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Research Article

OBSERVATIONS ON THE WINTERING OF WHITE-STORK *CICONIA CICONIA* (LINNAEUS, 1758) FROM SOUTH-EASTERN PART OF TÜRKİYE

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Abstract: *Between the January 2019 and January 2023 periods, 108 individuals of White-stork Ciconia ciconia (Linnaeus, 1758) have been recorded during winter seasons that covering only December and January months. White-storks determined between Diyarbakır and Batman provinces from 12 different locations and also nearly all of the records obtained within the boundaries of the Bismil Plain IBA's between Diyarbakır and Batman provinces. The wintering of species in this part of Türkiye and Diyarbakır province have been firstly documented. The availability of suitable habitat's together with food possibilities and mild climate conditions may have been supports the population increase in the area during all year round. This study showed that White-storks have found the favourable conditions for wintering in our region and have now started to wintering. Monitoring of the wintering population in the region is recommended for evaluate changes in size of population and range expansion of species in the area by a comprehensive field study in this part of country.*

Keywords: *White-stork, Ciconia ciconia, wintering population, South-east Anatolia, Türkiye.*

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1. Introduction

The White-stork *Ciconia ciconia* (Linnaeus, 1758) is a polytypic (*C. ciconia ciconia and C. ciconia asiaticus*) and large migratory bird species belong to Ciconidae family [1,2]. It has a large distribution range in most of Palearctic region [3], including Türkiye. Europe constitutes more than 75% of the global breeding area while the remaining areas are found in north-west Africa, south-west Asia, mainly [1,4,5]. The White-stork populations showed decrease during the almost the entire 20th century due to conventional reasons such as agricultural intensification and habitat loss, resulting in species categorised in ‘’near threatened’’ globally in 1988 and of Species of European Concern (SPEC) Category 2 in Europe [4,6]. However, thanks to conservation efforts and reintroduction programs that conducted mainly in Europe, their population has increased [7]. Related to population increase and large distribution range, it is stated as "Least concern" (LC) species [8] recently, together with increasing trend in overall population's [3]. Recently, the global population size was reported as 700,000-704,000 individuals while European population is reported as 447,000-495,000 individuals [3,7]. Despite of the lack of current data, the size of breeding population in Turkey was given as 15,000-35,000 pairs [5].

The White-stork populations are stated as widespread summer visitor to much of Europe commonly [5], and migrate to their main wintering area in Africa following two main routes; via Gibraltar or Middle East [9,10]. The breeding population of species’ in Türkiye and individuals passing through Türkiye to Europe use the migration route via the Middle East to Africa. In general, the species is revealed as a common summer migrant in Türkiye except some parts of Black Sea Coastlands where

species is reported as very local [11,12]. The species arrive to their breeding areas in Türkiye about the end of February / early March, and after the breeding activities between April - June, they start to autumn migration in end of July or early August. Türkiye is not only an important breeding area but also serves an important feeding and stopover site for transiting individuals during migration seasons. Also, there are some irregular wintering records from west, south, central and south eastern part of Türkiye in the past [12].

South-eastern part of Türkiye has a rich biodiversity including birds [13,14], owing to its evolutionary history, strategic geographic location and occurrence of the special habitats together with different climatically conditions. Accordingly, as a result of recent studies, 17 Important Bird Areas (IBA's) and 19 Key Biodiversity Areas (KBA's) have been identified in the region. Among these, the Bismil Plain is one of the important area sheltering many species including birds thanks to some small natural wetlands in plain and riverine habitats mainly concentrated around Tigris River [14]. The big portion of plain thanks to special habitats and biological components including some threatened bird species together with one of the largest known White-stork population, declared as both IBA's [15] and a KBA's [16].

Although irregular wintering records of White-storks have been reported in different locations from Turkey, no regular wintering record has been found for the South-eastern Anatolia Region and Diyarbakır surroundings. In this sense, wintering of White-storks has been reported for the first time in the region. Based on observations, the new wintering site for White-stork have been determined in Diyarbakır province together with some parts of Batman province from South eastern Anatolia region. It was aimed to reporting new wintering site together with contributing knowledge to the ecology of species.

2. Material and Method

The material of this study constituted from White-storks that were wintering in the South-east Anatolia Region, mainly around Diyarbakır province (Figure 1). The data obtained during regular and irregular field excursions performed in the region between 2019 and 2023 years were evaluated. Among the observations, records obtained during December and January months were taken into account as wintering individuals (Figure 2). Field excursions have been carried out by conventional ornithological equipment which is composed from field glasses (8×40), telescope (20-60×80), a camera (with a 400 mm lens), GPS (Magellan eXplorist 100) and ornithological handbook [17].

The Bismil Plain is situated between Diyarbakır and Batman provinces. The plain is mainly shaped around the Tigris River and its large and small branches that carry the waters together with a few natural ponds. In the plain, where the altitude range varies between 500-550 m, there are special habitats such as river beds, natural ponds, swamps, meadows, etc. and the area hosts a significant biodiversity in the region in connection with special habitats [13,14]. The plain is one of the 17 IBA's that was defined by Doğa Derneği and Birdlife International in Türkiye [16,18].

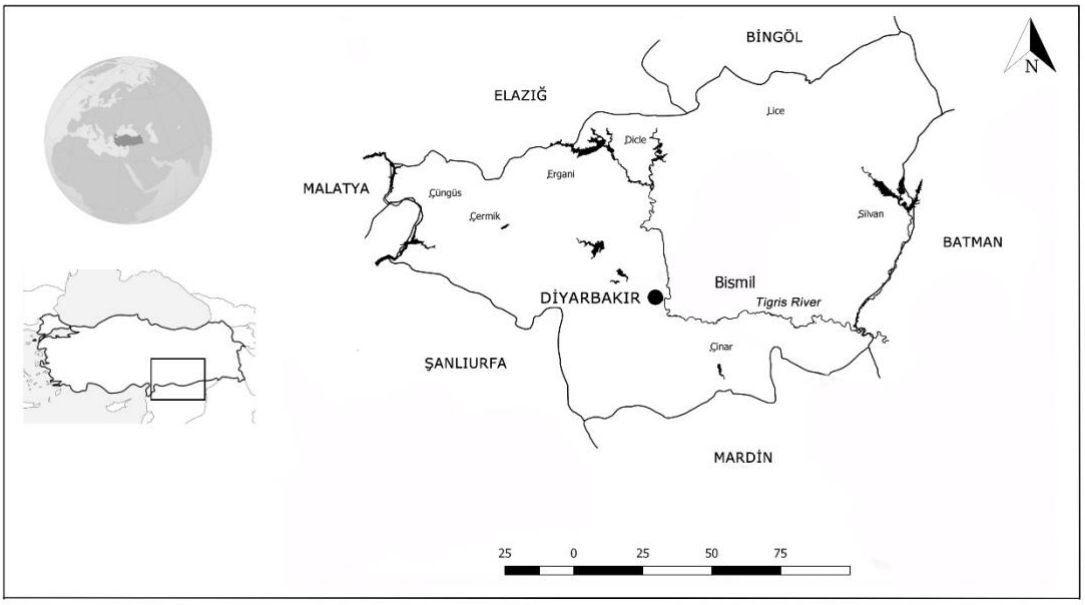

Figure 1. Map of the study area and location of the new wintering site

Figure 2. A group of White–storks together with Grey heron (*Ardea cinerea*) and Great heron (*Egretta alba*) between Diyarbakır-Batman provinces at 4 December 2021.

3. Results

Between the January 2019 and January 2023 periods, totally, 108 individuals of White-storks have been recorded during winter seasons that mean only December (64 individuals) and January (44 individuals) months. White-storks determined between Diyarbakır and Batman provinces from 8 locations (Table 1), mainly. All of the records obtained from some parts of Bismil Plain IBA's between

Diyarbakır and Batman provinces. The regular wintering of species in this part of Türkiye and Diyarbakır province have been firstly documented.

Table 1. The wintering records of White-stork in Diyarbakır and Batman provinces during 2019-2023 years

Location	Dates	Individual Numbers	GPS	Latitude
Batman bridge/Batman	06.01.2019	4	37 S 682754 / 4198312 N	539 m
Fidanlık/Diyarbakır	26.12.2020	11	37 S 614780 / 4186624 N	569 m
Batman River/Batman	02.01.2021	12	37 S 680306 / 4195974 N	532 m
Üçtepe/Bismil	04.12.2021	3	37 S 635966 / 4188229 N	555 m
Batman River/Batman	04.12.2021	42	37 S 679012 / 4194870 N	529 m
Bismil	15.01.2022	6	37 S 648301 / 4188964 N	537 m
Salat River/Bismil	11.12.2022	8	37 S 665148 / 4191786 N	531 m
Çöltepe/Bismil	08.01.2023	22	37 S 658165 / 4190953 N	562 m

Although there have been a few records of irregular wintering such as 1-2 pairs in the past, continuous wintering as in large groups has been determined for the first time in the region. Specially, the increase in the wintering records are remarkable for the last 4-5 years. Maximum 42 individual observed during December 2021 and followed by 22 individuals for January 2023 period. It is estimated that there has been an increase in wintering records in recent years and that this increase will probably continue in the future, when all records are analysed (Figure 3).

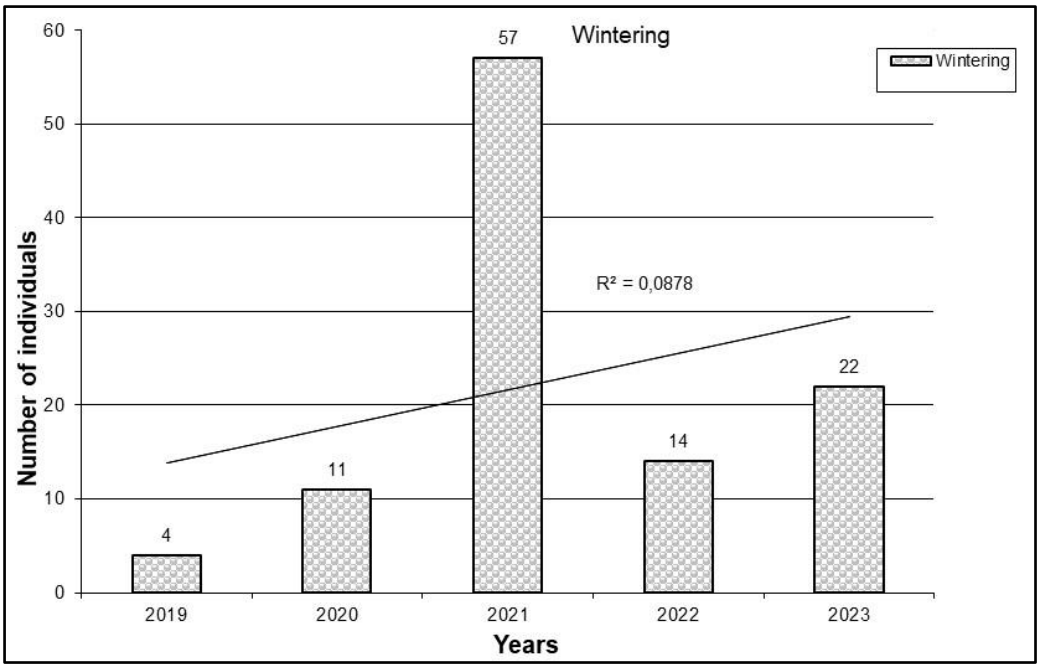

Figure 3. Number of individuals per year between 2019 and 2023 periods

Although ornithological observations were carried out in many different locations in the region for the related period, the species was determined only in this plain means that the area has suitable conditions for the wintering of the species in terms of both climate and feeding opportunities.

Bismil Plain was declared as IBA in 2004 [15] because it regularly supports significant breeding populations of the Great Bustard *Otis tarda* and the White-stork *Ciconia ciconia*, by meeting IBA A1 and B2 criteria, respectively for the mentioned species [18]. Also the area serves as a stop-over site for a large number of migratory waterfowls and raptor bird species [14]. Seasonally-looded meadows and small ponds are very important habitats for many waterfowls including White-storks. Available food resources and suitable climatic conditions are among the main factors affecting the presence of any bird species in an area. Tigris River and together with other components including food resources presumably affected on the wintering of mentioned species in the area. Despite of it's difficulties and risks, bird migration is an activity that is carried out due to it allows them to avoid harsh winter conditions and access abundant food resources. It has been evaluated that the start of wintering of White-storks may be related to many reasons such as food availability, climate change, global warming, etc.

As a result, White-storks have been started to wintering in the Bismil Plain IBA's where is located between Diyarbakır and Batman provinces. Presumably the size of population will increase in the future. The existence of suitable habitats together with food possibilities such as insects, frogs, snakes, small mammals, etc. [1] supports population increase in the area during all year round. These regular wintering records are first for Diyarbakır province and our information on the wintering of species for South-eastern Anatolia is unclear due to there is no any field work covering all of the region for the wintering periods. Monitoring of the wintering population in the region is recommended which may allow us to evaluate changes in size of population and range expansion of species in the region together with a comprehensive field study for determination of wintering population size in this part of Türkiye.

4. Discussion

The White-stork is revealed as a common summer migrant in Türkiye [11,12] with the exception some wintering records during last years [11,12,19,20]. It was considered that the number of wintering individuals, which was limited to a few individuals in the past [14], has increased in recent years. The exact reason of the increase in wintering population size of the species in Türkiye is not known fully. However, there are some studies on how temperature changes due to climate change affect biodiversity, including birds, and in this context, cause changes on distribution ranges, phenologies and structure of communities of many species in some countries [21,22]. And also, there are many studies showing that the transformation of many natural ecosystems by humans has led to habitat loss and degradation, that this situation has worsened with global climate change and that many species are affected by this, recently [23].

In recent years, a small portion of breeding populations of White-storks from western Europe started to wintering in the continent, also elsewhere in locations close to their breeding areas [24]. It was experienced that environmental factors affect the distribution and population dynamics of many waterbirds including White-storks together with available food resources and climatic conditions, in different parts of the world [25].

Despite off without more details, the occurrence of White-storks has been reported from 62 different locations in Türkiye during the winter seasons, by a recent study [19]. Also, by predicting the future situation of the species depending on climate and environmental variables, it has been stated that more suitable habitats will be found for this species in Turkey in the future [19]. Also, during last decades regular wintering areas reported from different part of country such as East Anatolia (Iğdır Plain) [20].

Although the species is still revealed as a widespread summer visitor to much of Europe [5], in generally, including Türkiye, it could be stated that there may be an increase in wintering areas by increase in resident populations. It is predicted that wintering records probably will increase in near future, especially in regions where the climate will be suitable together with available food opportunities during the winter seasons.

The Bismil Plain is one of the important areas for many bird species both as flyway and breeding area in this part of country [14]. Having a wide food diversity, the White-stork eats a wide variety of animal prey, including mainly large insects, fish, amphibians, reptiles and small mammals [1]. Species mainly prefers suitable areas where near the settlements, open farmlands, riverine habitats, marshes and wetlands. Presumably, the availability of suitable habitat's together with food possibilities may have been supports the population increase in the area during all year round. However, many factors such as the constant change of natural processes, global warming, etc. can cause the distribution ranges of species to change over time. Therefore, the continuation of the field works in the region has a great importance. Despite of limited data, it has been reported that the survival rate of White-storks wintering in Europe is higher than in individuals that migrating to Africa for wintering [26]. Therefore, this staying phenomena may cause shorter distance migrations in the future in many Palearctic countries including Türkiye.

Consequently, there are still significant gaps in our knowledge to understanding of how climate change will effects many species including birds. It could be suggested that further research needed for to clarify the impacts of climate change on white-stork distribution behaviour and ranges, particularly on wintering ranges of species. The other hand, this study showed that White-storks have found the favourable conditions for wintering in this part of Türkiye and have now started to wintering. Monitoring of the wintering population in the region will help to understand changes in size of wintering population in this part of country.

Ethical Statement

Due to species only observed ethics committee permission is not required.

Compliance with the Research and Publication Ethics

This study was carried out in accordance with the research rules and publication ethics.

Conflict of Interest

The author declares no conflict of interest.

Author Contribution

R.K. conducted the fieldworks and collected all data and written the manuscript.

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