxic to birds. Field studies of methoprene have demonstrated that there is little effect on non-target organism including dragonflies, water boatmen and fairy shrimp.

Bacillus thuringiensis israelensis (*Bti*): *Bti* is a bacterial insecticide and this bacteria commonly found in many environments. Waters may be treated for mosquito larvae with *Bti*. *Bti* is toxic to a specific and limited number of insects. *Bti* has no direct effect on aquatic organisms other than Mosquitoes, Blackflies and Chironomids. Other aquatic organisms, such as shrimps, mites and oysters are generally unaffected (Glare and Callaghan 1998). *Bti* does not appear to persist in the environment. The toxins produced by *Bti* are rapidly degraded by sunlight. Hanowski *et al*. (1997) found that no effect of *Bti* or

methoprene treatments on the bird community or on 19 individual bird species and Niemi *et al*. (1999) reported that no negative effects on zooplankton or breeding birds could be attributed to treatment or changes to insect communities.

Aromatic plant species had a repellent effect against mosquitoes (Palsson and Jaenson 1999). Some bird species were used some parts of these plants (e.g. leaf) against parasites. *Achillea ligustica, Helichrysum italicum, Lavandula stoechas and Sistus creaticus* found in Corsican nests (Lambrechts and Dos Santos, 2000). It is such as that this plant species may be cultivated around wetlands.

During all year, it is estimated that one million people visit wetlands to photo-graph, bird watch, or just "get away from it all." Each people is under the risk. Insect repellents (e.g N, N-diethyl-m-toluamide) help these peoples reduce their exposure to mosquito bites that may carry potentially serious viruses such as West Nile virus.

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THE ORNITHOFAUNA OF SARIÇAY DELTA IN ÇANAKKALE

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This study was carried to determine the bad environmental situations that affected the bird species and the ornithofauna of Sarıçay Delta, which is located in Çanakkale province. In study period from 2002 to 2003, 61 bird species were identified in the area. However, it was determined that various activities near the wetlands affected the nutrition and destroyed the biotops of some bird species.

Key words: Sarıçay Delta, Ornithofauna, Protection, Distribution, Systematic

INTRODUCTION:

Turkey, which has geographical and climatic diversity, is an important area providing convenient conditions living organisms. Anatolian, which functions as a natural bridge between Asia and Europe continents on location grounds, is a place, which is on the path of great migrations. Consequently, significant bird migrations pass over Turkey in autumn and spring. One of these paths is Çanakkale Bosporus (Dardanelles). One of the most important rivers of Çanakkale is Sarıçay, the source of which is Kaz Mountains (İda). Sarıçay, which is also called Kocacay and which is about 40 km long, merges with Çanakkale Bosphorous around Çimenli Castle in the south. On Sarıçay is Atikhisar dam, which is an important wetland for birds. These lands are of great importance in the sustainability of natural balance in terms of the richness of the organisms it contains. As a result of domestic, agricultural and industrial waste being discharged into the wetlands in different ways. Some aquatic organisms living in this environment are indicated to be influenced directly or indirectly (Uysal and et all., 1985; Tunçer, 2002). Due to the increasing environmental pollution in Sarıçay, birds are also observed to go through a feeding and having problems and to have deteriorations in their biotopes.

In recent years, the number of the studies relating to ornithofauna of certain regions has been increasing substantially (Sıkı, 1988; Ertan, 1996; Erdoğdu, 1999; Erdoğan, 1998; Yaman, 2001). In the investigations carried out, not detailed study has been found, concerned with information was given about Gökçeada bird fauna (Ertan, 2001) and the bird species seen in the wetlands in Çanakkale (Ertan, 1996). Therefore, the bird species seen in Sarıçay Delta in Çanakkale were determined and the adverse environmental hardships they encounter were investigated.

MATERIAL AND METHODS:

Land works make up the great part of the study carried out at different periods. The region ranging from the place where Sarıçay merges with the sea to the place where Atikhisar dam is located was investigated. The coordination of our studies is 40º 09´ north latitude and 26º

27′ east longitude.

The investigation area was divided into 3 sub areas on the grounds that it was too large and contained different biotopes so that detailed observations could be made. The first one was Atikhisar dam and its surrounding, the second one was Sarıçay and the last one was the part of the Sarıçay where it merges with the sea.

During the period of the study, zoom binoculars (90x60) in bird observation and Canon AE1 camera and its lens were used to take the photographs of the species. In addition, Sony 120x optic, 20x digital camera were used to obtain image of the birds by video-filming detailed land and bird species. By the help of various reference books (Baran and Yılmaz, 1984; Kiziroğlu, 1989; Heinzel, Fitter and Parslow, 1995) considering the morphology and color design characteristics of the birds obtained through photographs and images, species identification was carried out.

RESULTS:

Totally 61 bird species were determined, 12 of which were Orders (Podicipediformes, Gaviiformes, Pelecaniformes, Ciconiformes, Falconiformes, Gruiformes, Charadriiformes, Columbiformes, Cuculiformes, Coraciiformes, Piciformes, Passeriformes) and 29 of which were families in the studies carried out between 2002-2003 in Sarıçay Delta. The species identified are given in Chart 1 according to systematic order.

Table 1:

FAMILIES	SPECIES	THE STUDY FIELDS		
		ATİKHİSAR DAM	SARIÇAY	THE PLACE WHERE IT MERGES THE SEA
Podicipedidae	Podiceps cristatus			+
Gaviidae	Gavia stellata			+
Phalacrocoracidae	Phalacrocorax carbo	+	+	+
	Phalacrocorax aristotelis	+	+	+
Ciconiidae	Ciconia ciconia	+	+	+
	Ciconia nigra	+		

Ardeidae	Egretta alba	+	+	+
	Egretta garzetta	+	+	+
	Ardea cinerea	+	+	+
	Ardea purpurea	+	+	+
Accipitridae	Accipiter nisus	+	+	
	Buteo buteo	+	+	
	Haliaetus albicilla	+		
	Aquila heliaca	+	+	
	Aquila chrysaetos	+	+	
Falconidae	Falco tinnunculus	+	+	
Rallidae	Fulica atra	+		+
Laridae	Larus ridibundus		+	+
	Larus minutus		+	+
	Larus cachinnans		+	+
Burhinidae	Burhinus oedicnemus		+	
Charadriidae	Vanellus vanellus	+	+	
Columbidae	Columba livia			+
	Columba palumbus		+	+
	Streptopelia decaocto		+	+
	Streptopelia turtur		+	+
Cuculidae	Cuculus canorus		+	
Alcedinidae	Alcedo atthis		+	
Meropidae	Merops apiaster		+	
Picidae	Dendrocopus syriacus	+	+	
Alaudidae	Galerida cristata		+	+
	Alauda arvensis		+	

Alaudidae	Melanocorypha calandra		+	
Hirundidae	Hirundo rustica		+	+
	Riparia riparia	+	+	
	Hirundo daurica		+	
Motacillidae	Motacilla alba	+	+	
	Anthus campestris		+	
Laniidae	Lanius excubitor		+	
Turdidae	Erithacus rubecula		+	+
	Luscinia megarhynchos		+	+
	Oenanthe oenanthe		+	
	Turdus merula		+	+
	Turdus viscivorus		+	+
Paridae	Parus ater		+	+
	Parus major		+	+
Sittidae	Sitta europaea		+	+
Emberizidae	Emberiza melanocephala		+	
	Emberiza caesia		+	
	Miliaria calandra		+	
	Emberiza cirlus		+	
Fringillidae	Fringilla coelebs		+	+
	Carduelis carduelis		+	+
	Carduelis chloris		+	+
Passeridae	Passer domesticus		+	+

Sturnidae	Sturnus vulgaris	+	+
Corvidae	Corvus monedula	+	+
	Corvus corone	+	+
	Corvus corax	+	+
	Garrulus glandarius	+	+
	Pica pica	+	+

DISCUSSION

The field efforts constitut an important region in terms of the habitat diversity as well as its characteristics to be a pass area for bird species. In this study 61 bird species were observed, 12 of which belong to order and 29 of which belong to families. *Egretta alba* (Great White Egret), *Egretta garzetta* (Little Egret), *Ardea purpurea* (Purple Heron), *Ardea cinerea* (Grey Heron), *Ciconia ciconia* (White Stork) and *Phalacrocorax carbo* (Cormorant) were found in all three areas of the study. The feeding area of these bird species especially comprises all the parts of Sarıçay Delta.

Rain in the region usually falls in full and winter a drought is relatively in summer. It has also been seen that some species of birds may die, depending on seasonal factors.

Sarıçay delta, which is not in the status of preservation, is perpetually being polluted as a result of industrialization and the growing population. The waste of some plants and mining institutions, which are located on Çanakkale-Çan highway, is mixed up with Sarıçay. In addition, Sarıçay is not only bird species but also other species (fish, frog, and mammals) are adversely affected by the waste from houses that are directly or indirectly connected to Sarıçay.

In order to protect endangered birds that our country has, it should not be forgotten that we need to be respectful for their habitat.

The hunt for birds in the wetlands especially, is considersbly important on the migrating and local species. Over hunting, which seems to be done in inappropriate times, prevents many species from existing today (Ertan, 1996). Our area, which is rich in birds is under threat as a result of inconvenient hunting. What must be focused on is that the citizens living in the area must be trained in these matters.

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USE OF DNA ANALYSIS FOR SEXING BIRDS IN RUSSIAN BREEDING PROGRAMS

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Breeding of endangered species in the zoo and breeding center (ex situ) is very important for conservation of these species. Ex situ conservation is not an alternative for, but rather is complementary to conservation of these species in their natural habitats (in situ). At the same time there has been and still is an ever increasing threat to species, habitats, and ecosystems throughout much of the natural word. Consequently, ex situ zoo populations should be managed so as to support the survival of species in the wild. The World Zoo Conservation Strategy (1993) have shown that primary aim of the zoo is to support the conservation of species. The leading zoos began to evolve into conservation centers. It is estimated that the thousand federated zoos of the word collectively house more than 1,000,000 animals, predominantly higher vertebrates. An increasing proportion of this total number is made up of individuals belonging to endangered species. (WZCS 1993). So there are about 260 species of birds (about 1700 specimens) in Moscow Zoo, and 42 of them including in IUCN Red List of Threatened Animals . There are 607 species and subspecies of birds in collection of the Zoos of Russia, Belarussia Ukraine and another countries of the former USSR , 84 of these including in IUCN Red List of Threatened Animals and 184 from these 607 were bred in 2001. Moscow Zoo take part in 14 EEP (European endangered program). And It is specialized in breeding of such species as crane, birds of prey some species of pheasants The same species as crane Japanese (Grus japonensis), white-napped crane (Grus vipio), siberian crane (Grus leucogeranus), tawny eagle (Aquila rapax), golden eagle (Aquila chrysaetos), black vultur (Aegypius monachus), white-tailed eagle (Haliaeetus albicilla) and other successfuly are bred in these zoos and breeding center. And now it was began work of reintroduction of japanese crane. There is greater population of Steller's sea eagle (Haliaeetus pelagicus) in our zoos - 96 birds in 26 zoos and breeding center (2001).

Many avian species do not have sexual dimorphism or it becomes apparent only at maturity. That should be one of the reason of unsuccessful breeding in captivity. So development of sex-identification techniques for birds is important for breeding and conservation programs. Sex identification is especially important for juvenile birds, because they both form pairs more easily and are subjects for transferring. Morphologic and behavior is not reliable effective for sexing birds Wrong sex ratio in a juvenile group could caused formation of homosexual pairs. In such pair one bird can perform behavior inherent to another sex. So there are four young white-napped (Grus vipio) cranes in the breeding Center of Cranes of Oka reserve that later formed two pairs and then all this birds became to lay eggs. (Panchenko, Kashentseva 1995). Laparoscopic technique can't help for young birds and if adult birds are not in the breeding season.

For several years we use cytogenetic techniques for sexing birds. The birds have sex chromosomes - ZZ - male and ZW- female.

Now we use PCR-based method that was created by Griffiths (Griffiths et al., 1998)

New test based on the two conserved CHD - genes (chromo-helices-DNA- binding), that are located on the avian sex chromosomes: (CHD-W and CHD-Z gene) (Griffiths et al., 1998). It employs two PCR primers (P2 and P8) which anneal to conserved exonic regions but then amplify across an intron in both CHD-W and CHD-Z. Introns are noncoding part of genes and so they are less conserved and their length usually differs between the genes. As a result, the PCR product of CHD-W gene and CHD-Z differ in size. Gel electrophoresis reveals one band in the male and two in the female. This method can be used to sex birds throughout the class Aves, with exception of ratites.(Griffiths et al. 1998).

We isolated DNA from feather or blood.

The sex identification test employs just the P8(5'- CTCCCAAGGATGAGRAAYTG-3') and P2(5'-TCTGCATCGCTAAATCCTTT-3') primers. An initial denaturing step at 94 ºC for 1 min 30 s was followed by 30-35 cycles of 48o C for 45 s, 72oC for 45 s and 94o C for 30 s. A final run of 48oC for 1 min and 72o C for 5 min completed the program (Griffiths et al. 1998) (.PCR products were separated by electrophoresis for 45-70 min. at 10-12 v/cm in 6%,8%,15% acryl amid gel. Sometimes we have a problem of primer competition. The competition occurs because the primers may match one CHD gene slightly less well than the other. This result in differential amplification such that one band is less bright than the other on the gel. This fault can be resolved by changing the PCR annealing temperature or increasing concentration of primers.

For 2001- 2003 we successfully sexed following species:

Japanese cranes *Grus japonensis ;* demoiselle cranes *Anthropoides virgo* ; siberian cranes *Grus leucogeranus* ; common cranes *G. grus* - ;white-naped cranes G. vipio , crowened crane *Balearica pavonina,* Humboldt's penguins - *Spheniscus humboldti* , black vultures *Aegypius monachus* , bearded vultures *Gypaetus barbatus* , egyptian vultures *Neophron percnopterus*, griffon vultures *Gyps fulvus* , golden eagle *Aquila chrysaetos*, tawny eagle *Aquila rapax*, lesser spotted eagle *Aquila pomarina, duck* hawks *Falco peregrinus*, greater spotted eagle *Aegypius clanga*, goshawk *Accipiter gentilis,* white storks *Ciconia ciconia*, black stork *Ciconia nigra,* scarlet macaws *Ara macaw* ; grand military *macaw Ara ambigua, sulphur*-crested cockatoo *Cacatua galerita*, eastern rosella *Platycercus eximius*, blue-fronted amazons *Amazona aestiva*, orange-winged parrots *Amazona amazonica*, gray parrots *Psittacus erithacus,* mute swan *Cygnus olor*, black swan *Cygnus atrata*, whooper swan *Cygnus cygnus.* Total- about 300 specimens of 29 species.

The most difficult work was sexing of lapland *owls Strix nebulosa*) and ural owls *Strix uralensis ,* because CHD-Z and CHD-Z bands were so similar in size. To solve this problem we have to use 8% denaturing acryl amide gel. We have one successfully experience of sexing these owls.

We sexed birds from Moscow Zoo, Leningrad Zoo, Tallinn Zoo, Perm Zoo, Penza Zoo, breeding Center of Oka reserves, Ivanov Zoo, Kazan Zoo, Novosibirsk Zoo, Tashkent Zoo, Krasnoyrsk Zoo.

This method permits both store feather and blood samples for a long time and transports them at a long distance. So it is useful for studying sex ratios in wild populations of birds.

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THE REASONS OF DRAINAGE IN THE VAN LAKE BASIN AND THEIR EFFECTS ON THE WETLANDS AND BIRDS

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In this study, the effects and, the reasons of drainage caused by water sources that feed Van and Erçek Lake were investigated. It found that the most important reason of drainage is to open more agricultural field and pasturage. Also drought ness caused by making easy collection of marsh and other plants, public activity and to dry the swamps are the reasons of drainage in the basin. The drainage in the basin is achieved by discharging the collected water that feed the marshy field quickly via waterway into lake. Rarely, the basin was being dried by changing the flowing way of the water resource. Drainage is made by labour machine in urban area but it is carried out by human power. Marshy fields that harbour much kind of living organisms are demolished completely or partially by drainage activity. The birds and other living in these fields come across with problems of feeding, nest, broady hen, environmental pollution shelter drought and it observed these organisms generally realt by changing the area.

Key words: The Lake Van, The Lake Erçek, Wetland, Birds

INTRODUCTION

Wetlands are the places where the birds are abundant. These wetlands have been feed by water. In these regions, besides birds; there are other animal and plant species. It is woodland areas which have more animal and plant species than wetland areas.

One example of wetlands is delta. Delta areas occur near fresh water resources. These regions not only shelter many animal and plant species and but also prevent flood. And so, it doesn't allow erosion, there fore wetlands don't pollute. But nowadays some drainage works have destroyed these productive regions.

Natural drainage of Lake Van region, since it is surrounded by high mountains, is from highlands toward lake level.

The waters flowing toward lakes have determined the most important areas in the region. The problem of drainage, underlined in article, is a destruction of region by human body. If a region doesn't have forest wetlands are the most important courses for fish species. Lately, in this region the region the destruction has been increased.

MATERIAL AND METHOD

Material of this research is the problem of drainage destroying this region. In the region ornithological studies have been carried out since 1991. By way of these studies, it was observed that wetlands completely are partly having been destroyed and decreased. For

enlightening this important point, by the data's obtained from a study lasting ten years, this article was written.

FINDINGS

It was determined that the most important cause of the destruction in the region is drainage. Drainage has been occurred by gathering of water in artificial canals and so the water, useful for region has flown towards the lake. These drainage works have been carried out by heavy machines near cities and by human being in cities. And most of these heavy machines are from the public.

The most important employment in the region is stock-breeding. The winter, approximately lasting 8 months has led the people to the wetlands. And so, the reason for drainage is to have more wetland besides.

This ecological problem has occurred by lack of information and lack of coordination between public sector.

RESULT AND SUGGESTION

Wetlands in the Van Lake basin are under the danger of drainage. This danger will harmfully affect the natural life. But the complete losing of the region will lead to be extinct of the life in the region. It must be informed for the people and public that wetlands are the past of natural ecology.

In every effort, for drainage biology must be charged. In the region, the people must be supported by scientifically materials both in stock breeding and feed plants. Governors and people must be warned for behaving more respectful to the environment.

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THE CONTROL EFFECTIVENESS OF WOODPECKER SPECIES ON THE GREAT EUROPEAN SPRUCE BARK BEETLE IN TURKEY

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Woodpeckers are members of Picidae family. There are eight species of woodpeckers found in Turkey, seven of which are present in the Northeastern Black Sea Region. The purpose of this research is to study the effects of woodpecker species influencing the actual population of the great European spruce bark beetle (*Dendroctonus micans* (Kug.) (Coleoptera: Scolytidae), which is found in about 250 000 ha of 450 000 ha oriental spruce (*Picea orientalis* (L.) Link.) forests and continues to extend its spread. In this scope in Artvin, Giresun, and Trabzon Regional Directorate of Forestry spruce forests were studied. In 125 plots a total of 3853 trees were evaluated. Woodpeckers eat thousands of bark beetles or wood boring insects which are serious pests on oriental spruce. The actual effectiveness of woodpecker species on D. micans population was about 5 percent. The woodpecker's species play a vital role in helping to control insect pests in oriental spruce forests in Turkey.

Key words: Woodpeckers, *Dendroctonus micans*, Natural control

INTRODUCTION

As the result of, usages unsystematically and damages of oriental spruce, *Picea orientalis* (L.) Link. forests in Turkey for centuries has created today's fragmented and degraded structure. In addition to this heavy pressure, these spruce forests are under threat of *Dendroctonus micans* (Kug.) and *Ips typographus* (L.) (Coleoptera: Scolytidae), which are the most hazardous insects of Eurasian conifer forests. These species transgressed Georgia borderline in 1966 and 1984, respectively (Acatay, 1968; Alkan, 1985, 2000, 2001; Grégoire, 1988).

Oriental spruce forests are distributed in a total of 450 000 ha in the north facing aspects of Eastern Black Sea Mountains in Turkey. By now, *D. micans* has invaded 250 000 ha of this area and *I. typographus* has spread out 150 000 ha. In the biological control program started in Artvin in 1985, the specific predator *Rhizophagus grandis* Gyll. (Coleoptera: Rhizophagidae) has been mass reared in laboratories, and then introduced to affected trees (Keskinalemdar vd., 1987; Alkan and Aksu, 1990; Alkan 2001). It was determined that 35% of these trees were affected by *D. micans* and in 24% the invasion was continuing. The effectiveness of *R. grandis* was calculated as 87% in the galleries, 31% in the study plots where it was found and 15% in the whole studied area (Eroğlu, 1995).

There are more than 200 different species of woodpeckers in the world, of which about 8 are found in Turkey (Serez, 1981; Kiziroğlu, 1989; Turan, 1990). Close to seven species of these woodpeckers live in the Eastern Black Sea Region. Most of them live all year in the same area and don't migrate. Woodpeckers play a vital role in helping to control insect pests. While most woodpeckers are primarily insect eaters feeding on tree-dwelling and

wood-boring insects, they also will eat berries, fruits, and seeds. Many woodpeckers prefer dead or rotting trees for excavating their nest holes. Woodpeckers are often a "core species" of the woodland avifauna (Lester, 1982).

The woodpecker species living in Eastern Black Sea Region, White-backed woodpecker, *Dendrocopos leucotos* (Bechstein, 1802) (Danford, 1880; Kumerloeve, 1962; Serez, 1981), Great spotted woodpecker, *Dendrocopos major* (Linnaeus, 1758) (Kumerloeve, 1961, 1962, 1963, and 1967; Vielliard, 1968; Serez, 1981), Middle spotted woodpecker, *Dendrocopos medius* (Linnaeus, 1758) (Kumerloeve, 1962, 1967, and 1970; Vielliard, 1968; Serez, 1981), Lesser spotted woodpecker, *Dendrocopos minor* (Linnaeus, 1758) (Kumerloeve, 1962 and 1970; Watson, 1961; Vielliard, 1968; Serez, 1981), Syrian woodpecker, *Dendrocopos syriacus* (Ehrenberg, 1833) (Ballance, 1958; Kumerloeve, 1962, 1969, and 1970; Vielliard, 1968; Winkler, 1973; Serez, 1981), Black woodpecker, *Dryocopus martius* (Linnaeus, 1758) (Kumerloeve, 1962 and 1967; Schweiger, 1965; Serez, 1981), and Green woodpecker, *Picus viridis* Linnaeus, 1758 (Wadley, 1951; Kumerloeve, 1962; Serez, 1981), and their distribution and habitats in the region and Turkey is given in Table 1.

As shown in Table 1, *D. leucotos*, one of the rarest European woodpeckers, is an old-growth deciduous forest specialist (Carlson, 1999). It favors mature, deciduous forests that include many dead trees (Virkkala et al., 1992; Martikainen et al., 1998), has also preferred oak stands in the region. Like this species, it's determined that *D. medius,* an endangered species confined to mature oak forests (Pasinelli, 2000), has preferred deciduous forests and it can be found in the vicinity of Ordu province (Kumerloeve, 1970), and mountainous pure beech forest areas in Akkuş in the south of Ordu (Serez, 1981).

It's known that *Dendrocopos syriacus* lives in the inner parts of wide river valleys and in poplar and willow trees, and in fruit gardens consist of apple, pear, plum, walnut, mulberry, apricot, cherry and sour cherry trees in certain altitudes in valleys of these river braches (Ballance, 1958; Kumerloeve, 1962, 1969, and 1970; Vielliard, 1968; Winkler, 1973).

Dendrocopos minör lives in fruit gardens in lower lands, river deltas, and woody areas in bottom of streams (Kumerloeve, 1962 and 1970; Watson, 1961; Vielliard, 1968). In the region only one individual was recorded in Hopa (Serez, 1981).

In addition, *Dendrocopos major*, *Dryocopus martius* and *Picus viridis* live in pure and mixed forests consisting of coniferous and deciduous trees between the altitudes 700-2500m in the region and in the other parts of Turkey (Wadley, 1951, Kumerloeve, 1961, 1962, 1963, and 1967; Schweiger, 1965; Vielliard, 1968; Serez, 1981).

Of these species, *D. major* is widespread between 1000-2000 m in all forests in the region (Serez, 1981). The great spotted woodpecker is the most common and best-known woodpecker species in the W Paleacrtic (Michalek and Miettinen, 2003).

Table 1. Distribution and habitats of woodpeckers in the region and Turkey

Scientific Name	Distribution in Turkey	Habitat
Dendrocopos leucotos	Şavşat-Cunta hill, Kayadibi village; Kürtün-Yukarı Uluköy ve Kırgeriş villages; Zonguldak-Dorukhan; Orta Toroslar-Karanfil mountain, Pozantı; Osmaniye.	oak coppice forests (1400-2000m), oak stands in mature spruce-oak mixed forests (1600-1700 m), oak stands in pine-oak mixed forests (1400-1600 m).
Dendrocopos major	Sarıkamış; Göle; Şavşat-Cunta hill, Şenköy, Kayadibi, Karaköy; Şavşat-Kocabey and Çökek, Şavşat-Meydancık; Ardanuç-Karanlıkmeşe; Borçka-Karagöl and Kaynarca; İkizdere-Ilıca, Cibil; Çaykara-Kastelli, Araklı-Çatak, Pazarcık, Sulakyurt; Maçka-Meryemana; Düzköy-Çayırbağı, Horozdağı; Torul-Tokçam; Espiye-Karadua; Giresun-Kulakkaya; Bulancak-Bicik;Kastamonu; İstanbul; Bolu-Abant; Bolu; Ankara; Bursa-Uludağ; İstanbul-Belgrat Forest; South Anatolia, Mersin, Tarsus, Mut.	Scotch pine forests of north Anatolia mountains (1800-2300 m); nest-holes on standing dead trees and old trees with partly decaying boles in spruce forests (1300-1600 m); pure, mature beech forests (1700-1900 m); nest-holes on dead trees in mixed forests of beech, spruce, fir (1300-2500 m); common in pure and mixed forests of spruce in range of *D.micans* (1000-1700m).
Dendrocopos medius	Ordu, **Akkuş-Güllüce and Taşkesiği,** Kastamonu-Ilgaz;Bolu-Abant; Akhisar-Gördes; İzmir-Tire; Beyşehir, Akşehir; Yatağan, Köyceğiz; Akseki, central Taurus; coastal region of central Taurus, Mut; Osmaniye, Karatepe; K.maraş; Besni; west and southwest of Lake Van; Siirt-Şirvan; Elazığ.	forest areas surrounding hazelnut plantations; pure, mature beech forests (900-1300 m); fir and fir-black pine mixed forests; black pine, cedar, fir forests (1200-1800 m); oak, black pine forests; oak coppice forests.
Dendrocopos minör	**Hopa;** delta of Yeşilırmak; Kastamonu-Ilgaz; the Bosphorus, Belgrat Forest; Keşan-Çamlıca; Edremit; İzmir, Aydın; Yatağan, Milas; Alanya, Gazipaşa, Anamur, Gülnar, Mut, Silifke, Taurus; Tarsus-Güzeloluk, Gülek and Bürücük,	fruit gardens in lowland , river delta (50-100 m); Turkish pine and black pine forests near to valley base (400-700 m).

Dendrocopos syriacus	**Gümüşhane- Mescitli and Kale villages, Torul, Harşit stream valley; Bayburt Forestry nursery;** the Bosphorus; Uludağ; Balıkesir-Manyas, Gönen; İzmir, Tire, Efes, Selçuk; Senirkent, Yalvaç, Gelendost; Eğirdir, Göller region, Antalya-Manavgat, Gazipaşa; Mut , Mersin-Elvanlı; Pozantı-Çakıt; K.maraş; Gaziantep, Ş.urfa-Birecik, Malatya, Elazığ, vicinity of lake Hazar, Pertek, Tunceli, Pülümür, Erzurum, Horasan-Karakurt, Sarıkamış; Artvin-Ardanuç; Ağrı, Murat Suyu valley, Doğubeyazit, Iğdır, Tuzluca, Bitlis, Siirt, vicinity of lake Van; Tatvan, Gevaş, Gürpınar, Çatak; Hakkari-Zap stream and creeks, Çukurca.	fruit gardens with poplar, willow, apple, pear, plum, walnut, mulberry, apricot, cherry, sour cherry in Harşit stream valley (900-1500 m); poplar and willow trees in Çoruh river-Bayburt (1600 m); plain and hilly areas in Aegean and Mediterranean region, fruit tree gardens and shrubs (700-900 m); poplar and other deciduous trees and fruit trees in river valleys, and oak coppice forests in eastern Anatolia (1000-2000 m).
Dryocopus martius	Artvin-Çoruh basin; Artvin, Şavşat-Tertop; Hopa Orta Mahalle; Çamlıhemşin-Ilıca; İkizdere-Cibil; Araklı-Çatak and Pazarcık; Maçka-Meryemana; Torul-Sarıçdağı; Düzköy-Gazara, Çayırbağı and Horozdağı; Giresun-Kulakkaya and Kemerköprü; Kastamonu-Dorukhan, Ilgaz Mountains; widespread in north Anatolia mountainous regions; Elmadağ; Bolu-Seben; Uludağ; Kazdağı.	coniferous forests in Çoruh river basin, alder and beech forests (300-1200 m); spruce-beech, spruce, fir, Scotch pine forests (800-1500 m); beech, spruce, fir forests (1300-2500 m); spruce-fir mixed forests (1700-1900 m); chestnut, beech, oak and Scotch pine, fir mixed forests (1100-1900 m); coniferous and deciduous forests in north Anatolia.
Picus viridis	**Şavşat-Şenköy; Karaköy; Yusufeli Kirazalan village;** Artvin-Borçka, Murgul; **Çamlıhemşin-Ilıca; Çaykara; Bayburt Forestry nursery.** Bayburt Keçi Castle; Ilgaz Mountain; Kızılcahamam, Belgrad forest, Istranca Mountains; Uludağ; Beyşehir, Eğirdir, Keçiborlu, Uluborlu and Senirkent; Muğla; central Taurus, Silifke, Pozantı; Osmaniye; vicinity of lake Van, Tatvan, Bitlis, Mutki, Siirt, Sarıkamış, Göle, Çıldır.	mature beech, spruce, Scotch pine, fir forests (1000-1700 m) spruce, beech, reech forests, Scotch pine forests in high altitudes (1500-1900 m); black pine, fir forests in north Anatolia, central Taurus Mountains (1100 – 1600 m), south Anatolia forest line (1900 m), east Anatolia oak coppice forests.

From the stomach analysis of 9 female and 6 male individuals hunted in summer, it's seen that insect consumption of the species was 72% ants and 15% bark beetles (Serez, 1981). *D. martius* has been determined in most of the areas where *D. major* has been recorded. In summer time insect consumption of three individuals has been composed of 63% ants and 15% bark beetles.

Picus viridis has been recorded in forests where former two species determined and in some mixed stands of coniferous and deciduous species, Bayburt Forestry nursery in upper Çoruh

river basin (Serez, 1981). As a result, it's seen that *D. major* and *D. martius* has important control effectiveness on pest bark beetles living in the region. In addition to these species, *P. viridis* can have a limited effectiveness on these pests.

In this study, it's aimed to determine damage level of *D. micans* and the effectiveness of the woodpecker species on the population level of this pest, and compare the effectiveness of these birds with the effectiveness of the predator *R. grandis*, which has been reared for the control of the pest.

MATERIAL AND METHODS

Experiments were carried out in total of 143 study plots -30X10 m in size- in oriental spruce forests where *D. micans* spread out. Eggs, larva, pupa and adults of *D. micans* were counted and brood areas were calculated in damaged trees. The effectiveness of *R. grandis* on *D. micans* was based on the number of *D. micans* individuals in different development stages in the galleries and number of *R. grandis* individuals even they were in adult or larval stages. Woodpecker holes were determined in 57 study plots out of 143 plots. Each woodpecker hole on the bark was assumed as "one caught beetle" from *D. micans* brood galleries. The actual effectiveness of these birds was calculated according to the caught pests in active brood systems. In the examined trees, each woodpecker hole on the bark over the old consumed area was also assumed as "one caught beetle". Approximate number of individuals developed in these old galleries was calculated based on these old consumed areas. The previous effectiveness was estimated by comparing the number of pests calculated for these old consumed areas and the number of woodpecker holes on the bark. The cumulative effectiveness was assessed by adding previous effectiveness to the actual effectiveness. The effectiveness of these birds was compared with the effectiveness of *R. grandis*. The variations in the activities of the birds between altitude zones and forest structure were considered.

RESULTS AND DISCUSSION

In this study a total of 4289 trees were examined. It's determined that 15% of these trees were affected by *D. micans* and in 9.9% the invasion was continuing. A total of 32 831 *D. micans* individuals were evaluated. The effectiveness of *R. grandis* was calculated as 86% in the galleries, 24% in the study plots where it was found and 12% in the whole studied area. The effectiveness of woodpeckers species was calculated as 12.66% in the study plots, and 5.34% in the whole studied area actually and 14.6% cumulatively (Table 2). Woodpecker holes were determined in 57 study plots out of 143 plots.

In the biological control program of *D. micans*, a total of 3 800 000 *R. grandis* adults were mass reared in the laboratories and introduced to affected trees in 120 000 ha. The effectiveness of the predator has been assessed as 12% in the whole studied area. Millions of dollars were spent in laboratory rearing for having this effectiveness, whereas, woodpeckers have provided 5.34% actual effectiveness and 14.6% cumulative effectiveness without any manipulation in the area.

Twenty-four percent of study plots were between 700-1300m, 52% of the plots were

between 1300-1700 m and 24% of them were between 1700-1900 m. Of the counted holes 34.7% were between 700-1300 m, 43.5% were between 1300-1700m and 21.8% were between 1700-1900 m. But, when the number of study plots was taken into consideration, average number of holes in each plot was 37.13 between 700-1300 m, 21.87 between 1300-1700 m and 23.33 between 1700-1900 m. Average numbers of holes between 700-1300 m was approximately 17% higher than other altitudes. It must be considered that whole number can change depending on pest density. The distribution of pest density to these altitude zones was 14.06%, 57.76% and 28.17%, respectively. In these altitude zones, average pest number in each study plot was 19.47, 37.48 and 39, respectively.

As a result, while the average number in each plot was 19.47 in first altitude zone, number of holes/number of pest's ratio was 1.91. In second and third altitude zones this ratio was 0.58 and 0.59, respectively. Woodpecker activity between 700-1300 m may be nearly 4 times higher than the activity between 1300-1700 m and 1700-1900m. The rich vegetation in this zone, wide mixed forests composed of deciduous and coniferous trees, and pure coniferous and pure deciduous forests in close distances can be the most important reasons of this activity.

Table 2. Data of the effectiveness of woodpeckers and *R. grandis* on *D. micans*

No of plot	Altitude (m)	Aspect	Location	Date	No of tree	Diam. of tree (cm)	Host Tree Feature *	Dendroctonus micans					R.grandis		Woodpecker Activity				Actual Effectiveness (%)
								Exit Holes	No. of eggs	No. of larvae	No. of pupae	No. of adults	No. of larvae	No. of adults	No. of Holes	Place on Boles (cm)	Old Holes	New Holes	
1	1600	North-east	Artvin Soçidibi	17/9/92	2	32	7			4					30	0-800	30		
2	1650	South-east	Artvin Soçidibi	17/9/92	1	40	27	20		3		2			10	0-200		10	67
3	1550	north	Artvin Taşlıca	18/9/92	21	10	22	10							25	0-800	25		
4	700	South-west	Artvin Kafkasör	19/9/93	1	24	27	25		40		1		2	8	500-600		8	16
4	700	south-west	Artvin Kafkasör	19/9/93	10	38	7	30		250					12	300-500		12	5
4	700	South-west	Artvin Kafkasör	19/9/93	14	52	27	50				10	5		6	250-350		6	38
5	700	South-west	Artvin Kafkasör	22/4/94	1	50	6								50	0-1000	50		
5	700	South-west	Artvin Kafkasör	22/4/94	7	36	27	8			5	5			40	0-400	40		

5	700	South-west	Artvin Kafkasör	22/4/94	17	30	27	10				8			8	800-1000	8			
6	1650	south	Artvin Ceratepe	28/8/01	1	47	7	125				2			4	300-450	4			
6	1650	south	Artvin Cerattepe	28/8/01	35	45	27	101				1			4	90-260	4			
7	1790	North-east	Artvin Mersivan	28/8/01	13	59	7	63	58	56		5	8	5	11	140-300	11			
7	1790	North-east	Artvin Mersivan	28/8/01	20	42	7	69				1			8	120-400	8			
7	1790	North-east	Artvin Mersivan	28/8/01	25	52	7	7				1			2	200-240	2			
8	1260	south	Artvin Kafkasör	28/8/01	1	44	7	51		63		4	4		6	180-300	6			
8	1260	south	Artvin Kafkasör	28/8/01	13	48	6	66							12	160-380	12			
9	1650	North-east	Artvin Taşlıca	29/8/01	7	49	6	20							3	500-800	3			
9	1650	North-east	Artvin Taşlıca	29/8/01	8	62	7	36		115		2		4	6	0-120	6			
9	1650	North-east	Artvin Taşlıca	29/8/01	11	59	6	40							18	100-400	18			
10	1630	South-	Artvin	4/8/03	19	38	27	21	121	844	32	22	56	8	21	160-		21	2	

		west	Cerat-tepe													270				
10	1630	South-west	Artvin Ceratepe	4/8/03	33	22	7	12	279	27	1	5	1		12	120-135		12	27	
11	1630	South-west	Artvin Ceratepe	4/8/03	20	38	6	57							57	140-550	40	17	100	
12	1800	North-west	Ardanuç Peynirli	9/9/92	2	40	7			8		1			6		6			
12	1800	North-west	Ardanuç Peynirli	9/9/92	3	66	7			12		5		10	10	50-150		10	37	
12	1800	North-west	Ardanuç Peynirli	9/9/92	16	50	7					90		6	12	0-150	12			
12	1800	North-west	Ardanuç Peynirli	9/9/92	22	36	7			30		5			15	0-300	15			
12	1800	North-west	Ardanuç Peynirli	9/9/92	23	50	37					6			8	100-150	8			
12	1800	North-West	Ardanuç Peynirli	9/9/92	24	62	7					60			10	0-200	10			
13	1500	East	Ardanuç Tosunlu	17/9/92	5	28	26	30							30	0-400		30	100	
13	1500	East	Ardanuç Tosunlu	17/9/92	20	54	26	25							8	0-800		8	100	
13	1500	east	Ardanuç Tosunlu	17/9/92	21	58	26	20							10	0-800		10	100	
14	1550	east	Ardanuç Tosunlu	17/9/92	6	18	26	20							10	0-200		10	100	
33	1550	east	Ardanuç	17/9/9	20	38	22									750				

15	1650	North-east	Tosunlu Ardanuç Avcılar	2 19/9/92	2	38	7			288			15	4	80	0-300		80	22
16	1600	north	Ardanuç Avcılar	18/9/92	1	30	7	50	20	130	10	61	60	8	10	250-350	10		
16	1600	north	Ardanuç Avcılar	18/9/92	5	24	7	20		95					15	0-300	15		
17	1800	north	Ardanuç Avcılar	18/9/92	1	26	7	20		75			4		25	0-350	25		
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	1	30	7	70	10						40	0-50	40		
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	7	18	22	40							30	0-200	30		
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	10	16	6	35							15	0-50	15		
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	20	20	6	20							20	400-800	20		
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	21	24	26	55							15	0-150	15		
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	24	24	6	35							15	100-400	15		
18	1100	North-west	Ardanuç Tepe-	3/8/95	26	16	6	40							3	0-50	3		

			düzü																	
18	1100	North-west	Ardanuç Tepe-düzü	3/8/95	29	32	6								5	0-100	5			
19	1250	North-west	Ardanuç Tepe-düzü	3/8/95	5	48	27	25				2	45		15	100-800	15			
19	1250	North-west	Ardanuç Tepe-düzü	3/8/95	13	34	26	25				1			5	0-100	5			
19	1250	North-west	Ardanuç Tepe-düzü	3/8/95	23	56	6	20					27		20	0-100	20			
19	1250	North-west	Ardanuç Tepe-düzü	3/8/95	25	38	27	60		80					8	400-800	8			
19	1250	North-west	Ardanuç Tepe-düzü	3/8/95	29	36	26	20							8	0-200	8			
20	1250	North-west	Ardanuç Tepe-düzü	3/8/95	4	28	46								5	0-30		5	100	
20	1250	North-west	Ardanuç Tepe-düzü	3/8/95	11	32	6	75							70	0-200	70			
21	1800	east	Ardanuç Tepe-düzü	10/7/01	22	43	7	94	80						4	0-240	4			
22	1810	South-	Ardanuç	12/7/0	9	54	6								1	250		1	100	

		east	K.meşe	1																
23	1780	west	Ardanuç K.meşe	12/7/01	4	45	26	80						62	70-250	62				
24	700	South-west	Borçka Atan-oğlu	18/5/93	1	100	7			20	5			300	0-1800	300				
24	700	South-west	Borçka Atan-oğlu	18/5/93	3	80	6							150	0-800	150				
24	700	South-west	Borçka Atan-oğlu	18/5/93	7	64	22							80	0-800	80				
24	700	South-west	Borçka Atan-oğlu	18/5/93	9	76	22							100	0-800	100				
24	700	South-west	Borçka Atan-oğlu	18/5/93	19	34	27	20				3		8	0-800	8				
25	1500	North-west	Borçka Karagöl	18/9/93	1	42	27	55	30	10		4	2	30	0-800		30	68		
25	1500	North-west	Borçka Karagöl	18/9/93	2	34	7	30		10		3	3	20	0-800		20	61		
25	1500	North-west	Borçka Karagöl	18/9/93	14	36	7	40		10			4	2	25	0-400	25			
25	1500	North-west	Borçka Karagöl	18/9/93	23	24	7	30				2		30	0-800		30	94		
26	600	west	Borçka Aralık	19/9/93	10	54	6							40	0-300	40				

26	600	west	Borçka Aralık	19/9/93	19	80	22								20	0-300		20	100
27	1450	North-west	Yusufeli Yarbaşı	5/9/92	5	28	7	80		179	25				40	0-200	40		
28	1650	North-east	Yusufeli Yarbaşı	5/9/92	11	38	37	15		166		8			6	0-50	6		
28	1650	North-east	Yusufeli Yarbaşı	5/9/92	13	22	7	5				2			4	0-200		4	67
29	1650	North-east	Yusufeli Yarbaşı	6/9/92	1	26	7	15				2			10	0-100		10	83
29	1650	North-east	Yusufeli Yarbaşı	6/9/92	4	30	7	15		8					8	0-200	8		
30	1650	North-east	Yusufeli Yarbaşı	16/9/92	1	20	6	20							12			12	100
30	1700	South-west	Yusufeli Yarbaşı	16/9/92	2	22	7			3	7	5			15	50-150		15	50
30	1700	South-west	Yusufeli Yarbaşı	16/9/92	7	34	36								35	0-800	35		
31	1700	South-west	Yusufeli Yarbaşı	16/9/92	7	40	26	110							45	0-800	45		
31	1650	North-west	Yusufeli Yarbaşı	4/8/95	18	40	27	20	40	20		1			8	0-50		8	28
31	1650	North-west	Yusufeli Yarbaşı	4/8/95	23	28	27	55		3			23		5	0-1500	5		
31	1650	North-west	Yusufeli Yarbaşı	4/8/95	24	40	7	35				10			8	0-50		8	44
32	1650	North-west	Yusufeli Yarbaşı	4/8/95	11	38	7	110	55	20		6	25	2	12	0-50		12	32
32	1600	North-	Yusufeli	4/8/95	20	30	6	50							35	0-	35		

		east	Yarbaşı													200			
32	1600	North-east	Yusufeli Yarbaşı	4/8/95	29	26	26	55					10		50	0-100	50		
32	1600	North-east	Yusufeli Yarbaşı	4/8/95	9	16	7	35		15	2	4		2	35	0-50		35	63
33	1700	North-west	Yusufeli Yarbaşı	4/8/95	11	28	7	55		20					55	0-200		55	73
33	1700	North-west	Yusufeli Yarbaşı	4/8/95	13	16	6	6							6	0-50	6		
33	1700	North-west	Yusufeli Yarbaşı	4/8/95	17	38	7	85		25		6			10	0-100	10		
33	1700	North-west	Yusufeli Yarbaşı	4/8/95	19	34	7	28	15	13	12		6	1	10	0-100		10	29
34	1700	North-west	Yusufeli Yarbaşı	4/8/95	19	24	7	30		30			5		4	0-50		4	12
35	1550	north	Yusufeli Yarbaşı	8/8/03	39	12	6	10							10	200-250		10	100
36	1550	north	Yusufeli Yarbaşı	8/8/03	25	28	27	30							14	40-130	14		
36	1550	north	Yusufeli Yarbaşı	8/8/03	28	32	26	10							10	0-60	10		
37	1550	north	Yusufeli Yarbaşı	8/8/03	9	36	26	30							30	50-90	30		
38	1550	north	Yusufeli Yarbaşı	8/8/03	8	18	7								4	0-50		4	100
38	1550	north	Yusufeli Yarbaşı	8/8/03	22	20	26	26							26	50-100	26		
39	1550	north	Yusufeli Yarbaşı	8/8/03	34	24	6	40							18	40-80	18		

40	1540	South-east	Maçka Yeşiltepe	28/6/01	37	45	237			60	10				70	0-280		70	50
41	1800	South-west	Maçka Yeşiltepe	3/7/01	1	34	27	77		24	1	4		1	77	40-250	40	37	56
41	1800	South-west	Maçka Yeşiltepe	3/7/01	19	22	237	27		153		2			27	50-130	27		
42	1800	South-west	Maçka Yeşiltepe	3/7/01	2	36	27	114		164				1	114	190-400	114		
43	1830	South-west	Maçka Yeşiltepe	3/7/01	10	20	237	22							22	70-150	22		
44	1800	North-west	Maçka Yeşiltepe	1/8/03	21	34	27	56	1			4			56	200-300	56		
45	1800	North-west	Maçka Yeşiltepe	22/8/03	3	36	36	27							27	140-200	27		
46	1800	North-west	Maçka Yeşiltepe	22/8/03	8	34	7	4	25	13			8		4	130-150		4	24
47	1800	North-west	Maçka Yeşiltepe	22/8/03	3	44	27	4							4	200-250		4	100
48	1800	South-west	Maçka Yeşiltep	24/9/03	2	42	27	16		223		2			15	150-250	15		

			e																	
49	1450	North-east	Giresun Kulak-kaya	24/8/93	3	54	7	30	30	10	15	8			20	0-300		20	38	
50	1500	west	Giresun Kulak-kaya	18/7/95	1	20	27	25				5			15	0-100		15	75	
50	1500	northeast	Giresun Kulak-kaya	18/7/95	3	20	26	15							10	50-200	10			
50	1500	west	Giresun Kulak-kaya	18/7/95	5	26	27	20				10			25	0-100		25	71	
50	1500	North-east	Giresun Kulak-kaya	18/7/95	6	28	27	35				5	2		30	0-1500	30			
51	1600	South-west	Giresun Kulak-kaya	18/7/95	8	24	6	15							25	0-200	25			
51	1600	South-west	Giresun Kulak-kaya	18/7/95	12	28	27	130				7	5		30	150-250	30			
51	1600	South-west	Giresun Kulak-kaya	18/7/95	13	20	6	12							20	0-200	20			
52	1500	west	Giresun Kulak-kaya	19/7/95	13	80	36								50	0-400	50			
53	1510	west	Giresun	26/9/0	42	32	37	57		344		7	1	4	41	0-	41			

			Kulak-kaya Giresun	1													110				
53	1510	west	Kulak-kaya Giresun	26/9/01	12	32	37	16		257		17			16	50-200	16				
53	1510	west	Kulak-kaya Giresun	26/9/01	30	50	7	151		22		36	187	8	151	200-700	151				
54	1350	South-west	Kulak-kaya Giresun	27/9/01	3	36	7	7				3			6	60	6				
54	1350	South-west	Kulak-kaya Giresun	27/9/01	30	33	7	52	129			2			34	100-300	34				
54	1350	South-west	Kulak-kaya Giresun	27/9/01	31	26,5	6	9							9	100-150	9				
54	1350	South-west	Kulak-kaya Giresun	27/9/01	33	35	7	68		110		2		4	18	0-130	18				
54	1350	South-west	Kulak-kaya Giresun	27/9/01	40	31,5	27	61		112					6	100-130	6				
55	1680	South-east	Kulak-kaya Giresun	27/9/01	15	61	7	1		191		5	20	2	1	130		1	1		
56	1580	south	Kulak-kaya	27/9/01	44	60	7	9		13		13			9	250-300	9				

57	1600	south	Giresun Kulak-kaya	28/9/01	7	42	26	11							11	140-250	11		
Total									626	3025	115	387			3214		2511	703	

* Host Tree Feature
2 wounded tree
3 forked tree
4 stump
6 Dendroctonus micans damaged tree
7 *D. micans* actually active on the tree
22 dead standing tree

Woodpecker species excavate their nest and rest holes both in deciduous and coniferous trees, and on dead trees, trees with dead tops and partly decayed boles and fallen trees. During the silvicultural practices in forests, trees that are suitable for woodpecker nest and rest holes must be left in certain regions. By protecting the old stands with dead and partly dead trees or trees with dried tops or present old growth forests, and increasing the density of these birds can provide high effectiveness in pest control without any more expenses. For conservation of lesser spotted woodpeckers, management should focus on a minimum of 40 ha of forest dominated by deciduous trees, which may be fragmented over a maximum of 200 ha (Wiktander et al., 2001). Management decisions concerning the endangered middle spotted woodpecker have focused on the conservation and promotion of large oaks; in the future they should consider the supply of trees suited for cavity excavation as well (Pasinelli, 2000). In order to preserve the white-backed woodpecker from extinction in Finland a network of deciduous forests favored by the woodpecker has been proposed (Virkkala et al., 1993).

There have also been found a positive relationship between woodpecker species richness and the number of species of other forest birds (Mikushski et al., 2001).

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WHY IS WHITE-HEADED DUCK WINTERING IN LAKE BURDUR (TURKEY) DECREASING?

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The ever-increasing human impact on existing natural resources has caused the extinction of many bird species and others have become endangered. The rapid human population growth of Turkey and associated demands on natural resources threaten the biodiversity of the nation's natural ecosystems. The number of White-headed duck (*Oxyura leucocephala*) has been declined greatly in the world. White-headed duck is one of endangered species wintering in the Lake Burdur. The lake is one of Turkey's first sites under Ramsar Conservation. The aim of this study was to research effects of hunting, feeding, and behavior of this species. It was determined that the largest populations were encountered as 4478 *O. leucocephala* in the lake from 1992- till 2001.

Key words: *Oxyura leucocephala*, Lake Burdur, Bird extinction, Wetland, Turkey.

INTRODUCTION

Any attempt to reduce human-caused extinction (i.e., to protect endangered species) requires an understanding of extinction rates over geological time. Fossil records from nearly any geological age reveal two types of extinction: extinction without replacement ("dead-end) and what might be called "chronological extinction" or "taxonomic extinction" The first type is based on the recognition by paleontologists that one species has changed through geological time to the extent that it is classified as a different species from the next earliest representative of its linage. The species involved represent an evolutionary continuum rather than an evolutionary dead-end (Nadachowski, 1993; Turner, 1993).

Because they are so conspicuous and appealing to the human senses of sight and sound, birds always have attracted more than their fair share of our zoological attention. Almost by necessity, therefore, birds have played a prominent role in our understanding of the processes by which species become rare, endangered, and finally extinct. Human caused the extinction of birds in four ways: 1. Direct Predation, 2. The Introduction of Nonnative Species, 3. The Spread of Disease, 4. Habitat Degration or loss (Steadman, 1995).

Oxyura leucocephala (White-headed Duck) is one of endangered species wintering in Turkey. Current studies show that a dynamic distribution of this species caused by the differences of habitats is the result of climatic fluctuations (Bauer and Glutz, 1969). Salathé & Yarar (1992) carried out climatic and anthropologic effects on this species in Lake Burdur and suggested that some protecting measures should be taken. Anstey (1989) and Green et al. (1993, 1996) investigated hydrobiology, water quantify, effects of hunting and other factors on *O. leucocephala*. This species and *Aphanius burduricus* were described as endemic species in Lake Burdur by Kiziroğlu et al. (1995). Tabur & Ayvaz (1997) investigated bio ecology of 41 waterfowl in Lake Burdur.

In order to determine the situation of White-headed Duck throughout the world and the

measures to prevent their extinction, the International Wildfowl and Wetland Trust developed a project that was conducted between 1990-1991 years. According to the International Bird Preservation Council and The Protection of Wildlife Club, Lake Burdur is one of the 78 wetlands which have to be protected in Turkey (Yazgan, 1991). A comprehensive study was carried out by Kiziroğlu et al. (1995) in order to protect the lake and its fauna.

This research aimed to determine the number of *O. leucocephala*'individuals, the distribution and abundance of this species in the lake and the effects of hunting, pollution, and other factors. Also, biological features, feeding ecology, behaviour of this species were studied in this study

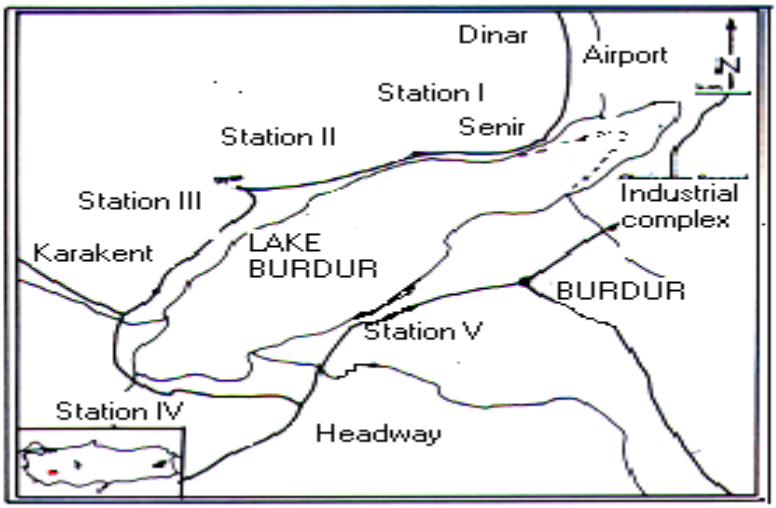
MATERIALS AND METHODS

Turkey contains a great variety of natural habitats, ranging from Mediterranean, Aegean, and Black Sea beaches to towering coastal and interior mountains, from deeply incised valleys to expansive steppes, from fertile alluvial plains to arid, rocky hill slopes (Kaya & Raynal, 2001).

Turkey has a lot of lakes. Lake Burdur is the third biggest lake in western Anatolia. The lake is located between the altitudes of 30^{o} 30'. It has 74 m. depth, 870 m. above sea-level, and water surface of 240 km^2. The community structure at Lake Burdur is very simple, and no major changes in structure were apparent at organic pollution sites. The percentage of sodium sulphate and chlorine in the lake had been established quite high. Water resources of the lake are brooks of Çentik, Karekent, Kukurtlu, Kocasu and streams of Gudelles and Bozcay (Erdem, 1995).

This study was performed from July 1995 to September 2002. During observations, the birds were counted in five stations. Because no White-headed Duck was observed in south and southeast of the lake, any station in this area was not selected. Observations were carried out by binocular, telescope and camera. Counts were made according to the Dobinson (1976) method. Also, Bruun & Singer (1978), Kiziroğlu (1989), Cerny (1993), Schneck (1999), Harrison and Greensmith (2000), Del Hoyo et al. (1992), Campbell (1999), Heinzel et al. (1995) and Cramp et al. (1980) were used in identification.

Figure 1. Lake Burdur & Stations.



FINDINGS:

In the first station located in the northeast of the lake, samples of Boragineceae, Crusifera and Chenopodiacea have been identified. In this station, White-headed Duck was not observed. In station II located in the northern of the lake, samples of *Chara sp*. *Cladophora sp*., *Oscillatoria sp*., *Navicula sp.*, *Nitzchia sp*. and *Gyrosigma sp*. were determined. It was observed that the flat area in front of the station II was used as a shelter by the birds when the weather was too cold. In the Station III, food resources were not found commonly. Station III, which was far from settlement area, was found as a suitable area for bird populations. In this station, species of Anatidae were observed as groups when the weather was bad. The Station IV located in northwest of the lake includes marshes and agricultural areas. Station V located near Denizli highway in the southwest of the Lake is unsuitable for birds, and no White-headed Duck was observed in this station. The station V was especially chosen to observe the effects of traffic on birds. In this station, although White-headed Ducks were not observed, other species were been seen rarely. Furthermore, none of the species was observed in cost-line and in the lake when the weather was bad. Also, food resources were determined insufficient for birds in this station.

Observations were performed in between October-April because White-headed Duck come to Lake Burdur in November and leave on March. Station I, IV and V was determined poorer than the Station II and III in relation to the number of bird (Table 1). In Station III, the food resources in the coastline were not enough for bird population. However, the coastline was preferred by all species when the weather was rather bad in the lake.

Table 1. The number of White headed-Duck counted various studies in Lake Burdur

Years	The number of White-headed Ducks
1992	4478 (Anonymous A., 2000)
1993	3000 (Anonymous A, 2000)
1994	3337 (Green at al., 1996)
1995	2805 (Green at al., 1996)
1996	1706 (Tabur & Ayvaz, 1997); 1300 (Anonymous A, 2000)
1997	1322 (Tabur & Ayvaz, 1997)
1999	2575 (Anonymous A, 2000)
2000	592 (Tabur and Ayvaz, 1997); 791 (Anonymous B, 2000))
2001	653 (Tabur, 2002)

DISCUSSION

In this study, the highest number of *Oxyura leucocephala* was counted in the Station III in 1996, 2000 and 2001. This station was preferred by the birds due to its distance from settlement area, less traffic on the road near the station and unsuitability for hunting. Although the station is poor in most food sources, it is rich in *Acrtodioptamus burduricus.* and *Aphanius burduricus* species which play an important role in the feeding of birds. Anatidae species were also observed in this area as reported by Baran & Yılmaz (1984) and Green at al. (1996).

Yarar (1991) reported that the dependence of White-headed Duck wintering in Lake Burdur can be explained by freezing of neighbouring lakes. Apart from its chemical and biological properties, not freezing in winter is another reason for the presence of birds in Lake Burdur. Kiziroğlu et al. (1995) also reported that White-headed Duck prefer lakes of 50-100 m. depth especially with fresh, shallow waters rich in food source and far from the coast. These data were supported by our findings as well.

Kiziroglu et al. (1995) and Cramp et al. (1980) reported that the breeding period of White-headed Duck is usually the middle of June and the beginning of July. Also, reproduction of this species in Turkey was reported by Ayvaz (1984) in Sultan Sazlığı. But, in our study, we were unable to observe the breeding of White-headed Duck. However, other daily activities were determined except for breeding. Another interesting result of our study is that, this species prefers to swim in the coastline rather than to fly. During the feeding and resting times, individuals of this species fight with each other.

Baran & Yılmaz (1984) and Kiziroğlu (1989) confirmed that White-headed Ducks live with other ducks in Lake Burdur. Various researchers reported the reduction in the number of birds in time. The bulletin of Wildlife Protection Club, "Kelaynak (December1996)"

reported counts performed in January 1996 and registration of 1273 individuals.
In our study, 1706 individuals were registered in March 1996. One year later in January 1997, 1322 individuals were counted. The differences between counting are normal and may have resulted from climatic conditions, the difference of dates, and decreasing of the species number.

Ayvaz (1984) showed that one of the habitats of this species is Sultan Sazlığı located in Kayseri in central Anatolia. There are a lot of lakes in Göller Bölgesi situated in Southern Turkey. For example, Lake Egirdir-the second largest lake in the west Turkey, Lake Beysehir, Lake Salda, and Lake Karatas, etc. But unfortunately no study concerning the number of the bird was carried out by ornithologist in these areas.

Timur et al. (1988) reported that sewage of Burdur province and factories surrounding factories flow into Lake Burdur. This factor causes increasing of pollution in the lake. Thus, it is important for the lake and its fauna. In addition, there is still continuing hunting and new construction in the area. It is inevitable that the food source and the birds will be damaged by these factors.

Kaya & Raynal (2001) reported natural ecosystem degrades and decline rapidly as human populations increase. Due to the rapid population increase in Turkey within the last few decades many natural habitats have been fragmented, reduced in size, degraded or destroyed. This data were supported by this study.

The number of the bird in the lake shows fluctuation every year. One reason for the fluctuation is pollution; the other is the climatic condition. Also, hunting in the lake can affect this fluctuation. It is believed that hunting is not important for this species because hunter dislike eating their meat. Also, during our observations, dead birds were not seen. But, hunters were seen rarely during the study.

In relation to the lake and its ornithofauna, recommendations are given below:
1. Industrial complex and airport at the end of the lake should be stopped, or at least subject to a very through Environmental Impact Assessment prior to approval.
2. All factories and buildings in the lake surroundings threat significantly the future of Lake Burdur and its fauna. The factories and the settlement areas must have modern sewage systems.
3. Studies of the hydrology of the watershed must be made by Turkish Government.
4. Hunting and hunters must be controlled in the lake.
5. The government must made management plan.
6. Measurements of water chemistry should be taken on a regular basis to allow long-term monitoring of changes in nutrient levels and other parameters.
7. Loss of habitat and species diversity must be controlled by the government.
8. Creating monitoring programs and building quantitative databases for conservation programs will be essential to assess future success in maintaining biodiversity.

This study is only a beginning for further investigations. It will be possible to determine the reduction in the number of White headed duck by counting performed periodically.

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THE IMPORTANCE OF MERIC BASIN (EDIRNE) REGARDING TO ORNITHOFAUNA AND SOME ECOLOGICAL PROBLEMS

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This study was carried out to determine the bird species occurring Meriç Basin. The area surveyed was in Meriç-Ergene basin, situated at about 10 km Northwest of Enez of Edirne province. During observations conducted between February 1997 and May 1998, 163 bird species were determined. Their status in the ''Red data'' list were summarised in tables. Of 163 species; 40 were residents, 90 were summer migrants, and 27 were winter migrants. Status of 6 species could not be determined due to low number of observations, such as one or two. It has also been found that 46 species breed in the study area. The importance of the region and the problems that threaten the arnithofauna are discussed.

Key words: Turkey, Thrace, Meriç Basin, Avifauna

INTRODUCTION

Thrace Region, which represents the European part of Turkey, is of paramount importance since it is on the way of the migratory birds migrating from central, East and North-west Europe to southern places. Both Thrace region and Turkey also gain an importance for bird fauna due to their different climate types and habitats they own depending upon their geography. Recently, bird fauna of Turkey is represented with 453 species (Kirvan *et al,* 1999).

Although there are some studies concerning Thrace region bird species these are not much enough in number (Kumerloeve 1962-1970, Kiziroğlu 1993-1989, Bilgin 1994, Ertan 1994, Heinzel *et al.,* 1987, Burun *et al.,* 1990, Yarar *et al.,* 1996-1997, Kaya *et al.,* .1989-1994-1999, 2003 and Kiziroğlu *et al.,* 2002).

Turkey is a rich country from the point of view of wetlands. One of the conspicuous features of Turkey except the presence of the widest wetlands, when compared to European countries and Middle East, is the occurrence of the junction of the ways of migration of birds over Anatolia. Besides this, wetlands are the most organic matter producing ecosystems per unit area after tropical forests and are economically valued (Ural, 1993). Therefore, wetlands should be investigated urgently and their problems should also be solved. If time passes, delayed measures might cost too much for the economy of the country since small problems turn into bigger ones quickly.

There are some main points that make Meriç Delta important to be investigated. First, Meriç Delta, an important wetland, is listed in the ***A*** Category International Wetlands (Erdem, 1994; TÇSV, 1989). It has a certain bird potential and the birds sheltering here face various hazards. For these reasons:
We aimed to reveal the problems that the birds have in this region and find solutions to them.

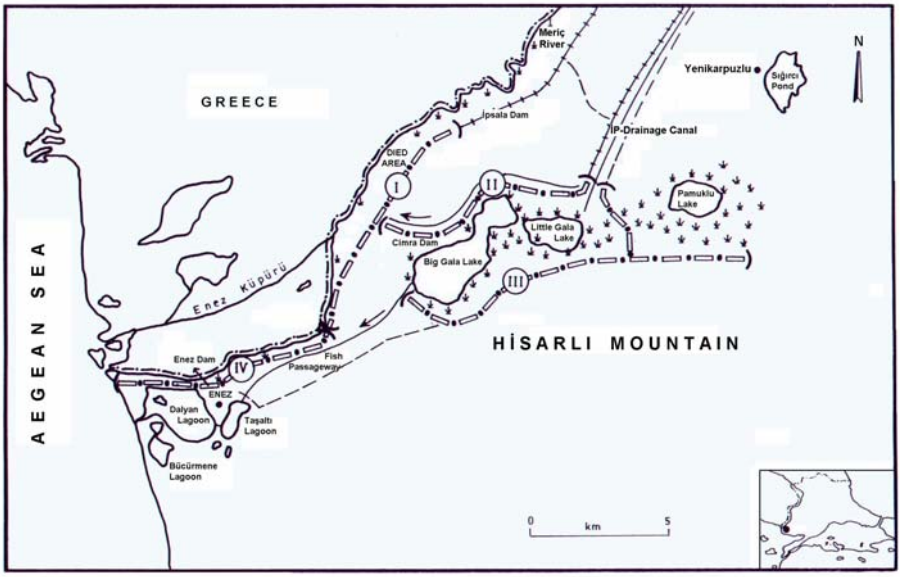

Figure 1: Meriç Delta

MATERIAL AND METHODS

Meriç Delta is a 45.000 ha. wetland formed at the mouth of the Meriç river at Egean Sea. Since the delta is located at Turkey-Greece border, the entrances to and exits out of the region is under military control. About 10.000 ha. part of the delta lies in Greece lands an is an important bird area. The rest 35.000 ha is constituted of Gala Lake, Pamuklu Lake, wide bulrushes areas, lagoons and river overflow areas of which most parts have been turned into rice fields (Yarar *et al.,* 1997).

Meriç Delta is composed of lakes, rushy areas, marshes and lagoons (Gala lake, Pamuklu Lake, Karpuzlu Watering Lake, Dalyan Lagune, Bücürmene Lagune and Taşaltı Lagune). Gala Lake, covering a 750 ha. area is composed of 560 ha. Big Gala (Çeltik Lake) and 190 ha. Small Gala lakes. The neighbouring Pamuklu Lake, on the other hand, covers an area of 188 hectares (Kantarcı, 1989).

In 1991, a part of the delta covering a total of 2.369 hectares, involving both Small Gala and Pamuklu lakes, has been declared as "Nature Conversation Area". In 1992, Gala and Pamuklu lakes and Dalyan, Bücürmene and Taşaltı lagunes were also declared as Site Area.
The climate of the delta shows continental characteristics in winter and is hot and dry in summer under the effects of the sea. The delta is open to both southern (originating from Aegean Sea) and cold northern (originating from Balcan Mountains) (Kantarcı, 1989; Tolunay, 1994).

Meriç Delta is consisted of various ecosystems. All these ecosystems are under the influence of a semi-humid climate type. These ecosystems also possess peculiar habitat characteristics and each houses native (animal and plants) and immigrant (birds) lifes adapted to the above-mentioned characteristics (Kantarcı, 1989).
A total of 33-day observations were done in Meriç Delta between the years 1998 and 2003.

Observations were done from dawn till dusk as long as the weather conditions allowed either with the naked eye or using various binoculars (e.g. Nikon Telescope, 10x50 Diana and 10x50 HP Soligor) when necessary. Birds were watched along the road and sometimes inside the rushes both from stationary points and in a boat over the lake. Any information about nesting (breeding) areas and habitat ecologies of the birds were tried to be collected. Also, bird species breeding in the Delta were determined. Nests of some of these species were found, some birds were seen with their young and some adults were seen while gathering nest material around. During field studies, techniques of Bibbi *et al.* (1998) were made use of for both determination of the breeding species and observations. Some photos and slides of birds, their nests, habitats and behavior were also taken to provide visual contribution. For this purpose, Pentax P30 and Pentax K1000 photograph machines and 120x600 mm and 200 mm tele and wide-angle objectives were used. For identification of birds Heinzel *et al.,* 1987, Bruun *et al.,* 1990 and Gooders, 1995 were benefited from.

About the status of the birds the meanings of the abbreviations in Table I are listed below; N (birds seen during the whole year) represents the native bird species; SM (summer migrant) represents the bird species seen during the breeding season from the beginning of March till the end of September; WM (winter migrant) represents the bird species seen during the time from the beginning of September till the end of March; represents breeding species; Red List (RL)- (VU= Vulnarable); critically endangered, (LR=lover risk); under low risk species.

FINDINGS

Totally 163 bird species were identified in Meriç Delta. While 40 of these species are resident (R), 27 of them are winter migrant (WM) and 90 are summer migrant (SM). No comments have been given about the statues of the remaining 6 species (US; undefined statue) since these were seen only once or twice during the whole study. These species are likely to visit the delta during their migrations. They are probably transit species. 46 species were also found to breed (BR) in the study area (Table 2).
When checks Table 2, one can see that 8 species are listed in the Red List. 4 species (*Branta ruficollis, Aquila clanga, Aquila hiliaca, Falco naumanni*) are critically endangered (VU) whereas 3 species are under lower risk (LR) (UNEP-WCMC 2000).

RESULTS

163 bird species were identified in Meriç Delta between the years 1998 and 2003 after a 33-day observation. The percentages of the native species, winter migrants and summer migrants in the delta are 24.53 % (40 species), 16.56 % (27 species) and 55.21 % (90 species) respectively. The statues of 3.68 % (6 species) of the whole could not be

determined and %28.22 (46 species) breed in the study area.

Table 1: Statues and percentages of the bird species (TBS: Total Bird Species).

	TBS	N (%)	WM (%)	SM (%)	US (%)	BR (%)
Meriç Delta	163	40 (24.53)	27 (16.56)	90 (55.21)	6 (3.68)	46 (28.22)

In a previous study of Kaya *et al. (2003)* involving Gale Lake and its surroundings, 134 bird species reported. The bird species number of Meriç Delta, including Gala Lake, found as 163 with this current study. The importance of such a rich place for birds is obviously very big.

We determined at the end of our study that birds living in Gala Lake and its surroundings face with very different types of problems. This finding depends on our observations and dialogues we did with local people. The below list gives the problems in question with their general lines.

PROBLEMS OF MERIÇ DELTA

The major problem of Meriç Delta is the rapid and increasing transformation of rushes and marshes known as "Dead Zone" located between Meriç River and İpsala Dam into rice fields by being dried. This activity still continues. About 2/3 of this region have been dried between the years 1990-2000. This is also the case in Pamuklu Lake rushes and the rushes found between Small Gala Lake and Çimra Dam**.** Most parts of the Pamuklu Lake rushes are about to be subdivided to be distributed to the region inhabitants. Our efforts to prevent this activity unfortunately could not come to an end. These rushy areas, however, are the region of the delta where the birds commonly nest, shelter and feed.

A project known as bracing channel is now being carried on in Meriç Delta by DSI. The putative hazards that this project might give to the delta must be investigated and the project must be prevented if necessary. In my opinion, this project may change Gala Lake into a pool system. If this happens, this will be the extinction of Gala Lake.

One of the biggest problems of the region is the irregular and uncontrolled hunting leading to a bird massacre. Hundreds of hunters from many nearby cities, especially from Edirne, Kırklareli, Tekirdağ, İstanbul, Çanakkale and İzmit, rush into the lake and its surroundings every weekend and on holidays and even during hunting prohibited periods. These hunters can easily do what they want and hunt as much bird as they can due to lack of any control and anybody doing protection and this leads to a bird massacre. They also use any kind of forbidden hunting techniques.

The borders of the 2369 ha "Nature Conversation Area" have not been clearly determined and and current drawings of borders are not accurate according to our opinion. Both the military zone, known as "Dead Zone", and Gala Lake, where the birds mostly occur must also be included in the borders of Nature Conversation Area**.** Inside this area rice agriculture and fishing activities are being performed and there exists here some fields, farms, barns

belonging to private ownerships and a building belonging to fishery cooperative.

Pamuklu Lake inside the protected area has been drained to obtain agriculture fields. Therefore, most part of the lake dries during the summer season and rice agriculture is performed here. In addition, the water of Pamuklu Lake is being transferred to Small Gala Lake by means of a channel. That's why, water level decreases especially during dry season.

There is a stone quarry located on the skirt of Hisarlı Mountain near Small Gala Lake which is also inside the protected area. Although this quarry is today not working, it has already damaged the region's natural structure.

Another major problem of the delta is pollution. The wastes of agricultural drugs and artificial fertilizers used in İpsala plain are carried to the lakes by İP-1 main emptying channel and Çımra and Telmata drainage Pomp stations. This excessive pollution in the lakes then leads to eutrification. The aquatic plants grow rapidly but the feeding regimes and growing of the fishes are ceased. An average of 169 tons of agricultural drugs (110-ton herbicide, 14 ton insecticide, 45 ton fungicide) and 80 tons of fertilizers (41 tons nitrogenated, 24 tons phosphored and 15 tons compose) are being used in the region per year (DSİ, 1986). During our study, dead fishes were seen around channels and lake especially at times when drug applications were high in number. This clearly shows the occurrence of an extensive pollution in lake and nearby wetlands. Besides fishes, many aquatic vertebrate and invertebrate animals also die due to existing pollution.

The leading pollution cause of Meriç River is the pollution of Ergene River. The pollution of Meriç starts with the union of Ergene River. Waters containing poisonous chemicals of Ergene pollute Meriç River both biologically and chemically. As a result, the polluted river means a polluted delta.

Sediments enter the lakes with channels connected to them. The materials causing the lakes to be filled are carried here with floodwater in winter. This is the result of excessive tree cut and animal grazing at the skirts of Hisarlı Mountain. There is a high degree of erosion here. The filling of lakes with materials carried with flood water is better seen in Small Gala Lake.

The rushes in Pamuklu and Gala lakes are being cut to obtain fields where agricultural activities will performed. These fields are also sold.

To water the rice fields, farmers use lake waters. Therefore, the lakes loose most of their water and they no longer show characteristics of a place where life exists. The whole Small Gala Lake and most parts of Pamuklu Lake dry during summer seasons due to water loss and sediment deposition.

A new road construction project has been finished between Enez and İpsala cities. This road lies very close to lake, in some parts only 1 or two meters away, around Hisarlı Mountain and reaches to Yenikarpuzlu city passing between Small Gala and Pamuklu lakes. The project was finished without thinking the damages it would give to the wetland. It will certainly give so much damage to the wetland. The natural structure of the region will go to worse. Some kind of noise pollution will also occur.

RESULTS

Meriç Delta, which is located on the way of one of the world's important migration ways of birds, is also an important scientific research area. Besides, social, cultural and economic activation will be lived here after making the necessary arrangements. The money that scientists, both from Turkey and from foreign countries, and amateur bird observers will bring to the region will be more useful to the region people than they earn from hunting.

Consequently, Meriç Delta is not an important habitat for only aquatic and terrestrial birds, but also for many mammalian, reptilian, amphibian and fish species. Like many other wetlands, Meriç Delta also faces various problems. These problems must be taken into consideration as soon as possible and further scientific investigations about delta must be performed. The results of these investigations must also be taken into consideration to take necessary protective measures and to make decisions about socio-economic activities, and lastly necessary legal arrangements must be done.

Table 2. Thrace Region Birds, their statues, breeding and danger levels: Statue (**ST**): (**R**) resident species, (**SM**) summer migrants, (**WM**) winter migrants, (**Date**) The date when the birds with no statue or transit birds observed. Breeding **(BR):** (□) species found to breed in the region. Red List **(RL):** (**VU**) critically endangered, (**LR**) under low risk species.

Latin	2.GS	RL
Tachybaptus ruficollis	R□	
Podiceps cristatus	SM□	
Podiceps grisegena	6.6.02	
Podiceps auritus	WM	
Podiceps nigricollis	R	
Phalacrocorax carbo	R	
Phalacrocorax aristotelis	SM	
Phalacrocorax pygmeus	R	
Pelacanus onocrotalus	R	
Pelacanus crispus	SM	
Botaurus stellaris	WM	
Ixobrychus minutus	SM	
Nycticorax nycticorax	SM□	
Ardeola ralloides	SM□	
Egretta garzetta	R□	
Egretta alba	R	
Ardea cinerea	R□	
Ardea purpurea	SM□	
Ciconia nigra	SM	
Ciconia ciconia	SM□	
Plegadis falcinellus	SM	
Platalea leucorodia	SM	
Phoenicopterus ruber	SM	

Latin	2.GS	RL
Cygnus olor	R	
Cygnus cygnus	WM	
Anser anser	WM	
Tadorna ferruginea	SM	
Tadorna tadorna	SM□	
Anas penelope	WM	
Anas strepera	WM	
Anas crecca	WM	
Anas plattyrhynchos	R□	
Anas acuta	WM	
Anas querquedula	R□	
Anas clypeata	WM	
Marmaronette angustirostris	13.11.02	
Netta rufina	WM	
Aythya ferina	WM	
Aythya nyroca	SM	LR
Mergus merganser	WM	
Milvus migrans	SM	
Milvus milvus	WM	LR
Haliaetus albicilla	14.9.01	LR
Circaetus gallicus	SM	
Circus aeruginosus	R□	
Accipiter gentilis	SM	

Latin	2.GS	RL
Accipiter nisus	SM	
Accipiter brevipes	SM	
Buteo buteo	SM	
Buteo rufinus	SM	
Buteo logapus	R	
Aquila pomarina	SM	
Aquila heliaca	R	V U
Falco tinnunculus	SM	
Coturnix coturnix	SM	
Rallus aquaticus	WM	
Gallinula chloropus	R	
Fulica atra	R	
Grus grus	3.10.01	
Haematopus ostralegus	WM	
Himantopus himantopus	SM	
Burhinus oedicnemus	SM	
Glareola pratincola	SM	
Charadrius dubius	SM	
Charadrius alexandrinus	SM	
Pluvialis apricaria	SM	
Hoplopterus spinosus	SM	
Vanellus vanellus	SM	

Latin	2.GS	RL
Calidris minuta	SM	
Calidris ferruginea	SM	
Gallinago gallinago	SM	
Limosa limosa	SM	
Numenius arquata	SM	
Tringa erythropus	SM	
Tringa totanus	SM	
Tringa nebularia	SM	
Tringa ochropus	SM	
Tringa glareola	SM	
Actitis hypoleucos	SM	
Arenaria interpres	5.3.01	
Larus minutus	WM	
Larus ridibundus	R	
Larus genei	SM	
Larus canus	SM	
Larus cachinnans	R	
Sterna caspia	SM	
Sterna hirundo	SM	
Sterna albifrons	SM	
Chlidonias hybridus	SM	
Chlidonias leucopterus	SM	
Columba livia	R	

Latin	2.GS	RL
Streptopelia decaocto	R□	
Streptopelia turtur	SM	
Cuculus canorus	SM	
Athene noctua	R□	
Apus apus	SM	
Apus melba	SM	
Alcedo atthis	R□	
Merops apiaster	SM□	
Coracias garrulus	SM	
Upupa epops	SM	
Dendrocopos major	SM	
Dendrocopos syriacus	R	
Melanocorypha calandra	R	
Calandrella brachydactyla	R	
Galerida cristata	R□	
Alauda arvensis	SM	
Riparia riparia	SM□	
Hirundo rustica	SM□	
Hirundo daurica	SM	
Delichon urbica	SM□	
Motacilla flava	SM	
Motacilla cinerea	SM	

Latin	2.GS	RL
Motacilla alba	R	
Troglodytes troglodytes	WM	
Eritracus rubecula	WM	
Luscinia megarhynches	SM□	
Phoenicurus ochruros	SM	
Oenanthe isabelline	SM	
Oenanthe oenanthe	SM	
Oenanthe pleschenka	SM	
Oenanthe hispanica	SM	
Turdus merula	WM	
Turdus pilaris	8.3.01	
Turdus philomelos	WM	
Cettia cetti	SM□	
Cisticola juncidis	SM	
Acrocephalus scirpaceus	SM□	
Acrocephalus arundinaceus	SM	
Hippolais olivetorum	SM	
Hippolais icterina	SM	
Sylvia melanocephala	SM	
Sylvia communis	SM	
Sylvia borin	SM□	
Sylvia atricapilla	SM	

Latin	2.GS	RL
Phylloscopus collybita	R□	
Muscicapa striata	SM	
Parus caeruleus	WM	
Parus major	R□	
Oriolus oriolus	SM	
Lanius collurio	SM	
Lanius minor	SM	
Lanius senator	SM	
Garrulus glandarius	SM	
Pica pica	R□	
Coruus monedula	R□	
Coruus frugilegus	R	
Coruus corone corane	R□	
Sturnus vulgaris	R□	
Passer domesticus	R□	
Passer hispaniolensis	SM□	
Passer montanus	R□	
Fringilla coelebs	WM	
Fringilla montifringilla	WM	
Carduelis chloris	R	
Carduelis carduelis	R□	
Carduelis spinus	WM	

Latin	2.GS	RL
Coccothraustes coccothraustes	SM	
Emberiza citrinella	WM	
Emberiza cirlus	SM	
Emberiza schoeniclus	R□	
Emberiza melanocephala	SM□	
Miliara calandra	R	

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FURTHER TO THE QUESTION OF WATERFOWL WINTERING IN TURKMENISTAN

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Historically high winter concentrations of ducks were found along the shores of the Caspian Sea and along the river, valleys crossed the nearby lowlands (Blanford 1876, Karelin 1883, Zhitnikov 1900, Buxton 1921). In the 1950s and 1960s construction of large-scale irrigation systems at the Central Asian plains (as example, Karakum Canal) resulted in the appearance of many new water bodies. These developments, while being largely detrimental for the human population (through salinisation and the subsequent deterioration of agricultural land), were beneficial for waterbird populations.

This paper represents the overview of wintering waterfowl in the southeastern Caspian Sea, although data were presented previously for discrete locations within the region (e.g. Vasil'ev 1977a, 1977b, Vasil'ev et al. 1984, Rustamov 1979, 1989, 1993, Rustarnov & Khakiev 1978, Rustamov & Vasil'ev 1981, Karavayev 1988, Rustamov et al. 1990).

STUDY AREA AND METHODS.

The numbers and distribution of birds wintering in the southeastern Caspian lowlands and along the lower reaches of the Atrek River been studied since the 1930s. During recent years counts have been carried out in all major wintering areas of the region from the eastern Caspian Sea to the Amudarya.

Sea bays and lagoons were surveyed from the air while the mainland waterbodies were observed from watchtowers, cars and boats as well as from the air. The sea was surveyed twice per winter - in November and January while the waterbird populations located on inland waters were usually counted once per year in January (a small number of counts were carried out in late December or early February). Surveys covered the area of 7930 km^2 and 1800 km of the Caspian shore (excluding Mangyshlak Bay), the Karakum Canal (in present – Karakumdarya) and Amudarya.

SPECIES COMPOSITION, POPULATION SIZE AND TRENDS.

Thirty-nine species of waterbird were located in the study area during winter counts including: *Podicipediformes* (five species), *Pelecaniformes* (White Pelican - *Pelecanus onocrotalus*, Dalmatian Pelican - *P. crispus*, Great Cormorant - *Phalacrocorax carbo* and Pygmy Cormorant - *P. pygmaeus*), *Phoenicopteriformes* (Greater Flamingo - *Phoenicopterus roseus*), *Anseriformes* (Mute Swan - *Cygnus olor*, Whooper Swan – *C. cygnus*, Bewick's Swan – *C. bewickii*, Red-breasted Goose - *Branta ruficollis*, Greylag Goose - *Anser anser*, Lesser White-fronted Goose - *A. erythropus*, Ruddy Shelduck - *Tadorna ferruginea*, Shelduck –*T. tadorna*, Mallard - *Anas platyrhynchos*, Common Teal - *A. crecca*, Gadwall - *A. strepera*, Wigeon - *A. penelope*, Pintail - *A. acuta*, Marbled Teal - *A. angustirostris*, Garganey - *A. querquedula*, Common Shoveler - *A. clypeata*, Red-crested

Pochard - *Netta rufina*, Common Pochard - *Aythya ferina*, Ferruginous Duck - *A. nyroca*, Tufted Duck - *A. fuligula*, Greater Scaup - *A. marila*, Goldeneye - *Bucephala clangula*, Long-tailed Duck - *Clangula hyemalis,* Velvet Scoter -*Melanitta fusca* (on the Caspian shore only), White-headed Duck - *Oxyura leucocephala*, Smew - *Mergus albellus,* Red-breasted Merganser - *M. serrator)* and *Gruiformes: Rallidae* (European Coot -*Fulica atra).*
Six species made up 94.6% of the total wintering flock of individuals. The predominant species were Coot (on average 34% of total regional count), Red-crested Pochard (18.3%), Mallard (12.9%), Teal (11.3%), Tufted Duck (9.1%) and Pochard (9.0%). The proportion of Coot in the count is high both on the sea shore (20.5%) and inland (13.5%) as proportions of Red-crested Pochard (10.9% respectively), Mallard (12.2%) and Teal (10.5%) make up more of the waterfowl counts on inland waters whereas Tufted Duck (1.6%) and Pochard (1.5%) are represented more on the sea.

Variation in species composition occurs between sites. In the Kelif Uzboy area, there was a mean of 13 or 14 species recorded with a maximum of 22 and a minimum of eight. Coot and Mallard, as well as Teal, Pochard and Red-crested Pochard were the dominant species throughout. There was a striking decrease in numbers of Gadwall, Pintail and Scaup between 1977 and 1988, while Shoveler, Wigeon, Ruddy Shelduck, Ferruginous Duck, Red-breasted Merganser, Goosander and White-headed Duck became very scarce. At the same time there was a pronounced increase in numbers of Cormorant, Shelduck and Tufted Duck. Greylag Goose had a stable wintering population of around 1000 birds between 1968 and 1976 but, between 1977 and 1985, numbers dropped dramatically to less than 50 birds and recently some recovering was observed for this species. Lesser White-fronted Geese were seen in small numbers in 1972, 1974, 1976 and 1986-88.

The Kelif Uzboy area held more species than the Khauzkhan Reservoir where a mean of nine species was recorded. Maximum number of species at Khauzkhan Reservoir was 15 in 1974 and 1976 while there was a minimum of only three in 1977. There were stable numbers of Mallard, Coot, Teal, Pochard and Red-crested Pochard throughout the study period. Red-crested Pochard occurs annually, although the population has decreased in number since 1977. Between 1977 and 1984 no Tufted Ducks were recorded at the reserve, but they have reappeared in recent years. Scaups, which were always less common than Tufted Ducks, have not been recorded at the Khauzkhan Reservoir since 1977. Other species of ducks occur rarely; for example, Smew, Red-breasted Merganser Goosander and Goldeneye appear in small numbers only during the cold winter months. Greylag Geese were first recorded only occasionally, with 180 birds in 1976, but began to winter regularly from 1985 reaching a peak of 500 birds in 1988. Cormorants not recorded on the Khauzkhan until 1977, but have become much more abundant in recent years with a mean of 110 birds present.

In the lower reaches of the Atrek and the nearby sea shore the number of species was recorded ranged from 14 to 25 (19 on average). Low water levels in the Atrek, a rise in sea level and a subsequent reduction for areas in this region have caused a reduction in the waterfowl population here. Dabbling ducks, mainly Teal, were most numerous but, since 1979, Coot has become the most widespread species. Pygmy Cormorant, Red-breasted Geese. Lesser White-fronted Geese, Marbled Duck, Ferruginous Duck and Shelduck have become very scarce while Greater Cormorants have increased in number.
Whooper Swans, Mute Swans and Greater Flamingos occur sporadically on the inland

waterbodies and winter mainly in the eastern Caspian. Mute Swans numbers increased from 28400 birds in 1972 to 53000 in 1985 while the numbers of Greater Flamingos increased from 10700 in 1973-77 to 18000 in 1980 (V.I. Vasil'iev, pers. comm.). The main population of Greater Flamingo winters in the southeastern portion the forward part of Krasnovodsk Bay.

The waterbird population of the region has declined drastically, totally around 50%. However, the rate of decline varies between regions. For example, in the Kelif Lakes waterbird numbers dropped by 93% from a mean of 124900 in 1970-1976 to only 8600 in 1977-1988, while in the Khauzkhan Reservoir, 73% decline, from 20400 to 5500 birds, occurred. Waterbird numbers on the lower reaches of the Atrek River and the nearby shores of the Caspian decreased by 45% from 124400 in the 1930s to 68400 in 1977-1988. Changes in bird numbers are similar in the Akhal group of lakes, the Khauzkhan Reservoir and the Kelif Lakes.

Migration The climate and hydrology varies considerably over the large geographical region included in this study. The northern half of the region (north of 40^0 N latitude) experiences prolonged snow and ice cover, while the southern half has mild winters and, as a rule, lacks ice cover on waterbodies. The majority of the important wintering sites (30 out of 41) are found within the southern zone.

Waterfowl migrate to the wintering grounds in advance of or parallel with cold climatic fronts and during this time mass migration can be observed over very short periods. For example, on 5 December 1988, the cold fronts moving in over the northern parts of Uzbekistan and Turkmenistan coincided with building up of waterfowl numbers in the middle reaches of Amudarya. Large numbers of waterfowl had arrived by 10 December. A.N. Poslavsky (pers.comm.) recorded a great number - 574800 inds of which 404000 (70.3%) were Coot, 74100 (13%) Red-crested Pochard, 31000 (5.4%) Tufted Duck and the rest Goosander and Mallard during aerial survey on 12 December in the Denghizkul Lake area to the south-east of Turkmenabat. However, by the end of December, the flock size had fallen by 90% to only 50000 birds.

The same situation is observed at the coast. The temperature falling and ice forming on the northern Caspian Sea provide birds moving into open water, mainly to Krasnovodsk Bay. At this time birds can also move to Krasnovodsk Bay from the Sarakamysh Lakes. This phenomenon of interchange characterizes not only the period when wintering flocks first gathering (November), but also during periods of warm weather in January when birds move over short distances to the north. However, this movement did not occur in cold (1968-69, 1971-72, 1976-77, 1984-85, 1990-91) and warm winters (1980-81, 1982-83, 1983-84, 1985-86, 1989-90) when birds rarely visit the usual wintering grounds. In cold years the waterfowls migrate further south to Iran and India, while in warm winters they remain in the northern Caspian, Aral or in the central Kazakhstan Lakes.

Rare and scarce species There following waterfowl species recorded during the surveys are included in the Red Data Book of Turkmenistan (1999): White Pelican, Dalmatian Pelican, Greater Flamingo, Lesser white-fronted Goose, Marbled Teal and White-headed Duck.

White- and Dalmatian Pelicans rarely winter throughout the whole study area while Pygmy

Cormorant was rarely recorded on wintering sites or migrating stop-overs. In December 1935-39, comparatively large flocks of up to 150 individuals were recorded on the lower reaches of the Atrek River (Isakov & Vorobiov 1940). More recent counts (February 1988) include 34 and 75 birds on the Sultandag Lake and Kelif Lakes respectively (Shernazarov & Nazarov 1990). Also in January 1980 and 1990 were counted 12 and 45 individuals in the middle Amudarya.

On the Caspian in 1980-1990 Lesser White-Fronted Geese were counted more frequently at the start (third decade of November) and less at the middle (second decade of January) wintering period. The total quantity was not high and reached at least 700-800 individuals at several years. During 1991-1995, drastically population decrease was observed and there was no this species recorded during autumn and wintering counts. From 1996, the number began to increase, especially, at the period of autumn migration (early wintering season). At this period during some years there were counted more then 1800 individuals, but at the middle winter the summarized counting data did not exceeded 400 individuals.

Marbled Teal was the common duck species in the region prior to 1940. These birds wintered and nested along the Amudarya, Murghab, Tedzhen and Atrek Rivers. In 1932-39, the numbers in the lower reaches of the Atrek and nearby coast reached 17000 (Laptev et al. 1934, Isakov & Vorobiov 1940). Presently there have been the only four observations of this species during winter. However, a concentration of 5000 individuals on the Dengizkul Lake in January 1988 (A.N. Poslavsky, pers.comm.) deserves a special mention.

White-headed Ducks on the Caspian Sea from 1986 onwards mostly have been found at Krasnovodsk and North-Cheleken Bays (86-100% of total population). 820 White-headed Ducks were counted in January 1998 along the coast of the southeastern Caspian between Carabogazgol and Esenguly, at this territory 723 birds were also counted in November 2001. In autumn-winter 1972-1978, peak annual count was 17000 birds (Ataev et al. 1978), while from 1988 onwards counts were down to 19-820 birds (Vasil'iev & Gauser, 2001a,2001b).

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THE EFFECTS OF POLLUTANTS ON THE BIRDS AND OTHER ORGANISMS LIVING IN THE VAN LAKE BASIN

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In the present study, the source of pollutants in the Lake Van and Erçek were investigated. The Primary important pollutants threatening the water and environment of these lakes are; domestic wastewater and solid waste materials carried by erosion. The secondary pollutants are; the illegal construction of buildings, solid waste deposited in the surrounding of lakes, industrial waste, herbicide and pesticide waste, sound and view waste. The reasons indicated above caused physical, chemical, biological and ecological pollution in the area. It was observed that people and other organisms are directly or indirectly influenced by these pollutants. It has been assumed that the pollution problem will increase in this area. Because the area is a closed basin and the cost and period of recovery will be more expensive and longer comparing with open basin.

Key words: Drainage, The Lake Van,The Lake Erçek, Wetland, Birds

INTRODUCTION

Environmental problems, that were local at first but later turn out to be global, come out parallel with industrial development since 1800 (1). In general environmental mother is known the most important problem in through world (2). Van Lake basin is affected by this negative ness as all of place on world is. As result of that, the climate changed remarkably and the rain system differentiated. Therefore, drought ness appears sometimes at important rate (4). While water level of lakes in the region rise from time to time (3). The water flow of rivers and organic matter carried out to the lake has been changed and all of living organisms, beginning fishes, are affected negatively (5,6,7). Changes in water are harmful particularly to birds and marshy area (8). Matters increase owing to ingeneration of long-term development model (10) and lack of Red List of birds living in the basin (9). Application of planed protection works in the basin will reduce the problem in short time (11, 12, 13).

MATERIAL AND METHODS

Material of this study consists of pollution reasons in Van Lake Closed Basin. Ornithology studies carried out in the basin since 1981. While this study continued, on the other hand, reason of pollution in the basin was observed. The findings of this study collected from basin observation approximately during 12 years.

RESULTS

Pollution source of the basin may be divided into two group according to importance rate. The first important pollutant group consists of municipal wastes, domestic wastes and erosion matters. While the second important pollutants are unlawful building in the coast, dwelling of garbage dump near to lake, industrial wastes, herbicides, appearance and sound pollution. Changes in the importance range will be possible by developments.

All of settlements such as town and cities placed around Van Lake allow flowing the municipal wastewater into the lake. Van Municipal Refinery plant work at low level and refiner only physically on the other hand Tatvan Municipal Refinery plant can not able to refinery due to planted at low altitude comparing to Van Lake. Water altitude situation in other settlements is not different than these places. Wastewater of villages or settlements of countryside are also flowing into rivers or streams that flow into Van Lake.

Wastes that have not been sufficiently refined mixed to waters cause to bad odour at the arrival point of rivers and the lake, biologic, physical and chemical pollution and bad appearance. People and animal living in these areas have serious healthy problems that originate from virus, bacteria, fungi and parasites but no scientific studies have been carried out in this context. Animal corpse, mostly birds, found many times in heavy polluted area.
The danger is spread out by marketing meat and milk produced from animal that fed from these areas.

Local people living around water sources that pouring into lake or rivers in basin spread generally their domestic wastes unconsciously. Same behavior was observed from people that come to picnic around coast. These wastes accumulated in coast in time devastate coasts in many ways.

It observed that the basin is poor from point view trees and present plant flora devastated by high activity of animal and human being water after melt of snow in spring plus additional of rain carry plentiful of soil into the lake. Recently carried soils mix with lake directly because of destruction of delta, which is joint point of rivers, and lake by build of drainage channels.
In the recent years, the gills of fishes fill up with mud and complete fish dying occurs coming to high accumulation of soil in the lake. This situation affects negatively the food chain of whole living organisms in the area.
It observed that coast law has been disobeyed in general basin. The shelter of wild animals are destructed in many places remarkably deform urbanization brought many problems with. Some of them are earthquakeness near the coast, mosquito fight and filling of coast against rising up of lake water. In addition, holiday house for summer build around coast out of municipality boundaries and out of control do not obey never since last five years.

Garbage collected in the basin threw away in empty field just out side of towns with out assignment of harm or unharmed rubbish since selected garbage places are either near rivers or hill with high altitude produces problems. Evocated garbage on a hill can reach rivers or water sources easily by wind or rain. It is high possibility that the rubbish may diffuse in springs in time from garbage store. Many of new industrial foundation observed that either established on coast or near to rivers flowing into lake in the future these establishments can

be source of pollution at high level. In addition, electricity plant using fossil fuels are important pollution sources. In addition, use of low calorie fuel for heating is an important matter approximately for 7 months in winter. Another problem is long time waiting of cars in traffic lambs.

It determined that herbicides are being used at low level. However, DDT, which is accepted as global problem and forbidden, can be yield easily.

The following appearance pollution sources identified; Deformed urbanization, coastal devastation, garbage problem in environment and bare electricity-telephone cables. It found that many bird species and human may be harmed from telephone-electricity cables.
It determined that the most important noise pollution are car horn and exhausted sound.

RESULT AND CONCLUSION

"Closed Basin" character of basin should be taken into account and all of authority, at first Municipality Unity has to deal with problem for permanent refinery processes. People in intensive polluted are should be scanned from point view of healthy seriously and to take decision for necessary precaution.

One of urgent precaution is the conservation of erosion increases these last years. Furthermore, randomly drainage works cause to destruction of marshy fields.
Settlements, build up by disobeying Coastal Rule, are a burden to government permanently owing to have risks.

Besides, it vanish living organisms in natural environment, such as sand dune, marshy place and swamp. To solve this and this kind of problem, Coastal Rule has to apply and housing places should be assigned far from coasts.

Modern rubbish bin should be constituted for settlement places far from water sources. Precaution should be taken garbage to protect health. Recycling plant system should be formed by establishing garbage assignment shat time.

Industrial area and industrial types should be selected by investigating environment, earthquakeness, agricultural fields and other condition. Energy must be originated from water and alternative methods should be searched. The quality of coal used should be increased and natural gas has to plan. Regulation to increase traffic course have to be arranged.

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STUDY ON ORNITHOFAUNA OF PORSUK DAM LAKE IN ESKIŞEHIR

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Abstract: This study has been carried to determine the ornithofauna of Porsuk Dam Lake in Eskisehir and its around the surrounding area. In this study, 81 species have been identified that belong to 34 families from 13 orders. 33 of this observed species are native, 25 of them summer visitor, 16 passage migrant, 7 of them winter visitor.

Keywords: Ornithofauna, Aves, Eskisehir, Porsuk Dam Lake.

Introduction

Türkiye is extremely rich in terms of flora and fauna diversity because of its biogeographic features showing continental characters and its different and diverse climate conditions. With 426 bird species registered, Türkiye has a more diverse ornithofauna than most of other Europe countries (Kiziroğlu, 2001). According to Roger Tory Peterson, "Birds are an ecological litmus paper. Because of their rapid metabolism and wide geographical range, they reflect changes in the environment quickly; they warn us of things out of balance, sending out signals whenever there is a detoriotarion in the ecosystem. We can assume that what kind of an environment awaits us in the future". After the human being exists on earth thousands of years ago and during the process of civilization, the human being has become a dominant species. Because of this dominance, human being has more or less devastated forests, green plains, soil, water and whatever we can imagine and he continued his development as a supreme species to other living things. The meaningless fight which the human being has attempted with nature, has resulted with mass extinction of many species. Even in the Anatolian region which has exposed diverse human activities, many species has extinct. Birds are one of the most affected animal groups by this environmental crisis. In 1950's on the West and South West Anatolia regions, the use of DDT against the Grasshopper herds, not even destroyed many species, but also resulted with the extinction of the Geronticus eremita (Bald ibis) species that feed on them. In the same way, because of the aridation of the Amik lake to put up with the malaria disease, Anhinga rufa (Dart) couldn't settled here anymore (Kiziroğlu, 1989). And by the passing years, the society realized that controlling malaria disease can be managed with organizing a healhty community with out aridation of lakes.

The studies concerning Turkish ornithofauna started before 1930's and carried out by researchers named Strickland (1836), Dickson ve Raus (1839), Gozenbach (1852, 1858,1860), Krüper (1869, 1875), Danford (1878,1880), Katheriner ve Escherich (1895), Selous (1900), Derjugin (1900), Braun (1908), Ramsay (1914) ve Mc Gregor (1917). Since 1930's, many researchers have carried out considerable studies about Türkiye's various regions. This studies have made by Vehbi Ali (1930,1932), Niethammer (1934); Kummerloewe ve Niethammer (1934,1935), Neu (1936), Bird (1937), Mauve (1938),

Lambert (1946); Wadley (1951), Oglivie (1954), ve Hollom (1955) and published in various Periodics (Kasparyan, 1956).

In recent dates, the studies about Turkish ornithofauna has increased in numbers. This studies has been carried out not only to establish the whole Türkiye ornithofauna, but also establish the ornithofauna of some particular regions in Anatolia. Kasparyan (1956) and Kumerloewe (1961) prepared List of Türkiye Birds. Kiziroğlu (1989), in his book "Birds of Türkiye", presented the list of bird species in Türkiye and also gave information about their biologies, distribution in Türkiye, statues, whether they are in the red list data book or not, with pictures and maps. With this characteristics, the book reflects the ornithological status of Türkiye which has a bird diversity equal to the whole Europe. This book became the main reference for the study. In additon to these, there are many regional studies about Turkish ornithofauna: Eggers and Lemke (1964), Warncke (1970), Kiziroğlu and Kiziroğlu (1987), Kiziroğlu (1992), Beytepe and its surruounding area, Ayvaz, Malatya and Pınarbaşı Lake (1990), and Elazığ/ Hazar Lake (1982) and Kayseri/Sultan Reed bed (1984). Sıkı, Çamaltı Saltpan-Homa Fishpond (1988) and İzmir Region (1983). Dijksen and Koning (1986), determined the bird species of some regions from Türkiye. Lensink (1986), informed the bird species of several marshy regions of Türkiye. Djiksen and Van der Volf (1987), informed their bird countings in the middle of winter at several regions of Türkiye. Adızel (1998), the bird species of Van Lake and its surroundings.

No study has been done before about Porsuk Dam Lake and its surroundings. There are also a few ornithological studies about Eskişehir region. Bezzel (1964), in his surveys on several regions of Türkiye, informed 6 bird species on Eskişehir and surroundings. Warncke (1964), informed 7 bird species from Eskişehir and surroundings. Kumerloewe (1966) in his researches on Türkiye, informed 30 bird species form Eskişehir and surroundings. Erdoğdu (2001) in his study about the ornithofauna of Doğancı Pond which is in borders of Alpu county, determined 86 species and 1 subspecies. Aslan and Kiziroğlu (2003), in their research about the ornithofauna of Sakaryabaşı and Emekin pond/ Çifteler County.

Porsuk Dam is one of the oldest dams in Türkiye., dams provide habitat for birds, especially aquatic ones..There are hundreds of marshy plains in Türkiye (Yarar et al. 1997). Apart from these, there many artificial marshy areas existed because of human activities. Eskişehir Porsuk Dam Lake is one of these areas. Porsuk Dam is formed to prevent floods, to supply drinking water and to water the agricultural fields. Besides these main proposes, this dam lake has also become an important feeding, settling and reproduction area for many birds, especially aquatic ones. With no doubt, we know that artificial environments have often harmful effects because they change the natural environment which has been evolved for long jeological periods. This study aims to determine the possible benefits and harms of the dam to the ornithofauna of the region by recording the bird species observed in the region with their statues and also, aims to make a contribution to "Atlas of Türkiye Birds" project.

Characteristics of The Study Area

Porsuk Dam Lake ise in Eskişehir borders with coordinates of 31^0 53' 47'' East Latitudes-39^0 40' 11 North Longtitudes (Figure 1 and Figure 2). The altitude of the region is 850 metres. Porsuk river's origins are the rivers which are borned at the North east of Murat Mountain. This rivers unite at the north of Altıntaş and form Porsuk River. When passing

through the north east of Kütahya plain Porsuk River unites with Felent River. In the past because of the irregular urbanization, when Porsuk river flooded, Eskişehir, and Alpu Plains were gone under water up to the Sazılar Station. When flooded the Porsuk River not only gave damage to the crop fields, but also the flood formed marshy areas and this became dangerous for the public health. To prevent these problems and to water Eskişehir and Alpu plains, the goverment decided to build Porsuk Dam near İncesu Village (Anonim, 1949). The dam construction was completed on 07/01/1949 began its mission of flood control by gathering the winter water (Anonim, 1956). To strengthen flood control density and to provide drinking water for Eskişehir, the dam's height was rised on 1972.

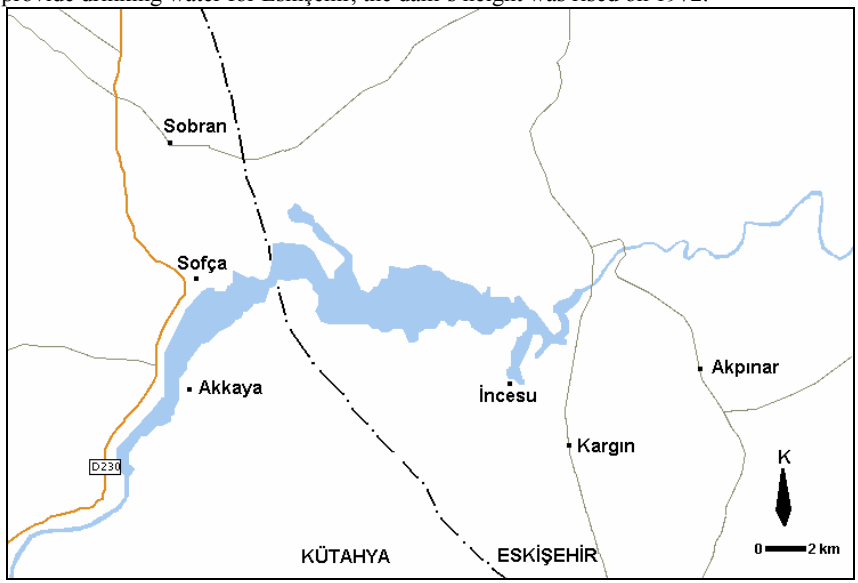

Figure 1: Map of study area.

The lake covers an enomous area today. The whole Sofça village and its filed, some of the fields of İncesu and Sobran villages and Big and Little Kalburcu farms are now under water. Around the dam lake Akpınar, Sofça, Sobran and İncesu villages are present. The dam workers live in the buldings around the dam wall. At this parts of the lake the bird are not present except a few species that are familiar with humans. People live in the villages around the lake are occupied with fishing and farming. The villagers do fishing on the lake even in the periods when fishing is forbidden. There is a great hunting pressure on the fish population and this also effects the birds directly. In addition to this, the birds become frightened because of human crowd and and noises form the engines of boats. Farming fields are very close to the lake. This fields affects the birds harmfully. In addition to this, the diverse use of pesticides and artifical fertilizers become a direct threat for lake water. Near the dam lake, from Sofça village to Sabuncupınar village where dam lake ends, Eskişehir-Kütahya highway passes through. This road is very busy and makes considerable air and noise pollution for birds. On Porsuk Dam Lake near the Sofça village, a wharf for water sports (surfing, sailing etc.) has been built by Kütahya governorship. This building is

not active now and is used as shelter by Larus ridibundus (Black-headed gull). The birds are hunted densely by both villagers and people from outside the lake area. Especially there is a great hunting pressure on the population of Anas platyrhynchos and Fulica atra. The most important pollution sources for the dam lake are; waste waters of houses and slughterhouses in Kütahya city; Nitrogen and sugar factories in Kütahya and the industrial wastes of Seyitömer power plant.

Figure 2. The satellite image of Porsuk Dam Lake.

Material and Methods

In the study, 10x50 Sotem and 7x50 Soligor binoculars are used for observing the birds. The birds which were seen out of the camera's vision range, are investigated with binoculars and their pictures were drawed to the bird watching record notebook. Various references are used in identifying the bird species. While determinating bird species at field, the diagnostic features that Kiziroğlu (1989), Perrins (1987) and Henzel et al. (1995) mentioned are used. The species identifications are controlled by Prof. Dr. İlhami Kiziroğlu.

At research field, the birds are observed by transect method. To reach to the research field, Eskişehir-Kütahya highway and Eskişehir-Kızılinler-Akkaya-İncesu route is followed. The research field extents the region from dam gates at the east of the lake, to the east of the dam and from Frig valley entrance which is the end of the dam lake, to Sabuncupınar bridge. There are 14 overall observation stations determinated, two on the dam wall, one on Sobran village, four on Sofça village and its surroundings, five on Akpınar village where the dam lake unites with Porsuk river and three observation stations on İncesu village. Observations are carried out by waiting at each station for 30 minutes or 1hour and also extra observations are done while moving from a station to another. 26 expeditions are done from March 2002

to 2003 January. The observations are done at the time between 0700: and 20:00 in a day. The time of waiting at the stations varies according to the diversity and abundance of the birds around each station. The species and their statues determined at the research field were classified systematically according to Kiziroğlu (1993). Each bird's English name was given after its scientific name and family names (Figure 3).

Results

81 species are observed in this study. These species are: 1 species that belongs to 1 family of Podicipediformes Ordo; 2 species from 2 families of Pelecaniformes Ordo. 9 species from 3 families of Ciconiformes Ordo; 3 species from 1 family of Anseriformes Ordo; 7 species from 1 family of Accipitriformes Ordo. 1 species from 1 family of Falconiformes Ordo; 1 species from 1 family of Gruiformes Ordo; 3 species form 3 families of Charadriiformes Ordo; 3 species form 1 family of Columbiformes Ordo; 1 species from 1 family of Strigiformes Ordo; 1 species from 1 family of Apodiformes Ordo; 4 species form 4 families of Coraciiformes Ordo; 45 species from 14 families of Passeriformes Ordo (Table 1).

Figure 3. Species list and region statues of species.

No	Family Name	Scientific Name	English Name	Status for Region
1	Podicipedidae	Podiceps cristatus	Great Crested Grebe	SV
2	Pelecanidae	Pelecanus onocrotalus	White Pelican	SV
3	Phalacrocoracidae	Phalacrocorax carbo	Great Cormorant	R
4	Ardeidae	Ardea cinerea	Grey Heron	R
5		Ardea purpurea	Purple Heron	PM
6		Egretta alba	Great White Egret	WV
7		Egretta garzetta	Little Egret	PM
8		Ardeola ralloides	Squacco Heron	PM
9		Nycticorax nycticorax	Night Heron	PM
10	Threskiornithidae	Plegadis falcinellus	Glossy Ibis	PM
11	Ciconiidae	Ciconia ciconia	White Stork	SV
12		Ciconia nigra	Black Stork	SV
13	Anatidae	Tadorna ferruginea	Ruddy Shelduck	R
14		Anas platyrhynchos	Mallard	R
15		Anas clypeata	Northern Shoveler	WV
16	Accipitridae	Milvus migrans	Black Kite	SV
17		Circaetus gallicus	Short-toed Eagle	SV

18		Accipiter nisus	Eurasian Sparrowhawk	R
19		Buteo buteo	Common Buzzard	R
20		Buteo rufinus	Long-legged Buzzard	R
21		Neophron percnopterus	Egyptian Vulture	SV
22		Aegypius monachus	Black Vulture	SV
23	Falconidae	Falco tinnunculus	Common Kestrel	R
24	Rallidae	Fulica atra	Common Coot	WV
25	Charadriidae	Charadrius dubius	Little Ringed Plover	SV
26	Laridae	Larus ridibundus	Black-headed Gull	WV
27	Sternidae	Chlidonias leucopterus	White-winged Black Tern	PM
28	Columbidae	Columba livia	Rock Dove	R
29		Streptopelia decaocto	Collared Dove	R
30		Streptopelia turtur	Turtle Dove	SV
31	Strigidae	Athene noctua	Little Owl	R
32	Apodidae	Apus apus	Common Swift	PM
33	Alcedinidae	Alcedo atthis	Common Kingfisher	PM
34	Meropidae	Merops apiaster	European Bee-eater	PM
35	Coraciidae	Coracias garrulus	European Roller	PM
36	Upupidae	Upupa epops	Hoopoe	SV
37	Alaudidae	Melanocorypha calandra	Calandra Lark	R
38		Galerida cristata	Crested Lark	R
39		Lullula arborea	Wood Lark	R
40		Alauda arvensis	Sky Lark	R
41	Hirundinidae	Riparia riparia	Sand Martin	PM
42		Hirundo rustica	Barn Swallow	SV
43		Delichon urbica	House Martin	SV
44	Motacillidae	Anthus spinoletta	Water Pipit	WV
45		Motacilla cinerea	Grey Wagtail	PM
46		Motacilla alba	Pied Wagtail	R
47	Turdidae	Erithacus rubecula	European Robin	WV
48		Luscinia megarhynchos	Nightingale	SV

49		Phoenicurus phoenicurus	Common Redstart	PM
50		Saxicola torquata	Common Stonechat	SV
51		Oenanthe oenanthe	Northern Wheatear	SV
52		Oenanthe hispanica	Black-eared Wheatear	SV
53		Oenanthe isabellina	Isabelline Wheatear	SV
54		Monticola solitarius	Blue Rock Thrush	SV
55		Turdus merula	Blackbird	R
56	Sylviidae	Sylvia nisoria	Barred Warbler	PM
57		Sylvia atricapilla	Blackcap	SV
58	Muscicapidae	Muscicapa striata	Spotted Flycatcher	SV
59		Ficedula hypoleuca	Pied Flycatcher	PM
60	Paridae	Parus ater	Coal Tit	R
61		Parus caeruleus	Blue Tit	R
62		Parus major	Great Tit	R
63	Sittidae	Sitta neumayer	Western Rock Nuthatch	R
64	Oriolidae	Oriolus oriolus	Golden Oriole	SV
65	Laniidae	Lanius collurio	Red-backed Shrike	SV
66		Lanius minor	Lesser Grey Shrike	SV
67	Corvidae	Garrulus glandarius	Eurasian Jay	R
68		Pica pica	Magpie	R
69		Corvus monedula	Eurasian Jackdaw	PM
70		Corvus corone	Carrion/Hooded Crow	R
71	Sturnidae	Sturnus vulgaris	Common Starling	R
72	Passeridae	Passer domesticus	House Sparrow	R
73		Passer montanus	Tree Sparrow	R
74		Passer hispaniolensis	Spanish Sparrow	R
75		Petronia petronia	Rock Sparrow	R
76	Fringillidae	Fringilla coelebs	Common Chaffinch	R
77		Carduelis chloris	Greenfinch	R
78		Carduelis carduelis	Goldfinch	R
79		Carduelis spinus	Siskin	WV

80	Emberizidae	Emberiza melanocephala	Black-headed Bunting	SV
81		Miliaria calandra	Corn Bunting	R

Status abbreviations for Table 1: R = Resident and definitely breeding
SV= Summer migrant and breeding visitor WV = Winter visitor PM = Passage migrant

Discussion

The results of this study generally correlate with the recent studies about the ornithofauna of Türkiye. According to Kiziroğlu (1993), 81 species from 34 family of 13 ordos are observed in this study. Among this, 33 resident species, 25 summer visitor species, 16 passage migrant species, 7 winter visitor species are determined (Figure 3). Bezzel (1964) reported 6 bird species from Eskişehir. 3 of these are observed at the study field. Warncke (1964) reported 162 bird species in his study about various regions of Türkiye. 50 of them are observed at the study field. Four of 7 species which researcher reported from Eskişehir and surrounding are also observed in the study field. Erdoğdu (2001) reported 86 species and 1 subspecies in his study about the ornithofauna of Doğancı Lake which is in the borders of Eskişehir-Alpu village. 46 of these species are observed at the study field. Aslan and Kiziroğlu (2003) reported 102 species in their studies in Eminekin pond, Çifteler town, Eskişehir. 57 of this species are also observed int the study field.

Compared with the last two studies above, although the study field is wider, few species are present, the main reason for this is are the sugar and nitrogen factories of Kütahya, the toxic wates of this factories are drained directly to Porsuk river. Also, the water level of Porsuk dam changes frequently and because of this, the plants that make marshy places cannot grow and the birds which perefer marshy habitats do not come to Porsuk Dam Lake. Because of this, birds prefering marshy places such as *Circus cyaneus, Podiceps ruficollis, Circus aerugineus, Rallus aquaticus, Porzana pusilla, Gallinula chloropus, Scolopax rusticola, Cettia cetti, Acrocephalus arundinaceus, Panurus biarmicus, Remiz pendulinus, Ixobrycus minutus, Botarius stellaris, Tringa totanus, Tringa hypoleucus, Numenius arquata, Limosa limosa, Lmynocyptes minimus, Gallinago gallinago* are not observed in the study field, although they are observed in the last two studies above. Also *Motacilla flava feldbefgg species* that is obsrved in tihse studies,are not observed in the study field although they are observed nearby aquatic areas. When we investigate the soecies observed in the study field, we see that some important species for Turkish ornithofauna use the region for various reasons.

Aegypus monachus breeds at very few regions including Türkmenbaba mountain, Eskişehir. This species came to to the study area as a food visitor probably from Turkmenbaba mountain. *Sitta neumayer* is a native species that live and breeds in Türkiye, the nests of this bird in which they breed are observed in the study field. *Ciconia ciconia* has an important breeding population in the region. 50 incubating couples are observed in the study field. Although individuals are observed in spring and summer, incubating cuples of ciconia nigra are not observed in the study field. 60 individuals of *Pelecanus onocratalus* species have used come to the field for feeding. More than 600 individuals of *Larus ridibundus* species are observed in a long period. They generally prefer the aquatic sports wharf which is made by Kütahya governorship. However when the aquatic sports wharf begins to work, this species will be badly affected like many other species. The dam lake is an important

feeding region for this species. Many species belonging to *Phalacrocorax carbo species* use the dam lake for feeding and taking shelter.

Because there are so many foundations in Türkiye that is concerned with environment, it is often confused which of them are responsible for a particular environmental problem. So many dams have been built without considering "Environmental Effect Evaluation Reports" and these dams have effected their environment badly both in long and in short terms. Porsuk dam will still be active for many years and by considering the datas we obtained above our ornithofaunal datas, we can present some advices about making this region an important aquatic region for many birds. The fishing activities of inhabitants of villages around the dam lake must be regulated, village inhabitants makes fishing even on hunting prohibition periods and this effects the birds feeding on fishes badly. Another indirect effect is the fact that the engine noises of fishing boats terrifies many birds. Bird hunting done by villagers must be regulated too. Birds shouldn't be hunted at prohibition periods and the species whose hunting is forbidden, must be protected. Eskişehir and Kütahya highway passes close by the dam lake through the distance from Sofça village to Sabuncupınar turn. This road is busy throughout the year and causes extreme air pollution. Also engine noises of the vehicles terrifies birds. Its very difficult to change the route of the highway but at least, high barriers or panels can be constructed near the lake side of the road. Improvement should be done for Porsuk river beginning from its fountain. Industrial wastes shouldn't be drained to river without treatment.

Some particular areas around the dam lake and river should be afforested. In addition artificial nesting platforms should be built for birds. This will make migratory birds prefer the dam lake for feeding. Also, artificial nests for smaller birds should be placed to various places in the forest that surrounds the dam lake.

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