

# Attempts to increase a scarce peripheral population of the Red-breasted Flycatcher (*Ficedula parva*) using a new type of nestbox

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**Abstract** The Red-breasted Flycatcher has a large and stable global population widespread through much of the Western Palearctic. Contrarily, however, it is a very scarce breeding bird in the forested montane habitats of Hungary. The few pairs breeding here represent a peripheral population on the very edge of the species' geographic area. This peripheral population declined considerably (from 3–500 to 100 pairs) during the past decades likely due to the degradation of suitable habitat patches including the loss of appropriate nesting sites. To reverse this trend, we applied a new type of artificial nestbox developed specifically for this species. Occupancy rate was very low and breeding success was also low unless applying a protective wire mesh to reduce predation pressure.

Keywords: Red-breasted Flycatcher, nestbox, breeding success

**Összefoglalás** A kis légykapó a Nyugat-Palearktiszban elterjedt, stabil állományú faj. Ezzel szemben hazánkban a hegyvidéki erdős élőhelyek igen ritka fészkelő madara. A Magyarországon költő néhány pár a faj földrajzi areájának peremén élő, periférikus állományt alkot. E szegélypopuláció mérete az elmúlt évtizedek során jelentősen csökkent (kb. 3–500 párról kb. 100 párra), vélhetően az alkalmas élőhelyfoltok degradációja, és ezen belül a megfelelő fészkelőüregek hiánya miatt is. E folyamat megfordítása céljából egy kifejezetten e faj igényeihez tervezett, új fészkelő típusot alkalmaztunk. Az odúk elfoglalási aránya igen alacsony volt, és a költési siker is alacsony, hacsak nem alkalmazunk ragadozók elleni dróthálót.

Kulcsszavak: kis légykapó, fészkelő, költési siker

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## Introduction

The Red-breasted Flycatcher (*Ficedula parva*) is a small, insectivorous passerine in the family Muscicapidae. It breeds in forested areas from Germany to the Ural Mountains (also in the Caucasus) and overwinters in India. What was formerly regarded as its Eastern subspecies, the Taiga Flycatcher, is now elevated to the rank of a full species, *Ficedula albicilla*. While the global population size of the Red-breasted Flycatcher is relatively large (estimated to cca. 3.5 million pairs), the species is represented by only a few thousand of breeding pairs scattered scarcely across suitable habitat patches along the Western edge of its geographic area, in Sweden, Germany, Austria and Hungary (Cramp & Perrins 1993, Flade 1997, Taylor 2006, BirdLife International 2013).

In the Carpathian Basin the Red-breasted Flycatcher typically breeds in forested mountainous habitat patches at elevations between 400–800 m (Michael *et al.* 1993, Németh 2000). The population size was estimated at 300–500 pairs at the end of the past century (Magyar *et al.* 1998), then it shrank to cca. 100–300 pairs in the following decade (Hadarics & Zalai 2008), and currently estimated to about 100 pairs.

There were 5–6 breeding pairs in the Sopron Mountains that disappeared by 2013 (S. Mogyorósi personal communication). About 8–10 pairs have been breeding in the Kőszeg Mountains through the past decade (Németh 1999, 2009, 2013). Furthermore, 17 territories were known in the Bakony Mountains through 2009–2013. The yearly number of breeding pairs fluctuated here within the range of 2–10, however, no singing male was found in 2014 (T. Deme unpublished data). It has been only a casual breeder in the Pilis Mountains. Approximately 30 pairs breed in the Börzsöny Mountains (Á. Selmeczi Kovács personal communication). The number of breeding pairs was estimated to 10 pairs in the Mecsek Mountains through 1989–2009, however, none has been found here in recent years (T. Deme unpublished data). At least 30 pairs bred in the Bükk Mountains at the end of the last century, while only 10–12 pairs have been found here in recent years, disappearing from cca. three-quarters of its formerly known breeding sites (Fitala 2010). The last known record from the Zemplén Mountains is from 2012 (ANP biotic database). Overall, the number of pairs breeding in Hungary is currently estimated to be about 100 pairs.

Since the global population appears to be relatively stable (BirdLife International 2016), and also because the Red-breasted Flycatcher exhibits high fidelity to its breeding areas through several years (as demonstrated by ringing data, Török 2009), we presume that reasons of this remarkable decline are probably local. Motivated by this idea, I have implemented artificial nestboxes specifically designed for this species by Mészáros and Szalai (1987). The purpose of the present paper is to review results of Red-breasted Flycatcher nestbox projects published by former authors in Hungarian, and also to describe results of my own efforts.

## Nestbox design

The Red-breasted Flycatcher is not a typical hole-nesting species, thus it has been extremely rarely recorded to breed in classical nestboxes (see e.g. Mauks 1913, I. É. Böhm personal communication). A study carried out in the Białowieżai National Park, Poland, examined the nest site of 117 natural nests (Mitrus & Soćko 2004). Three types of nest sites were identified:

- about half of the nests were built in half holes on tree trunks, these are partially open, shallow cavities with big entrances,
- about a quarter of nests were built on ‘shelves’ located outside the main trunk, often covered by bark,
- about a quarter of nests were built in chimneys-shaped holes, usually in broken and rotten top of thin trees.

The nestbox design proposed by Mészáros and Szalai (1987) roughly mimics the first two types of natural sites (*Figure 1*). Nest boxes are optimally made of hardwood, and their colour should approximately match the colour of the tree trunk it is positioned on.

### Optimal positioning of nestboxes

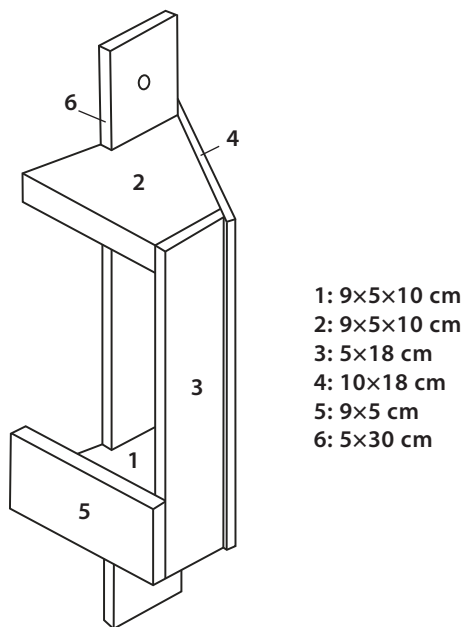
Through much of its geographic distribution, the Red-breasted Flycatcher mostly breeds in mixed and coniferous forests (Cramp & Perrins 1993). In the Białowieżai National Park, however, 79% of nests were built on hornbeam (*Carpinus betulus*) or small leaved lime (*Tilia cordata*). About 40% of nests were located between 2 and 4 meters height above ground, the average height was 4.9 m above ground, and >70% were located lower than 6.0 m.

Their entrances preferentially faced to South or East (Mitrus & Soćko 2004).

In Hungary, the Red-breasted Flycatcher primarily breeds natural or semi-natural, humid, montane mixed forests dominated by beech (*Fagus sylvatica*). These forests are also characterized by a lower canopy of secondary tree species (such as European hornbeam), by a proximity of small streams, and the presence of old trees (Schmidt 1998, Németh 2000). The presence of small sunny glades (such as 150–200 m<sup>2</sup> open patches created by fallen trees) is also preferred at least until the overall canopy cover remains relatively high. Weber (1958) showed that Red-breasted Flycatchers tend to leave those parts of a forest where the canopy closure falls below 70%. Thus small patches of trees scattered across large, logged areas do not provide suitable habitat for this species. In 2013, previously occupied territories became abandoned in the Hármaspatak Valley as a result of logging activity (Németh 2013).

Intensive forestry practices including the elimination of standing deadwood, and a decrease, or even the disappearance of water from former permanent streams likely contributes to the decline of this bird population (Zöllei & Selmeczi Kovács 2016). Implementing artificial nestboxes may perhaps reduce the negative effects of moderate forestry practices in potential breeding habitats.

Apparently, birds prefer nestboxes facing to the stream valley by their entrances. Since this species nests in relatively open cavities, predation pressure on broods can be



*Figure 1.* The structure of nestbox designed for Red-breasted Flycatcher by Mészáros and Szalai (1987)

*1. ábra* A kis légykapó számára Mészáros és Szalai (1987) által kifejlesztett odútípus

considerably high. Therefore, artificial nestboxes are optimally positioned under appropriate coverage of small branches. Well-covered positions are more available on horn-beam trees than on the smooth and poorly branched trunks of beech. Moreover, mounting a protective wire mesh around the nestbox is also advisable to reduce predation pressure. Mészáros and Szalai (1987) used this method in the Mátra Mountains to reduce the high (75%) brood mortality due to predation by Eurasian Jays (*Garrulus glandarius*). Their design (cca. 40×40 cm) consisted of side panels made of fine wire mesh (so-called “chicken wire”) and a front panel made of wire mesh with a 6×4 cm mesh size enabling flycatchers to easily move through.

### Nestbox occupancy and breeding success

The first nestbox installation project was carried out by Mészáros and Szalai (1987) in the Mátra Mountains during 1986–1988. Out of their 62 nestboxes, 8 were occupied by Red-breasted Flycatchers. Unfortunately, 6 of these broods were lost due to predation.

Twenty nestboxes were installed in the Kőszeg Mountains in 1996, where only one box was occupied 13 years later. This single pair bred successfully. Subsequently, further 15 nestboxes were added here and 35 more implemented in the Őrség region in 2009. One of these newer boxes was occupied in the Kőszeg Mountains and this breeding attempt was also successful (Németh 2010).

Urbán (2006) installed 15 boxes in the Bükk Mountains, but the fate of them was not controlled subsequently. Fitala (2010) implemented further 25 nestboxes in 2007, and recorded a single successful breeding attempt in 2010. Subsequently, he added 20 more boxes in 2011, but no more breeding birds were recorded.

Eleven nestboxes were put into operation in the Börzsöny Mountains, 2008. Unfortunately, subsequent control of these boxes was only partial, and no breeding birds were recorded (R. Kazi personal communication).

Finally, I have implemented a total of 103 nestboxes at three different locations (Óbánya valley, Réka valley, Páfrányos) of the Mecsek Mountains between 1989 and 2007. First, 30+20+20 nestboxes were implemented in 1989, 1990, and 1991, respectively. Further 14+17 boxes were added in 2002 and 2007. A total 6 boxes were occupied during the period of 1991–96. All boxes were protected by antipredator wire mesh cover, thus nestlings fledged from all of these nests successfully. Clutch size was known for five broods (6, 6, 6, 5 and 5), breeding success was 96%, and fledging rate was 89%. In comparison, fledging success from natural cavities was 51% in Poland (Mitrus & Soćko 2008), 34% in Germany (Müller 1970, cited in Cramp & Perrins 1993) and 54% in Belarus (Dorofeev 1969, cited in Cramp & Perrins 1993).

In 1994, I also put 34 nestboxes into operation in Zselic, where this species is a rare occasional breeder. Unfortunately, no box was occupied here.

I have also explored territories of 13 singing males in the Bakony Mountains, then installed 51 nestboxes at most promising sites in 2010. No breeding attempts were recorded in these boxes up to the present; all breeding pairs preferred to breed in natural cavities.

These occupancy rates fall far below the usual occupancy rates of typical cavity-nesting bird species. The likely reason for this low rate is the typically low density of birds at suitable breeding sites. On a 213 hectare area in Germany, 21 singing males were found, but only part of them had a breeding pair (Weber 1958). The breeding density was 0.6–1.7 pairs/10 ha (average: 0.28 pair/10 ha) in Germany (Flade 1994 in Flade 1997). In the Białowieża National Park, Poland, the density of breeding density varied between 0.6–2.0 pairs/ha (average: 1.2 pair/10 ha) (Tomiałojć *et al.* 1984), and were 2 pairs/10 ha even in the best habitats (Wesołowski 2002). The density of breeding density varied between 0.61–1.2 pairs/10 ha in Belarus and 0.08–0.25 pair/10 ha in Russia (Taylor 2006). Densities are even lower in Hungary; 0.012 pair/10 ha in the Bükk Mountains (Bankovics *et al.* 1996) and 0.09 pair/10 ha in the Kőszeg Mountains – considering only the suitable habitats (Németh 2000). These values are much lower than densities of typical hole-nesting small passerines breeding in Hungarian beech forests, like Great Tit (*Parus major*), 6.87 pairs/10 ha, Nuthatch (*Sitta europaea*) 1.14 pairs/10 ha, and Collared Flycatcher (*Ficedula albicollis*) 9.16 pairs/10 ha (Moskát 1985), Blue Tit (*Parus caeruleus*) 1.11 pairs/10ha, Great Tit 4.01 pairs/10 ha, Nuthatch 2.49 pairs/10 ha, Collared Flycatcher 4.43 pairs/10 ha (Moskát & Székely 1986), Collared Flycatcher 21 to 93 pairs/10ha (Török & Tóth 1988).

To summarize, the nestbox type specifically designed for the Red-breasted Flycatcher and illustrated in *Figure 1* were very scarcely occupied by this species in Hungary. Not only the occupancy rate was low, but predation pressure exerted upon broods were also high unless applying a protective wire mesh.

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