

Migration and wintering of the Mistle Thrush (*Turdus viscivorus*) in SE Hungary

László Bozó



Received: May 23, 2024 – Revised: July 30, 2024 – Accepted: August 02, 2024

Bozó, L. 2024. Migration and wintering of the Mistle Thrush (*Turdus viscivorus*) in SE Hungary. – Ornis Hungarica 32(2): 250–263. DOI: 10.2478/orhu-2024-0033

Abstract The migration and wintering of the Mistle Thrush (*Turdus viscivorus*) is the least known of the other common nesting thrushes in Europe. It is also an understudied species in Hungary, detailed studies having been carried out nearly 50 years ago. The aim of the present study was to summarise the data on migration and wintering of this species that have been collected over the last 20 years in Kevermes, southeastern Hungary. There is no breeding population of the species either here or in the surrounding area. The species was observed on 371 of the 2,807 days of field observations. The first individuals typically arrived in the second week of October, but there are also data from late September and early October. Its migration is characterized by several peaks. In spring, it was still migrating intensively in the first half of April, with the last individuals leaving the area by the end of the month. In recent years, they have appeared earlier in the autumn and left later in the spring, which may coincide with the increasing breeding population of the species in Hungary. The number of individuals observed was higher in spring than in autumn and winter, similar to the situation in other parts of the country. The number of birds was high every second or third year. The number of observations in the same seasons of different years showed different patterns as well as the autumn observations did not allow any conclusions to be drawn about the number of observations later in winter and spring. The most important food was the common hackberry (*Celtis occidentalis*), which was protected against the Fieldfares (*T. pilaris*). Comparing the two species, the migratory patterns were basically similar, but the seasonal abundance of the two species differed in certain years.

Keywords: breeding success, *Celtis occidentalis*, Fieldfare, food supply

Összefoglalás A léprigó (*Turdus viscivorus*) vonulása és telelése a többi, Európában gyakori fészkelő rigófaj közül a legkevésbé ismert. Magyarországon is alulkutatott faj, a részletesebb vizsgálatok közel 50 évvel ezelőtt történtek. Jelen tanulmánynak az volt a célja, hogy összefoglalja a faj vonulásával és telelésével kapcsolatos adatokat, amelyek az elmúlt 20 évben összegyűltek a délkelet-magyarországi Kevermesen. Sem itt, sem a környező térségben nem költ a léprigó. A 2,807 terepi megfigyeléssel töltött napból 371 napon figyeltem meg a fajt. Az első példányok jellemzően október második hetében jelentek meg, de van szeptember végi és október eleji adata is. Vonulását több csúcs jellemzi. Tavasszal még április első felében is intenzíven vonult, az utolsó példányok a hó végéig hagyták el a területet. Az utóbbi években ősszel egyre korábban jelentek meg, míg tavasszal egyre később vonultak el, ami a faj növekvő állományával magyarázható. A megfigyelt példányok száma tavasszal nagyobb volt, mint ősszel és télen, hasonlóan az ország más részein tapasztaltakhoz. A madarak száma minden második vagy harmadik évben kimagasló volt. A különböző évek azonos időszakaiban történt megfigyelések száma eltérő mintázatot mutatott. Az őszi megfigyelések száma alapján nem lehetett következtetni a téli és tavaszi megfigyelések számára. Legfontosabb tápláléka a nyugati ostorfa (*Celtis occidentalis*) termése volt, amit védelmezett a fenyőrigókkal (*T. pilaris*) szemben. Utóbbi fajjal összehasonlítva alapvetően hasonló volt a faj vonulási mintázata, de a két faj mennyisége bizonyos években elért egymástól

Kulcsszavak: fenyőrigó, költési siker, nyugati ostorfa, táplálékkínálat

Eötvös Loránd University, Department of Systematic Zoology and Ecology, 1117 Budapest, Pázmány Péter sétány 1/C; e-mail: bozolaszlo91@gmail.com

Introduction

The Mistle Thrush (*Turdus viscivorus*) is a polytypic species with 3 subspecies in its range. The nominate *T. v. viscivorus* is found from Europe to western Siberia and northern Iran, *T. v. deichleri* in northwest Africa, Corsica and Sardinia, while *T. v. bonapartei* nests from southcentral Asia to Turkmenistan and western Nepal (Collar 2020, Gill *et al.* 2023). It nests most parts of Europe except treeless regions. The largest populations occur in the taiga forests of Scandinavia and in the mountainous regions of western and central Europe. From the 19th century onwards, it colonised lowland areas, expanding into northern Scandinavia, Ukraine, Hungary and Italy. In England, Ireland and the Netherlands, however, there has been a significant population decline in recent decades, for which the exact reasons are not known (Knaus 2020).

Partial migrant, with a decreasing migratory propensity southward (Ashmole 1962, Huttunen 2004). At least 50 km from the ringing site, only 1,087 individuals have been encountered in Europe, which is at least an order of magnitude less than other European nesting species, except the Ring Ouzel (*T. torquatus*). The birds with the highest number of encounters are those marked in the Netherlands, France and Germany, while there are very few records from eastern European countries (Spina *et al.* 2022). The species migrates southwestwards from most regions (Bønløkke *et al.* 2006, Spina & Volponi 2009, Budinski 2013, Spina *et al.* 2022), but there are exceptions, such as birds from Finland and the UK, whose recaptures are widely dispersed but show an average southerly orientation (Ashmole 1962, Huttunen 2004). The birds ringed and later recaptured in Sweden wintered further south than the Dutch and Belgian ones, which probably explains that the species is a leapfrog migrant (Ashmole 1962). Most of the Mistle Thrushes that have been encountered at least 50 km from the ringing site have flown a maximum of a few hundred km, but some have flown 2,000–3,000 km (Spina *et al.* 2022). Analysis of data on recaptured birds during autumn migration in France over the last 70 years showed that Dutch and Belgian Mistle Thrushes were mainly observed in the west of France, while German individuals are widely distributed across the country (Lahournat *et al.* 2021). It spends the winter in southwestern Europe, but a few birds ringed in central Europe have been found in northwestern Africa (Spina *et al.* 2022).

It mainly breeds at the edge of old pine and mixed forests, but also prefers oak forests, planted forests and parks. In winter, it occurs in places where it finds sufficient food. During this period, it feeds mainly on berries, with a particular preference for mistletoe (Snow & Snow 1984). Studies in Italy have found that it avoids food-poor and grassy areas, but habitat use is 60% similar to that observed during the breeding season (Chiatante 2022). In winter, Mistle Thrushes maintain small territories on wintering grounds, which they protect not only from their conspecifics but also from other species (Snow & Snow 1984). This often involves protecting one or a few berry trees that are tall and solitary (Snow & Snow 1984). Cramp (1988) suggests that the species avoids dense forests, but this was not confirmed in Poland (Skórka & Wójcik 2005). In years when food was abundant, birds did not behave territorially, but fed in flocks. The extent of territorial behaviour decreased as winter progressed, probably due to a decrease in the birds' density (Cuadrado 1995, Skórka & Wójcik 2005).

In Hungary, it nests mainly in the Transdanubian region, in the hills and mountains of northern Transdanubia and in the central and southern parts of the Danube-Tisza basin (Gyurácz & Csörgő 2021). While it used to nest in hilly and mountainous oak forests, it now breeds in lowland acacia and pine forests, floodplains, shrub-wooded pastures and parks (Haraszthy 2019). The first lowland nesting was recorded in 1962 near Sárszentmihály (Pátkai 1963), while the first urbanised pairs were observed in the 1970s (Horváth 1976, Bozsko 1985a, Novák 1985). Later, it also bred in Budapest (Rózsa 2003). In the early 2020s, 3–4 pairs bred in the castle park in Fehérvárcsurgó (Kovács 2020).

Due to the absence of recaptures, no information is available on the migration and wintering sites of the Hungarian Mistle Thrushes (Csörgő & Gyurácz 2009). In autumn, the first migrants appear in the second half of September, with most observations from November. After that, the overwinterers can be seen. In spring, the last migrants leave Hungary by the end of April at the latest (Csörgő & Gyurácz 2009, Gyurácz & Csörgő 2021). According to Schmidt (2000), the birds wintering in Hungary probably originate from the surrounding high mountains, while the local population winters in the vicinity of the nesting sites. In contrast, Horváth's (1972) studies over several years have shown that the local population have most certainly left the breeding sites. These birds may be on the breeding grounds in spring as early as February. Pairs are formed during the winter, and nesting is sometimes complete by the end of March, but typically only in the first half of April. They usually breed only once a year, but sometimes twice (Haraszthy 2019). Between 2014 and 2018, the national nesting population was estimated at 12,000–14,000 pairs, with an increasing trend. In contrast, the wintering population has decreased moderately (Gyurácz & Csörgő 2021).

The migration of the species in Europe has only been studied in detail in very few works (Ashmole 1962, Huttunen 2004, Lahournat *et al.* 2021), and the national migration atlases provide only limited information too (Bønløkke *et al.* 2006, Spina & Volponi 2009). This is due to the fact that, compared to other European nesting thrush species, the number of individuals ringed is orders of magnitude lower (typically less than 100 individuals per year per country), and the number of recaptures is much lower than for other species. There is also a lack of knowledge on the timing of migration. In Italy, for example, there is a distinct autumn peak because this is when hunting of the species was most intense (Spina & Volponi 2009).

In Hungary, sporadic data on the breeding (Thibaut de Maisières 1940, Farkas 1951, 1955, Szijj 1955, Pátkai 1963, Horváth 1972, Varga 1976, 1979, 1982a, 2003, Anonym 1978a, 1978b, 1979, 1980, Barbácsy 1978, 1981a, 1981b, 2006, Homoki-Nagy 1980, Kasza 1983, Schmidt 1983, Szenek 1984, Bozsko 1985a, Molnár 1985, Novák 1985, Balsay 1986, Mogyorósi 1988, 2021, Moskát 1988, Varga 1989, Németh 2000, Rózsa 2003, Aczél 2011, 2012, Gyurácz 2012, Illés & Kóta 2012, Faragó & Szentirmai 2014), autumn and spring migration (Barta 1978, Szvezsényi 1978, Dénes 1981, 1982, Schmidt 1992, Gyurácz *et al.* 2007), and winter occurrences (Varga 1928, Simig 1978, Bali 1980, Ács 1981, Király & Varga 1981, Schmidt 1981, Szalai 1981, Varga & Király 1981, Nagy 1982, Varga 1982b, Bozsko 1985b, Matyikó 1985, Kalivoda 1986, Zsoldos 1986, Kalotás 1987, Bali 1990, Király 1992, Fintha & Szabó 1993, Kárpáti 2003, Kelemen 2003, Bedőcs

2013) of the species can be found in various journals. However, these usually contain only a few or very few observations, which do not provide a clear picture of the migration and wintering of the species.

The only study dealing with the species in detail was published nearly 50 years ago (Horváth 1972), showing that until then it was considered a resident bird in the Carpathian Basin, migrating from the Carpathian mountains to the plains for the winter (e.g. Chernel 1899). However, Horváth (1972) pointed out the fact that the species migrates and winters in Hungary in much larger numbers than the nesting population. He also mentioned that the *Aquila* journal (Herman 1894), in its 75 volumes, had only two articles with a few lines written on the species. The situation has not changed in the 50 years since then, so I thought it important to present my findings on the migration of the species. In this study, I have discussed the migration of the species in southeastern Hungary. The results are mainly based on field observation data. I was interested in the timing of the migration of the species and the differences in the number of birds that appear in each season.

Material and Methods

The study was carried out in the area of Kevermes and Lőkösháza in the southeastern part of Hungary. I considered the administrative boundaries of the two villages with an 80 km² total area as the territory of my research (Hevesi 2005). The landscape is dominated by agricultural lands with some planted forests, artificial lakes, canals and steppes (for details see Bozó 2018). The core area was the surroundings of Fenyves forest, with an approximate 50 ha total area. This area included the lake gravel pit (open water surface with dense lakeside vegetation), the forest of the former pheasant station (oleaster (*Elaeagnus angustifolia*) plantation), the Fenyves forest (dominated by common hackberry (*Celtis occidentalis*), common oak (*Quercus robur*), acacia (*Robinia pseudoacacia*) and a poplar (*Populus* spp.) plantation).

The study seasons covered the period between 1 January 2005 and 30 April 2024 in every year. The data collection was based on field observations with binocular. Because of the data collection was non-standard between 2005 and 2011, I do not considered the data of these period from the detailed analyses. For the description of migration periods and winter movements, I only considered the data from 2012 to 2024, when the intensity of data collection was similar. During this period, I visited the study site on 2,807 different days and I have seen the species on 371 different days.

I was interested in the earliest autumn and latest spring data, the length of time spent per season, and the observation date of the maximum number of individuals in a given season. For annual earliest and latest observations, I aimed to see if there were changes in the date of arrival and departure. For this goal, I used General Linear Models (dependent variable: season, independent variables: date of first autumn arrivals, date of last spring departures). I plotted the number of observations per 10-day interval and the number of individuals observed (in the latter case, cumulative and 10-day average values). I also plotted the number of observations per autumn, winter and spring seasons annually. In this

context, I used Spearman’s correlation to see if the number of observations in autumn was correlated with the number of observations in winter and spring. I looked at how the number of observations varied in the different seasons between 1 September and 30 April.

Results

Based on the data between 2012 and 2024 the first Mistle Thrushes arrive to the area in mid-October, rarely in late September and early October (earliest observation: 28 September 2023). Then, the number of observations increases and peaks in the first week of November. After that there is a decrease in mid-November followed by another peak between late November and mid-December. From late December to mid-February, the number of observations is constant, with a minimum in late February. The spring observations peak in late March and early April. The species has been rarely seen in the second half of April (latest observation: 28 April 2014) (Figure 1).

The 10-day average number of individuals observed in the months when the species was recorded varied between 1 and 4.3 individuals. Based on cumulative data, most individuals were observed in November and the first half of December, but there was also a small peak in late January and the mid-March (Figure 2).

Between 2005 and 2024, I observed the species on 371 different days. The number of observations varied between seasons. The fewest number of sightings (n = 10) was in 2017/18, while the highest number of sightings was in 2023/24 (n = 53) (Figure 3). Figure

The number of observations in the autumn (September – November), winter (December – February) and spring (March – April) seasons also differed (Figure 4). The number of observations in autumn was not correlated with the number of observations in winter ($R = -0.267$, $P = 0.426$) and spring ($R = 0.194$, $P = 0.566$).

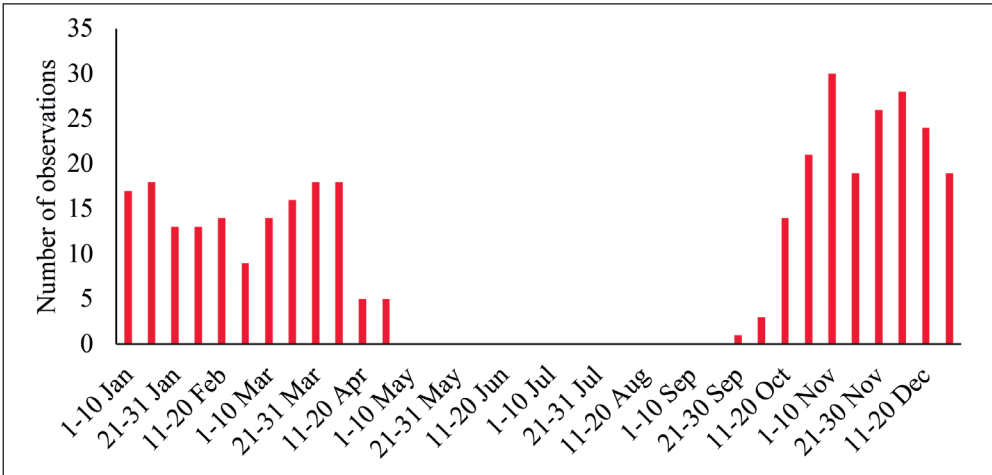


Figure 1. Distribution of the Mistle Thrush observations by 10-day intervals
1. ábra A léprígó megfigyelések 10 naponkénti eloszlása

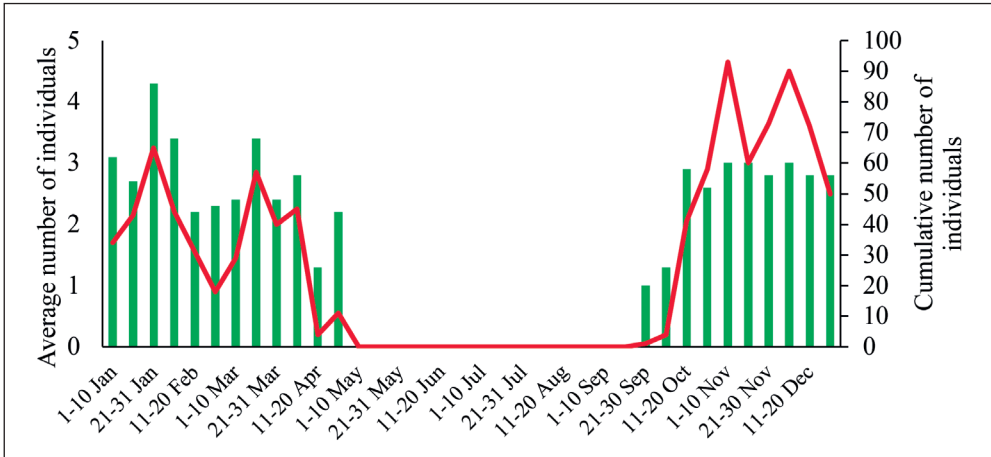


Figure 2. Average (column) and cumulative (line) number of individuals observed per 10 days
2. ábra A 10 naponként megfigyelt példányok átlagos (oszlop) és kumulált (vonal) száma

The dates of the birds' autumn arrival and spring departure also differed between years. The date of autumn arrival shifted earlier between 2011 and 2023 (Coeff. = -0.211 , Std. error = 0.095 , $t = -2.211$, $R^2 = 0.26$, $P = 0.051$), while the date of spring departure shifted later between 2012 and 2024 (Coeff. = 0.13 , Std. error = 0.083 , $t = 1.571$, $R^2 = 0.315$, $P = 0.147$), but the change was not significant in either case (Figure 5, Table 1).

The seasonal maximum varied between 4 and 17 individuals. On average, they spent 182.5 days in the area (minimum: 160 days, maximum: 201 days). The largest observed flock consisted of 17 individuals (15 March 2019). The seasonal maximum was mainly in autumn ($n = 8$), but it also occurred in spring ($n = 4$) or winter ($n = 3$) (Table 1).

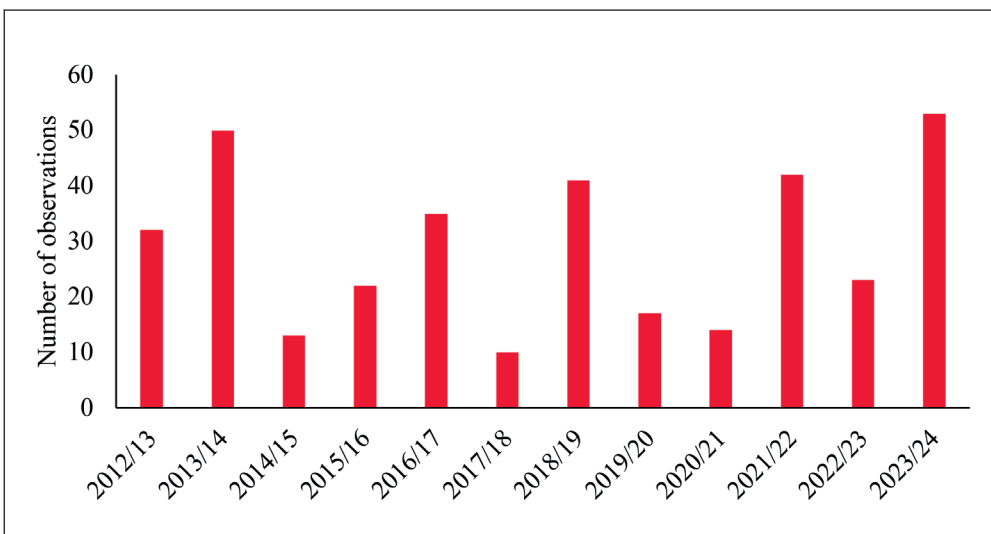


Figure 3. The number of observations by seasons
3. ábra A különböző szezonokban történt megfigyelések száma

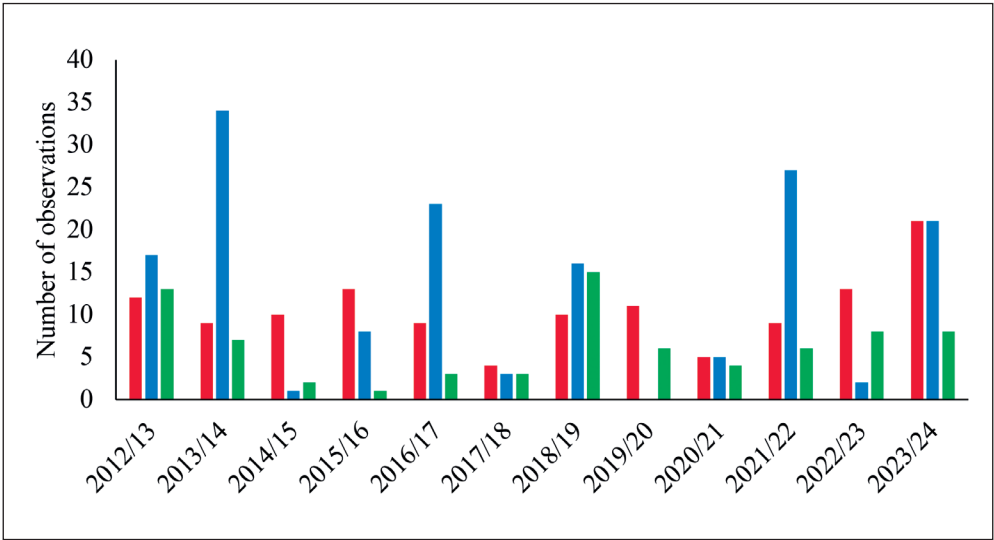


Figure 4. Number of observations in different autumns (red), winters (blue) and springs (green)
4. ábra A különböző szezonok őszi (piros), téli (kék) és tavaszi (zöld) időszakában történt megfigye-
lések száma



Figure 5. The dates of the earliest autumn (red line) and the latest spring (green line) records by year
5. ábra A legkorábbi őszi (piros vonal) és legkésőbbi tavaszi (zöld vonal) léprigó megfigyelések idő-
pontja évenként

Table 1. The dates of the earliest autumn, the latest spring observations and the seasonal maximums with the maximal numbers and the number of days spent in the area in the given season

1. táblázat A legkorábbi őszi és a legkésőbbi tavaszi megfigyelések, a szezonális maximumok időpontjai, a szezonális maximum példányszámok, valamint az adott szezonban itt töltött idő hossza

Season	Earliest observation	Latest observation	Peak day	Number of birds on peak day	Days spent in the area
2012/13	29 Oct	09 Apr	04 Feb	8	163
2013/14	11 Oct	28 Apr	20 Oct	12	200
2014/15	10 Oct	01 Apr	22 Nov	5	174
2015/16	28 Oct	05 Apr	03 Nov	10	160
2016/17	15 Oct	01 Apr	27 Oct, 04 Dec, 14 Dec	10	169
2017/18	07 Oct	03 Apr	16 Nov	10	179
2018/19	23 Oct	17 Apr	15 Mar	17	177
2019/20	08 Oct	12 Apr	18 Mar	6	187
2020/21	11 Oct	21 Apr	21 Apr	6	193
2021/22	11 Oct	23 Apr	09 Apr	12	195
2022/23	13 Oct	22 Apr	04 Nov, 24 Nov	4	192
2023/24	28 Sep	16 Apr	28 Oct	16	201

Discussion

The migration of the Mistle Thrush is the least known of all European thrush species, so all research contributes to our knowledge of the species. In the Carpathian Basin, the only study so far based on a multi-year dataset was conducted in the late 1960s and early 1970s, more than 50 years ago (Horváth 1972), and since then almost only summary books have provided general information (Schmidt 2000, Ecsedi & Zöld 2004, Csörgő & Gyurácz 2009, Gyurácz & Csörgő 2021). The ornithological monographs and annotated bird lists by counties published in recent years have only defined the local status of the species, without providing detailed data on its migration (Kovács 2020, Gyurácz & Kóta 2021, Bozó 2023). Based on data from 2004 to 2019, a similar study on the Fieldfare was carried out in the study area (Bozó 2019), so it was possible to compare the migration and wintering of the two species.

The study area is located in a region where the species does not breed, and the proportion of suitable areas are also very low (Bozó 2018). Nevertheless, it has been found in varying numbers in older planted forests every year. As the species' main winter food, the mistletoe, is not present in the area at all, its most likely food source is the fruit of the common hackberries. This is also the case for the Fieldfare (*T. pilaris*), which occurs in the same habitat patches (Bozó 2019). In mixed flocks with the Fieldfare or in homogeneous groups, Mistle Thrushes can also be observed in ploughs and grasslands foraging for

insects, worms and molluscs (Schmidt 2000, B. L. pers. obs.). My observations suggest that this is a characteristics mainly for migratory birds, less so in winter, which may be due to winter territoriality (Snow & Snow 1984). Overwintering Mistle Thrushes are likely to be defending common hackberries, a secure food source, against their conspecifics and other species, rather than seeking out temporarily available ground-dwelling animals. I have observed several instances of aggressive behaviour, mainly directed at nearby Fieldfares. As the forest cover in the area is extremely low and most of the few forests are poor in food (Bozó 2018), strong competition between the two species can occur. Intraspecific and interspecific competition has been cited by others as the primary cause of territorial habit (Snow & Snow 1984, Skórka & Wójcik 2005). My own study supports the view that the species occurs in dense forests, its occurrence being influenced only by food availability (Skórka & Wójcik 2005).

In autumn, the first individuals were typically arrived in the second week of October, but there was considerable variation between years. In Hungary, they typically breed only once, and these broods become complete by mid-April at the latest. However, a small proportion of the population breeds twice, and clutches may still be present in early July. Given that the youngs become independent after about 6 weeks from egg-laying, birds from the latest brood also fledge by mid-August (Haraszthy 2019). In Göd, the members of the local population left the nesting site in late July – early August, while the first migrants appeared only at the end of September (Horváth 1972). Horváth (1972) found that the plumage of breeding birds was lighter than that of wintering and migrating birds, and that the latter did not sing in the area, so that they could be clearly distinguished from each other. On this basis, he assumed that the local ones did not winter in Hungary and that birds from the north or from the higher mountains such as the Carpathians came to winter. My own results support these assumptions. In spring, sightings were still regular in the first ten days of April, but after that the number of sightings decreased. Observations from the second half of April may even indicate nesting individuals in the area. The dates of arrival in autumn and departure in spring are similar to those previously obtained for the Fieldfare, but an important difference is that individuals from more distant populations of those species arrived in the area only from November (Bozó 2019).

The species has not been proven to breed in Békés County (Bozó 2023), and considering Horváth's (1972) studies, it is likely that members of the native population do not occur in Kevermes, but probably originate from the Apuseni Mountains or the Carpathians (Romania). Both the number of observations and the number of birds observed fluctuated within the season, with several peaks characterising the occurrence, similarly to the Fieldfare (Bozó 2019). Most of the data were from the period November–December, which is at least one month later than the peak observed near Göd (Horváth 1972), but coincides with that observed in Italy (Spina & Volponi 2009). The spring migration near Göd took place between mid-February and mid-March, with local birds returning at the end of March (Horváth 1972). Accordingly, there was no temporal overlap in the presence of nesters and winterers, similar to, for example, southern England, where breeding birds departed between early July and mid-August, while winterers arrived from the north. In contrast, in Portugal and Spain, there were also resident, migratory and winter visitors (Bannerman 1954). In the

Hortobágy, where it was still considered a rare species in the 1970s, it was mainly seen only during migration. In autumn, they typically arrived in the first week of October, and were sporadic until late November – early December. In spring, the first individuals arrived in the last week of February, migrating most intensively between 10–20 March, and occurring in small numbers until mid-April (Ecsedi & Zöld 2004). Based on my own data, spring migration in Kevermes peaked about a week later, in the last ten days of March and the first ten days of April.

The number of observations was particularly high roughly every second or third year. Furthermore, the number of observations varied significantly between the same seasons in different years. In some years it occurred in larger numbers in autumn, in others in winter or spring. Moreover, the number of observations in autumn does not allow us to predict the number of observations in winter and spring. The number of observations in winter also varied considerably between years. In half of the winter seasons, I observed individuals only occasionally, while in other seasons they were in the area throughout the winter. This fluctuation was due to breeding success, weather conditions and food availability in the year, similar to other thrush species (Svårdson 1957, Tyrväinen 1970). Svårdson (1957) found that the Fieldfare invaded Scandinavia every third and fourth year, a similar interval to that I obtained for the Mistle Thrush. However, in none of the cases of the Mistle Thrush can be regarded as an invasive species, as even the largest flocks did not reach 20 individuals, and in most cases only a few individuals were seen. The larger flocks were typically observed during migration. Comparing the data for the Mistle Thrush and the Fieldfare in the study site, it can be seen that there is only a partial overlap in the number of observations and individuals observed each year. For example, in the 2013/14 season, when there were outstanding numbers of Mistle Thrushes in the area, the opposite was true for Fieldfares. In several years, however, numbers of both species were high or even low. It is therefore likely that the origin and seasonal breeding success of the two species may be different.

The seasonal average number of birds was higher in late January and spring than in autumn and winter. There is no obvious reason why they moved in larger groups at this time. This is similar to what was observed in the Hortobágy (Hungary) (Ecsedi & Zöld 2004), but contradicts the finding in Poland (Skórka & Wójcik 2005) that the number of the birds in the area decreased as winter progressed. This is probably due to the fact that the birds found sufficient food in the area throughout the winter.

Although the change was not significant in either case, it is worth noting that in the autumn they appeared earlier and earlier in the area, while in the spring I observed the last ones later and later. It is conceivable that the species has emerged as a nesting species in the area, in parallel with the increasing national nesting population, and this may explain the earlier and later observations. According to András István Csathó (in litt.), the species has become regular in Battonya only in recent years, and was not previously present. As the number of sightings has fluctuated considerably between years, clear trend could not be detected in the last 12 years. However, taking into account the period between 2005 and 2012, there has been a clear increase in the proportion of sightings, so the species has become more common.

References

- Aczél, G. 2011. Madarász eredmények a Marcal-medencében [Results of bird monitoring in the valley of Marcal]. – Cinege 16: 25–28. (in Hungarian with English Summary)
- Aczél, G. 2012. Marcal-medence madárfajainak jegyzéke [A list of birds in the valley of Marcal]. – Cinege 17: 37–47. (in Hungarian with English Summary)
- Ács, A. 1981. Faunisztikai adatok Zalából [Faunistical data from Zala county]. – Madártani Tájékoztató 5(4): 210. (in Hungarian)
- Anonym 1978a Faunisztika néhány sorban [Faunistics in brief]. – Madártani Tájékoztató 2(4): 11–15. (in Hungarian)
- Anonym 1978b Faunisztika néhány sorban [Faunistics in brief]. – Madártani Tájékoztató 2(5): 2–26. (in Hungarian)
- Anonym 1979. Faunisztika néhány sorban [Faunistics in brief]. – Madártani Tájékoztató 3(2): 33–37. (in Hungarian)
- Anonym 1980. Faunisztika néhány sorban [Faunistics in brief]. – Madártani Tájékoztató 4(2): 49–51. (in Hungarian)
- Ashmole, M. J. 1962. The migration of European thrushes: a comparative study based on ringing recoveries. – Ibis 104(4): 522–559. DOI: 10.1111/j.1474-919X.1962.tb08684.x
- Bali, J. 1980. Néhány adat Veszprém madárfaunájához 1980. január – február [Some data to the avifauna of Veszprém]. – Madártani Tájékoztató 3(3): 26–27. (in Hungarian)
- Bali, J. 1990. A veszpremi Haszkovo-úti garázstelep madárfaunája [The avifauna of the Haszkovo road garage in Veszprém]. – Madártani Tájékoztató 14(1–2): 43–44. (in Hungarian)
- Balsay, S. 1986. Léprigó (*Turdus viscivorus*) fészkelés a Hanságban [Breeding of the Mistle Thrush (*Turdus viscivorus*) in the Hanság]. – Madártani Tájékoztató 10(3): 24–25. (in Hungarian)
- Bannerman, D. A. 1954. The Birds of British Isles, Vol. 3. – Oliver & Boyd, London
- Barbácsy, Z. 1978. Madártani adatok Zala megyéből 1978-ból [Bird observation data from Zala county in 1978]. – Madártani Tájékoztató 2(6): 17–18. (in Hungarian)
- Barbácsy, Z. 1981a Madártani adatok Zala megyéből 1980-ban [Ornithological data from Zala county in 1980]. – Madártani Tájékoztató 5(1): 8–9. (in Hungarian)
- Barbácsy, Z. 1981b Madártani adatok az Őrségből 1980-ban [Ornithological data from the Őrség in 1980]. – Madártani Tájékoztató 5(4): 209. (in Hungarian)
- Barbácsy, Z. 2006. A szalafői őserdő madárközösségének összehasonlító elemzése 1994-ben és 2006-ban végzett felmérés alapján [Comparative analysis of the bird community of the Szalafő Primeval Forest based on surveys carried out in 1994 and 2006]. – Aquila 113: 9–19. (in Hungarian with English Summary)
- Barta, Z. 1978. Adatok a Bükk-hegység madár faunájához [Data to the the avifauna of the Bükk hills]. – Madártani Tájékoztató 2: 7–12. (in Hungarian)
- Bedőcs, Gy. 2013. Madárfaunisztikai megfigyelések a Rába körmendi partján [Some new avifaunistical data in the valley Rába near Körmen]. – Cinege 18: 49. (in Hungarian with English Summary)
- Bønløkke, J., Madsen, J. J., Thorup, K., Pedersen, K. T., Bjerrum, M. & Rahbek, C. 2006. Mistle Thrush *Turdus viscivorus*. – Dansk Trækfugleatlas: The Danish Bird Migration Atlas. – Rhodos, pp. 635–636. (in Danish with English Summary)
- Bozó, L. 2018. Dél-Békés természeti értékei [Nature assets of South Békés county]. – Dél-békési Természetvédelmi és Madártani Egyesület, Kevermes (in Hungarian)
- Bozó, L. 2019. Migration and wintering of Fieldfare (*Turdus pilaris*) in southeastern Hungary. – Ornis Hungarica 27(2): 86–99. DOI: 10.2478/orhu-2019-0018
- Bozó, L. 2023. Békés megye madárvilága szakirodalmi adatok alapján [The avifauna of Békés county by literature data]. – Magánkiadás, Kevermes, pp. 403–404. (in Hungarian)
- Bozsko, Sz. 1985a Léprigó (*Turdus viscivorus*) Debrecen határában [Mistle Thrush (*Turdus viscivorus*) on the outskirts of Debrecen]. – Madártani Tájékoztató 9(3): 29–30. (in Hungarian)
- Bozsko, Sz. 1985b A városi ornitofauna összehasonlító vizsgálata Magyarországon [Comparative study of urban ornithofauna in Hungary]. – Aquila 92: 19–47. (in Hungarian with English Summary)
- Budinski, I. 2013. Drozd imelaš (*Turdus viscivorus*) [Mistle Thrush (*Turdus viscivorus*)]. – In: Kralj, J., Barišić, S., Čiković, D. & Tutiš, V. (eds.) Atlas Selibde Ptica Hrvatske [Croatian Bird Migration Atlas]. – Croatian Academy of Sciences and Arts, Zagreb, p. 154. (in Croatian with English Summary)
- Chernel, I. 1899. Magyarország madarai különös tekintettel gazdasági jelentőségükre [Birds of Hungary with special reference to their economic importance]. – Magyar Ornithologiai Központ, Budapest, pp. 749–751.

- Chiatante, G. 2022. Habitat use of the Mistle Thrush (*Turdus viscivorus*): the importance of urban areas and permanent crops. – Journal of Vertebrate Biology 71(22041): 22041-1. DOI: 10.25225/jvb.22041
- Collar, N. 2020. Mistle Thrush (*Turdus viscivorus*), version 1.0. – In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D. A. & de Juana, E. (eds.) Birds of the World. – Cornell Lab of Ornithology, Ithaca, NY, USA. DOI: 10.2173/bow.misthr1.01
- Cramp, S. (ed.) 1988. The Birds of the Western Palearctic, Vol. V. Tyrant Flycatchers to Thrushes. – Oxford University Press, Oxford
- Cuadrado, M. 1995. Territory characteristics and the attacks against intruders in migrant Robins (*Erithacus rubecula*) wintering in the Mediterranean area. – Ardeola 42: 161–166.
- Csörgő, T. & Gyurácz, J. 2009. Léprigó *Turdus viscivorus* [Mistle Thrush *Turdus viscivorus*]. – In: Csörgő, T., Karcza, Zs., Halmos, G., Magyar, G., Gyurácz, J., Szép, T., Bankovics, A., Schmidt, A. & Schmidt, E. (eds.) Magyar Madárvonulási Atlasz [Hungarian Bird Migration Atlas]. – Kossuth Kiadó Zrt., Budapest, p. 472. (in Hungarian with English Summary)
- Dénes, J. 1981. Faunisztikai adatok Vác környékének madárvilágáról [Avifaunistical data from Vác]. – Madártani Tájékoztató 5(4): 222–228. (in Hungarian)
- Dénes, J. 1982. A réti tücsökmadár (*Locustella naevia*) fészkelése és egyéb madártani adatok Vác környékéről [The breeding of Grasshopper Warbler (*Locustella naevia*) and other ornithological data from Vác]. – Madártani Tájékoztató 6(1): 43–44. (in Hungarian)
- Ecsedi, Z. & Zöld, B. 2004. Léprigó [Mistle Thrush]. – In: Ecsedi, Z. (ed.) A Hortobágy madárvilága [The Birds of Hortobágy]. – Hortobágy Természetvédelmi Egyesület, Winter Fair, Balmazújváros – Szeged, pp. 451–452. (in Hungarian)
- Faragó, Á. & Szentirmai, I. 2014. Mindennapi Madaraink Monitoringja az Őrség különleges madárvédelmi területen [Common Bird Census in Őrség Special Protection Area]. – Cinege 19: 48–53. (in Hungarian with English Summary)
- Farkas, T. 1955. Léprigó újabb előfordulásai költési időben [New occurrences of the Mistle Thrush during breeding season]. – Aquila 59–62: 392. (in Hungarian)
- Farkas, T. 1951. Kis légykapó és léprigó fészkelése a Pilisi-hegyekben [Breeding of the Red-breasted Flycatcher and the Mistle Thrush in the Pilis hills]. – Aquila 55–58: 260. (in Hungarian)
- Fintha, I. & Szabó, A. 1993. Vetési varjak (*Corvus frugilegus*) városi mozgalmi Debrecenben [Urban movements of the Rooks (*Corvus frugilegus*) in Debrecen]. – Madártani Tájékoztató 17(2): 15–20. (in Hungarian)
- Gill, F., Donsker, D. & Rasmussen, P. (eds.) 2023. IOC World Bird List (v 13.2). – <http://www.worldbirdnames.org> DOI: 10.14344/IOC.ML.13.2
- Gyurácz, J. 2012. Léprigó (*Turdus viscivorus*) [Mistle Thrush (*Turdus viscivorus*)]. – In: Faragó, S. (ed.) Nyugat-Magyarország fészkelő madarainak elterjedési atlasza [Map of Birds Breeding in West-Hungary]. – Nyugat-magyarországi Egyetem Kiadó, Sopron, p. 168. (in Hungarian)
- Gyurácz, J. & Csörgő, T. 2021. Léprigó *Turdus viscivorus* [Mistle Thrush *Turdus viscivorus*]. – In: Szép, T., Csörgő, T., Halmos, G., Lovászi, P., Nagy, K. & Schmidt, A. (eds.) Magyarország madáratlasza [Bird Atlas of Hungary]. – Agrárminisztérium, Magyar Madártani és Természetvédelmi Egyesület, Budapest, pp. 614–616. (in Hungarian with English Summary)
- Gyurácz, J. & Kóta, A. 2021. Vas megye madarainak névjegyzéke. Nomenclator Avium Comitatus Castriferrei in Hungaria. An annotated list of the birds of Vas county in Hungary. – Magyar Nyugat Könyvkiadó, Szombathely (in Hungarian with English Summary)
- Gyurácz, J., Bánhidi, P. & Csiszár, B. 2007. Ritka madárfajok a Tömördi Madárvártán [Rare bird species of the Tömörd Bird Ringing Station]. – Cinege 12: 28–31. (in Hungarian with English Summary)
- Haraszthy, L. 2019. Magyarország fészkelő madarainak költésbiológiája. 2. kötet, Sárgarigóféléktől a sármányfélékig [Breeding Biology of Hungarian Nesting Birds, Vol. 2. Passeriformes]. – Pro Vértes Nonprofit Kft., Csákvár, pp. 415–420. (in Hungarian)
- Herman, O. 1894. Megnyitó – Vorwort [Preface]. – Aquila 1: 1–3. (in Hungarian and German)
- Homoki-Nagy, I. 1980. A Börzsönyi Tájvédelmi Körzet madárvilága az 1968–1979 közötti időszak megfigyelései alapján [Avifauna of the Börzsöny Landscape Conservation Area based on observations between 1968–1979]. – Aquila 87: 23–25. (in Hungarian)
- Horváth, L. 1972. A léprigó *Turdus viscivorus* L. életétörténete Magyarországon [The life history of the Mistle Thrush *Turdus viscivorus* L. in Hungary]. – Vertebrata Hungarica 13: 87–103. (in Hungarian and English)
- Horváth, L. 1976. A léprigó (*Turdus viscivorus*) az urbanizálódás útján [The Mistle Thrush (*Turdus viscivorus*) on the way of urbanisation]. – Aquila 83: 167–171. (in Hungarian with English Summary)

- Huttunen, M. J. 2004. Autumn migration of thrushes over eastern Finland: a comparison of visible migration and ringing recovery patterns. – *Ring. & Migration* 22(1): 13–23. DOI: 10.1080/03078698.2004.9674306
- Illés, P. & Kóta, A. 2012. A kőszegi-lukácsházi tározó (Abért-tó) madárvilága [Avifauna of the Lake Abért]. – *Cinege* 17: 47–56. (in Hungarian with English Summary)
- Kalivoda, B. 1986. Adatok Budapest ÉK-i részének madárfaunájáról [Data to the avifauna of the northeastern part of Budapest]. – *Madártani Tájékoztató* 10(1): 27–35. (in Hungarian)
- Kalotás, Zs. 1987. Az 1986–87. évi szokatlanul kemény tél néhány madártani vonatkozásáról [Some ornithological aspects of the unusually harsh winter of 1986–87]. – *Madártani Tájékoztató* 11(3–4): 9–11. (in Hungarian)
- Kárpáti, L. 2003. Adatok a Szombathelyi Parkerdő madárvilágáról [Data to the avifauna of the Parkforest of Szombathely]. – *Cinege* 8: 38–44. (in Hungarian with English Summary)
- Kasza, F. 1983. Léprigó (*Turdus viscivorus*) nyári előfordulása Somogyuszob környékén [Summer occurrence of the Mistle Thrush (*Turdus viscivorus*) from Somogyuszob]. – *Madártani Tájékoztató* 7(1): 37. (in Hungarian)
- Kelemen, T. 2003. Adatok a Vashegy madárvilágához [Data to the avifauna of Vashegy]. – *Cinege* 8: 36–37. (in Hungarian with English Summary)
- Király, G. 1992. Két év csonttollú (*Bombycilla garrulus*) megfigyelései Dombóváron [Waxwing (*Bombycilla garrulus*) observations during two year in Debrecen]. – *Madártani Tájékoztató* 16(2): 27–28. (in Hungarian)
- Király, R. & Varga, L. 1981. Költési és faunisztikai adatok a Kőszegi Tájvédelmi Körzetből 1981. IV–VII. hó [Breeding and faunistic data from the Kőszeg Landscape Protection Area, 1981. April – July]. – *Madártani Tájékoztató* 5(4): 206–208. (in Hungarian)
- Knaus, P. 2020. Mistle Thrush *Turdus viscivorus*. – In: Keller, V., Herrando, S., Voríšek, P., Franch, M., Kipson, M., Milanesi, P., Martí, D., Anton, M., Klvanová, A., Kalyakin, M. V., Bauer, H-G. & Foppen, R. P. B. (eds.) *European Breeding Bird Atlas 2. Distribution, Abundance and Change*. – European Bird Census Council & Lynx Edicions, Barcelona, pp. 710–711.
- Kovács, G. K. 2020. Csókakötőlől Daruhegyig. Fejér megye madárvilága [From Csókakötő to Daruhegy. The avifauna of Fejér county]. – „VÖLGY-HÍD” Természetvédelmi Alapítvány (in Hungarian)
- Lahournat, M., Jiguet, F., Villers, A., Eraud, C. & Henry, P. Y. 2021. Where do thrushes migrating to France come from? Within-France distribution and temporal changes over 70 years. – *European Journal of Wildlife Research* 67: 1–14. DOI: 10.1007/s10344-021-01525-y
- Matyikó, T. 1985. Téli madár csapatok Tarnalelesz környékén [Winter birds flocks in the surroundings of Tarnalelesz]. – *Madártani Tájékoztató* 9(3): 19–20. (in Hungarian)
- Mogyorósi, S. 1988. Madárállományok mennyiségi vizsgálata a Soproni-hegységben 1987-ben [Quantitative survey of bird populations in the Sopron hills in 1987]. – *Madártani Tájékoztató* 12(1–2): 86–91. (in Hungarian)
- Mogyorósi, S. 2021. A Soproni-hegység és peremterületeinek madárvilága [Avifauna of the Sopron Mountains and its surroundings]. – *Rence* 6: 43–189. (in Hungarian with English Summary)
- Molnár, I. 1985. Léprigó (*Turdus viscivorus*) költése a felsőörsi Királykúti-völgyben [Breeding of Mistle Thrush (*Turdus viscivorus*) in the Királykúti-völgy, Felsőörs]. – *Madártani Tájékoztató* 9(1): 39. (in Hungarian)
- Moskát, Cs. 1988. Madárközösség- és vegetáció-szerkezet a Pilis hegység egyik bükkösében [Breeding bird community and vegetation structure in a beech forest in the Pilis mountains, N. Hungary]. – *Aquila* 95: 105–112. (in Hungarian and English)
- Nagy, S. 1982. Adatok Dombóvár madárvilágához [Data to the avifauna of Dombóvár]. – *Madártani Tájékoztató* 6(2): 145–149. (in Hungarian)
- Németh, Cs. 2000. Adatok a Kőszegi-hegység és Kőszeg-hegyalja madártani viszonyainak ismeretéhez 1995–2000 [Data to the avifauna of the Kőszeg Hills between 1995 and 2000]. – *Cinege* 5: 28–32. (in Hungarian)
- Novák, L. 1985. Adatok a léprigó (*Turdus viscivorus*) fészkeléséhez [Data to the breeding of the Mistle Thrush (*Turdus viscivorus*)]. – *Madártani Tájékoztató* 9(3): 54–55. (in Hungarian)
- Pátkai, I. 1963. Adatok a Dunántúl madárvilágához [Data on the avifauna of the Transdanubia]. – *Aquila* 69–70: 260–266. (in Hungarian)
- Rózsa, L. 2003. A léprigó (*Turdus viscivorus*) első urbanizált költése Budapesten [The first urbanised breeding of the Mistle Thrush (*Turdus viscivorus*) in Budapest]. – *Aquila* 109–110: 171, 187. (in Hungarian and English)
- Schmidt, E. 1981. Madarak mennyiségi vizsgálata Budakeszi környékén [Quantitative bird surveys in the area of Budakeszi]. – *Madártani Tájékoztató* 5(1): 31–36. (in Hungarian)
- Schmidt, E. 1983. Vonulási adatok a Gellérthegyről 1982 ősz [Migration data from the Gellérthegy, 1982 autumn]. – *Madártani Tájékoztató* 7(1): 52–56. (in Hungarian)

- Schmidt, E. 1992. Összehasonlító vizsgálatok a Gellérthegy madárfaunájáról 1982 és 1985 augusztus-októberében [Comparative studies on the avifauna of Gellért Hill in August-October 1982 and 1985]. – *Aquila* 99: 149–154. (in Hungarian with English Summary)
- Schmidt, E. 2000. Léprigó *Turdus viscivorus* Mistle Thrush. – In: Haraszthy, L. (ed.) Magyarország madarai. Második, javított kiadás [Birds of Hungary. 2nd, revised ed.]. – Mezőgazda Kiadó, Budapest, pp. 294–295. (in Hungarian)
- Simig, L. 1978. Kiegészítő adatok a budapesti Sas-hegy természetvédelmi terület madár faunájához [Additional data to the avifauna of the Sas Hill Nature Conservation Area of Budapest]. – *Madártani Tájékoztató* 2(2): 5–8. (in Hungarian)
- Skórka, P. & Wójcik, J. D. 2005. Population dynamics and social behavior of the Mistle Thrush *Turdus viscivorus* during winter. – *Acta Ornithologica* 40(1): 35–42. DOI: 10.3161/068.040.0109
- Snow, B. K. & Snow, D. W. 1984. Long-term defense of fruit by Mistle Thrushes (*Turdus viscivorus*). – *Ibis* 126(1): 339–349. DOI: 10.1111/j.1474-919X.1984.tb03662.x
- Spina, F. & Volponi, S. 2009. Atlante della Migrazione degli Uccelli in Italia, Vol. 2. Passeriformi [Italian Bird Migration Atlas, Vol. 2.]. – ISPRA – MATM, Roma, pp. 245–249. (in Italian with English Summary)
- Spina, F., Baillie, S. R., Bairlein, F., Fiedler, W. & Thorup, K. (eds.) 2022. The Eurasian African Bird Migration Atlas. – <https://migrationatlas.org.EURING/CMS>
- Svärdson, G. 1957. The “invasion” type of bird migration. – *British Birds* 50(8): 314–343.
- Szalai, I. 1981. Adatok a Gerecse madárvilágához [Data to the avifauna of the Gerecse hills]. – *Madártani Tájékoztató* 5(3): 162–163. (in Hungarian)
- Szenek, Z. 1984. Léprigó (*Turdus viscivorus*) költése a Kiskunságban [Breeding of the Mistle Thrush (*Turdus viscivorus*) in the Kiskunság]. – *Aquila* 91: 200–201. (in Hungarian)
- Sziji, J. 1955. Madártani jegyzetek a Bakonyból [Ornithological notes from the Bakony]. – *Aquila* 59–62: 410. (in Hungarian)
- Szvezsényi, L. 1978. Madármegfigyelések Fenyőfő község határában [Bird observations in the surroundings of Fenyőfő]. – *Madártani Tájékoztató* 2(4): 5–6. (in Hungarian)
- Thibaut de Maisières, C. 1940. A léprigó fészkelése a Bükkhegységben [Breeding of Mistle Thrush in the Bükk hills]. – *Fragmenta Faunistica Hungarica* 3: 3–5. (in Hungarian)
- Tyrväinen, H. 1970. The mass occurrence of the Fieldfare (*Turdus pilaris* L.) in the winter of 1964/65 in Finland. – *Annales Zoologici Fennici* 7(4): 349–357.
- Varga, F. 1976. Léprigó (*Turdus viscivorus*) fészkelési adatai a Zagyva forrávidékéről [Breeding records of the Mistle Thrush (*Turdus viscivorus*) from the Zagyva river]. – *Aquila* 83: 291–292. (in Hungarian)
- Varga, L. & Király, R. 1981. Faunisztikai adatok a Kőszegi Tájvédelmi Körzetből 1980 október – 1981 március [Faunistical data from the Kőszeg Landscape Protection Area, October 1980 – March 1981]. – *Madártani Tájékoztató* 5(3): 137–139. (in Hungarian)
- Varga, L. 1982a. Faunisztikai adatok Vas megyéből 1981. V–X. hó [Faunistical data from Vas county, May–October 1981]. – *Madártani Tájékoztató* 6(1): 45–47. (in Hungarian)
- Varga, L. 1982b. További adatok a Kőszegi Tájvédelmi Körzet madárvilágához 1981. VIII. – 1982. III. [Additional data to the avifauna of the Kőszeg Landscape Protection Area, August 1981 – March 1982]. – *Madártani Tájékoztató* 6(3): 217–219. (in Hungarian)
- Varga, L. 2003. A Vadása II. víztározón végzett madármegfigyelések összeggzése [Summary of the ornithological observations in the Vadása II. water reservoir]. – *Cinege* 8: 29–35. (in Hungarian)
- Varga, Zs. 1979. Adatok a Börzsöny madárfaunájához 1978-ból [Data to the avifauna of the Börzsöny in 1978]. – *Madártani Tájékoztató* 3(1): 11–12. (in Hungarian)
- Varga, Zs. 1989. 1988-as állomány-adatok az Aggteleki Nemzeti Parkból és környékéről [Population data in 1988 from the Aggtelek Natura Protection Area and its surroundings]. – *Madártani Tájékoztató* 13(3–4): 6–8. (in Hungarian)
- Warga, K. 1928. Fenyves rigó invázió a budapesti Városligetben [Invasions of the Fieldfares in the Városliget, Budapest]. – *Aquila* 28: 189–190. (in Hungarian)
- Zsoldos, Á. 1986. Madártani adatok a Szabadság-hegyi Jókai kertből 1985–86-ban [Ornithological data from the Jókai Garden of the Szabadság Hill in 1985–86]. – *Madártani Tájékoztató* 10(3): 12–16. (in Hungarian)