

SEASONAL CHANGES IN THE NESTING SITES AND HUMAN PRESENCE AS FACTORS AFFECTING THE NUMBERS OF BLACKBIRDS (*TURDUS MERULA* L., 1758) IN THE WEST PARK OF SOFIA

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Abstract

The purpose of this study was to determine some of the environmental factors affecting the population of Blackbirds (*Turdus merula*) in the area of the West Park in Sofia. The study was conducted in 2008 and 2009. The number of blackbirds during the breeding (12.5 pair per 100 ha) and non-breeding (5.3 ind. per 100 ha) season was determined. It was found that the density of Blackbird in the area surveyed is defined by the availability of suitable nesting sites, the quantity of food and the soil moisture. The human presence also impacts the number of reported blackbirds.

Key words: black thrush, blackbirds, density, park area.

Introduction

Blackbirds (*Turdus merula* L.) inhabit many and varied habitats that range from remote mountain areas to the bustling urban centers. Often these habitats are relatively open deciduous, coniferous and mixed forests.

The high number of the species in sub-urban parks and gardens shows that the blackbirds are adapted to woodlands with plenty of fruits and diverse terrestrial food (Collar 2005).

The settlement of blackbirds in Sofia first happened during the after nesting wandering, then as wintering birds, and finally as nesting birds. The blackbirds used to remain in the city until the onset of winter since the beginning of the 20th

century (Andersen 1903, 1905). In 1930s the blackbirds already regularly spent the winter and nest in Sofia (Nankinov 1982).

The breeding season of blackbirds in Sofia is very long and covers the period from early February until the last days of August. The bulk of the population nests in the second half of March until late July (Nankinov 1982). The reproduction of the birds in Europe lasts from mid-March until early September. Birds make up to three broods per year (Collar 2005). The nesting success is generally lower in urban habitats and higher in high-end urban habitats where the presence of humans and domestic cats is low. The restoration of blackbirds in urban parks of Spain is related to the size of the park territory, predation, the height of the bushes, and

the level of human disturbance (Fernandez and Telleria 2000). The destruction of nests during the incubation period is greater when the number of corvid birds is higher. However, many studies show that the degree of concealment of nests correlates with the amount of young birds (Collar 2005). A study in Central Poland indicates that human presence is a factor obstructing blackbirds (*T. merula*) and song thrush (*T. philomelos*) from settling in urban park areas (Nowakowski 1994).

The purpose of this study was to establish the factors affecting the number of blackbirds that nest in a part of the West Park of Sofia.

Materials and Methods

The park study area covers a part of the West Park of Sofia, with an area of 60 ha. In this area the presence of people is higher in certain days of the week. The observations were carried out between 6:00 a.m. to 11:00 a.m. and 4:00 p.m. – 7:00 p.m. real time. Field observations have taken a total of 185.25 hours in 283 days in the period 2008–2009. Out of these field observations, 160 records were done in the morning and 123 records were made in the afternoon. During the breeding season 110 records (March–July) were done and outside the breeding season 173 (August–February) records were done. In these records account was given on the number of observed birds and the number male birds (these were recognized by the sounds they make) during the breeding season. In March, the first birds singing (the earliest song – on 3rd of March, 2009) were reported. In the first half of July the last young birds were

observed to leave the nest. The stocking rate was determined by transects and by the song of males during the breeding season. During the nonbreeding season, the number of blackbirds was determined by line transects (Bibby et al. 1992).

The transect was chosen to cover the whole range of the terrain (Fig. 1). The presence of people was determined by setting up three ranks according to the number of people that were present in the transect during the study. The first rank – low presence of people – when the number of recorded people was less than 10; second rank – average attendance – when the number of people recorded in the transects was between 10 and 30; third rank – strong presence of people – when over 30 people were present in the transects. Statistical data processing was done using single factor analysis of variance (Anova: Single Factor), Student's *t*-test, Excel 2003 and Mann-Whitney (U) test. The figures were done using Past (Hammer et al. 2001).

Results

Preference for nesting sites

The study area is divided into 6 different types of areas according to the nature of the vegetation cover (Fig. 1). The preferences of blackbirds to different areas during the breeding season were determined by the number of nests and their preferences for nesting sites in different parts of the study area. The largest number of nests was observed in area 3 (12 out of 24).

The birds prefer sites with dense shrub vegetation. Wells are located pri-

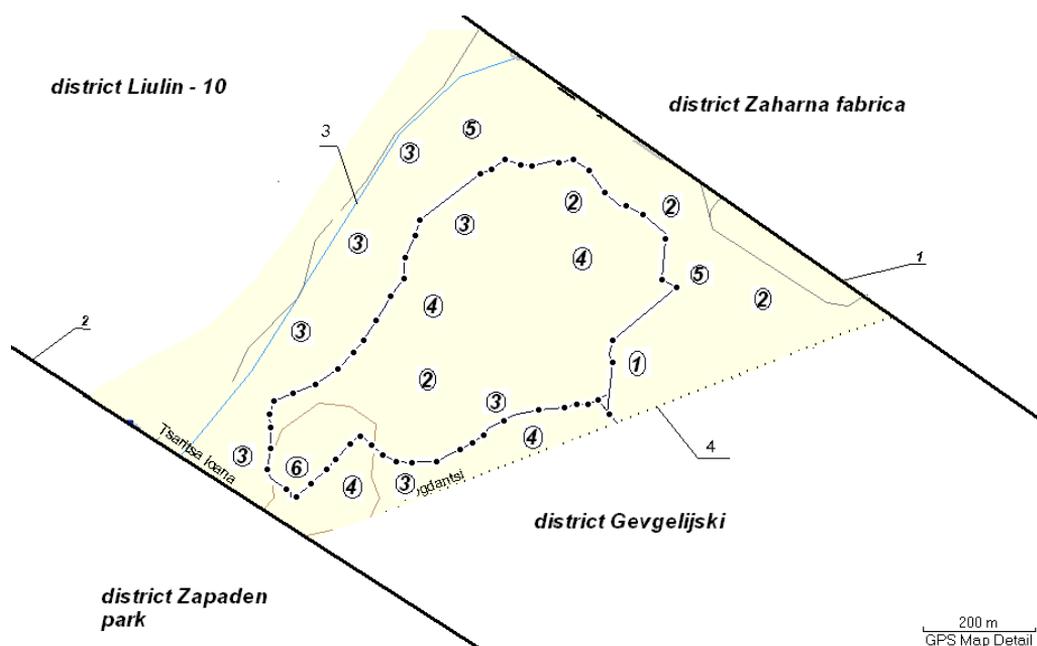


Fig. 1. Object of study – the West Park, Sofia.

Legend: 1. Slivnitsa Blvd. 2. Todor Aleksandrov Blvd. 3. Suhodolska River. 4. Railroad.

① – Children playgrounds; ② – Meadows; ③ – Deciduous forests with shrub understorey; ④ – Deciduous forest without shrub floor; ⑤ – Coniferous forests with shrub floor; ⑥ – Coniferous forest without shrub floor.

marily in low bushes or trees wrapped in clematis (Old man's beard, *Clematis vitalba* L.). Out of the 24 nests observed 12 were built on bushes, 7 were on deciduous trees and 5 on conifers trees. Blackbirds' nests were built on Black Elderberry (*Sambucus nigra* L.), plum (*Prunus* spp.) coated with clematis, Norway spruce (*Picea abies* (L.) Karst.), Yew (*Taxus baccata* L.), Oak (*Quercus* spp.), Willow (*Salix* spp.) and Ash (*Fraxinus* spp.) trees. Six wells were located near central park paths. According to the collected data it can be seen that for nesting Blackbirds prefer places overgrown with bushes. The birds also prefer quiet places rather than crowded alleys. Simi-

lar results were obtained by other studies (Fernandez and Telleria 1999).

Sixteen out of all observed nests were located near the Suhodolska River, which runs through the park. For comparison, near the railroad (which also passes through the park) only 3 nests were observed. One of these nests was situated very close to the rails. In this part of the park there is territory suitable nesting sites, but it is not especially preferred by the birds.

Human presence

The number of reported male birds during the breeding season and the presence of people was compared using a single-

factor ANOVA. It was found that the human presence affects the number of reported male birds ($F=8.1588$; $F_{crit}=3.093$; $P=0.00054$).

When the human presence was low, the number of male birds accounted for an average of 14 ± 3.92 (8–25) ind. compared to an average human presence when birds are 17 ± 3.9 (10–26) ind. When the human presence was high, the number of male birds was 13 ± 3.8 (6–20) ind. (Fig. 2).

With these results in mind, it is difficult to determine whether people can have a negative impact on the population of breeding blackbirds in the study area.

When the number of people is high, blackbirds go into the woods or climb high in the canopy. Such cases are observed

on 3rd, 10th, 18th, 19th, 25th and 27th of May 2008 and on 1st of June 2008 and also on 6th, 8th, 10th, 19th and 27th of May 2009. When the different cases of human presence and the number of male birds was compared, using a Mann-Whitney test, it was discovered that there are significant differences between the number of males reported when human presence was low to medium ($U=433$, $p=0.009$) and when human presence was medium to high ($U=200$, $p=0.0004$). However, there is no difference between the number of reported males when human presence is low and high ($U=441$, $p=0.187$).

Therefore it can be concluded that human presence does somewhat influence the number of birds reported, but human presence by itself cannot adversely affect the blackbird population in the study area. The reason behind this is that often high human presence is not permanent. Early in the morning and during working weekdays human presence is low or medium. During periods with high human presence birds can find peace in places with bushes, away from the crowded alleys. An instance when many of the blackbirds took these territories was observed on 14th of May 2008, when park workers mowed the grass in the meadows.

Human presence affects the total reported number of singing males ($F=5.867$; $F_{crit}=3.092$; $P=0.0039$). There is a statistically significant dif-

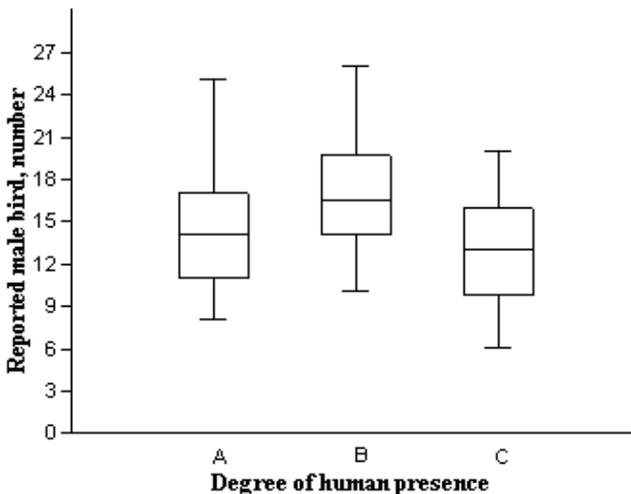


Fig. 2. Reported male birds in low (A), medium (B) and high (C) human presence.

Horizontal lines are means; bars represent standard deviations, and vertical lines indicate ranges.

ference in the number of singing males recorded when human presence is low to medium ($U=416.5$; $p=0.006$) and when human presence is low and high ($U=308.5$; $p=0.007$), but there is no significant difference between the recorded singing males when the presence of people is medium to high ($U=380$; $p=0.749$).

When the number of singing males recorded in the morning observations in low, medium and strong human presence was compared, there was no reliable difference found between them ($U=244$; $p=0.471$ low and medium), ($U=13.5$; $p=0.760$ medium and high) and ($U=34$; $p=0.983$ low and high). These findings indicate that human presence does not affect the number of singing males observed in the morning.

When comparing the data from the afternoon observations, significant differences were found in the number of male singing birds when human presence was low to medium ($U=64.5$; $p=0.0159$) and when human presence was medium to high ($U=255.5$; $p=0.0192$). There were no significant differences between the number of singing males recorded when human presence was low to high ($U=48.5$; $p=0.247$), (Fig. 3).

It was found that the number of birds when human presence was lower than the number of birds when human presence was high (4.7

ind. low and 7.4 high), (Fig. 3). This is so because during observations of the terrain, often as a result of bad weather, blackbirds sing with lower intensity, while at the same time the presence of people is low (such cases were observed on 14th and 16th of March 2009 and on 15th and 16th of April and on 05th of May 2008). Under favorable atmospheric weather conditions, birds display higher activity, but the presence of people is also higher.

The next period that needs to be considered is related to the hatching of the young birds. In both consecutive years in early May, immediately after the hatching of the young birds, for several days the number of singing birds was reduced and so was the intensity of the song. Then a sharp rise was observed on 6th of May 2008 and on 13th of May 2009. During the

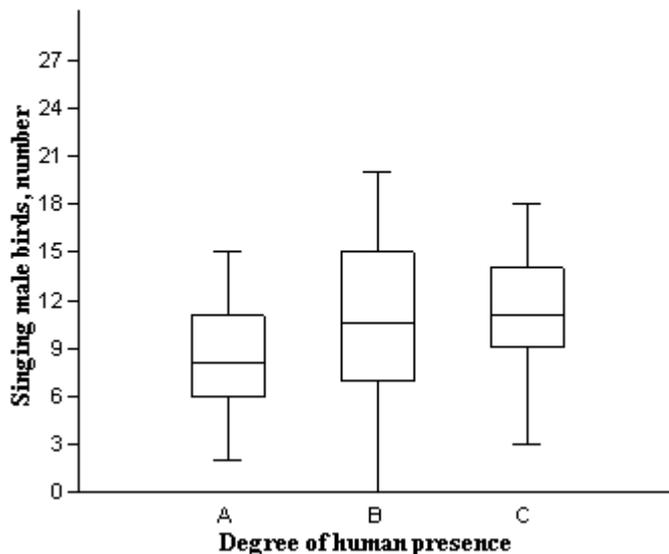


Fig. 3. Singing male birds in low (A), medium (B) and high (C) human presence. For explanation, see Fig. 2.

morning observations between 6:00 a.m. and 9:30 a.m., many of the blackbirds have been observed to feed and were therefore silent. These findings prove further that beyond human presence there are other factors that can influence the male song during the observation.

This is the reason why the comparison between the number of singing males in both breeding seasons when the human presence was low, medium and high, was done only in the cases when the weather was sunny and warm.

It turned out that in these cases human presence does not affect the number of reported singing birds (ANOVA single factor $F=0.200$, $F_{crit}=3.245$, $p=0.819$). While it can be argued that human presence affects the number of blackbirds during the breeding period, it cannot be determined whether this is a negative influence and whether human presence can be a factor itself. This is why this study sought another connection between human presence and the number of observed blackbirds.

When the afternoon observations were compared, medium human presence did not seem to affect the number of observed birds ($U=84.5$; $p=0.549$). However, high human presence did affect the number of blackbirds observed ($U=251$; $p=0.0119$). When human presence was high, the number of observed blackbirds in the study area decreased. These birds did not leave but retired in less inhabited areas, overgrown with thick bushes, where the birds find refuge and peace.

When comparison was made in the morning observations, the number of observed blackbirds was found to be independent of the human presence in the area ($U=307.5$; $p=0.890$). In the morning people just pass through the park and do not remain for longer in the study area. After

lunch, however, there are many people who use the park area for recreation and walking and their stay is longer. Therefore when determining the human presence as a factor influencing blackbird population in certain areas, it should be taken into account not only the number of people but also duration of their stay in the area.

During the two years of observation, based on the study area the relative number of breeding territories and the number of incubating that nesting pairs made was defined. In 2008 16 breeding sites were discovered, 12 of them with successful nesting. In 2009 19 nesting territories were initially employed and there was successful nesting in 12 of them. Out of the 12 nesting pairs, six had 2 incubating, 1 had 1 incubating and five had 3 incubating.

On 12th of April 2008 a female was seen to carry nesting material. On 26th of April 2008 some of the females had already hatched in nests. In both consecutive years the first hatched young birds hatched in the first ten days of May. There were 53 morning observations during the breeding season. There were two observations with high human presence, 16 observations with medium human presence and 35 observations with low human presence. During the two years the number of afternoon observations during the breeding period was 70. Out of the 70 observations, 35 showed high human presence, 21 showed medium and 13 showed low human presence. More people visited the study area after lunch rather than in the morning. High human presence is not permanent and continuous. Increased number of people was seen most often after 4 p.m. (excluding the holidays).

Considering the presented data, it can be seen that in the two consecutive years the number of breeding pairs was relatively constant. High human presence

though is not constant in the study area. In the study area itself there are many areas where people have limited access due to the rich shrub vegetation. It is in these places where the birds can move in when there is strong disturbance.

Discussion

Preference for nesting sites

The analysis of the habitat shows that blackbirds prefer places overgrown with thick bushes, where they found refuge and peace. When looking for food, the birds can be seen in the open park spaces. These results are consistent with other studies in Europe (Fernandez and Telleria 1999, 2000; Cresswell 2001).

Human presence

The impact of human presence on the numbers of blackbirds in the park territory was confirmed by other studies (Nowakowski 1994; Fernandez and Telleria 1999, 2000). In urban areas of Lodz, central Poland, the human presence has led to changes in the horizontal and vertical distribution of the blackbirds' nests. Bird populations present in the parks have built their nests behind the bushes and at distance from the alleys. **There are statistically significant differences between the nesting sites of urban and forest blackbird populations (Nowakowski 1994).**

Studies performed in Madrid related to blackbirds' nutrition and human presence showed that pedestrians in the park areas may adversely affect the feeding birds. Most often when pedestrians walk by, the blackbirds fly into the nearby bushes. Au-

thors also mention that other factors such as number of magpie, domestic cats and dogs, vehicle movement, have a negative impact on the birds' feeding. Authors have also established that the number of active blackbirds decreases with the increase of human presence. It was found that the density of the blackbirds is negatively correlated to human presence (Fernandez and Telleria 2000). Another similar study by the same authors revealed that human presence alone cannot affect the recovery of blackbirds in the park areas. Nesting success may reach high levels in the park areas as it depends on many specific factors, such as human disturbance or habitat complexity (Osborne and Osborne 1980).

Blackbirds in large-area parks benefit from the large number of suitable habitats and they are able to avoid the effects of adverse factors, unlike those in small-area parks, where the effects of these factors have more impact and are felt more strongly by the birds (Fernandez and Telleria 2000).

The survey results show that the presence of nesting sites, the amount of available food and human presence affect the presence of blackbirds in the park areas. Due to classifying of human presence in only three categories no clear trend of decreasing or increasing of the presence of birds was noticed in the study area. However, it cannot be said that human presence has an adverse effect on the number of birds in the study area, as they retire to places with bushes or high in the canopy when there is increased human presence. High human presence is not constant throughout the day, but only in certain days and at certain times. If human presence will increase in the future, perhaps this would reduce the number of breeding blackbirds in the study area, but at the time of the study such trend was not observed.

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