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History and current status of Red-footed Falcon population size and conservation activities in Voivodina

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Abstract The Red-footed Falcon population in Voivodina shows a considerable decrease on a large temporal scale, however due to recent conservation measures, it seems to be stable in the past six years. Here I present the history of population estimates and results of partial surveys that have been carried out since 1909. I also show the details and results of conservation efforts recently implemented in the region. Recovery records of individually colour ringed birds indicate that the population breeding in northern Serbia is an integral part of the Carpathian Basin population and thus conservation management should be coordinated within a framework of international cooperation.

Keywords: survey, colour ring, nest-box, Serbia, *Falco vespertinus*

Összefoglalás A vajdasági kék vércse állomány jelentős csökkenést mutat nagy időbeli skálán, azonban, köszönhetően az elmúlt néhány év védelmi intézkedésének, ez a tendencia megállni látszik. Röviden bemutatom az elmúlt közel száz év részletes eredményeit és a közelmúlt természetvédelmi intézkedéseit, amelyek feltehetően segítették megállítani az állománycsökkenést. Színes gyűrűs kék vércse megkerülési adatokkal demonstrálom, hogy a vajdasági költő állomány szerves része a kárpát-medencei állománynak, és így hatékony és hosszú távon sikeres védelme csak nemzetközi együttműködés keretében valósulhat meg.

Kulcsszavak: felmérés, színes gyűrű, költő láda, Szerbia, *Falco vespertinus*

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Introduction

Red-footed Falcons *(Falco vespertinus)* sparked the interest of ornithologists in Serbia as early as the beginning of the 20th century. This attention can partially be attributed to the connection between Red-footed Falcons and Rooks *(Corvus frugilegus)*, the latter being widespread and having large colonies at the time in Voivodina (Tucakov *et al.* 2010). Despite the attention, we only have sporadic data on the distribution and population size of Red-footed Falcons from that time. It was probably a scarce to rare breeder; larger number of birds was typically observed prior to autumn migration (Dimitrijević 1980). The first confirmed breeding data derive from the vicinity Aleksa Šantić (Babapuszta), where Red-footed Falcons were recorded to nest on the Fernbach estate in 1909 (Fernbach 1912). This small colony existed until 1981, when a large storm destroyed it, making it one of the longest operating Red-footed Falcon colony to date (Fülöp & Szlivka 1988). Richárd Csornai took on the survey of Red-footed Fal-

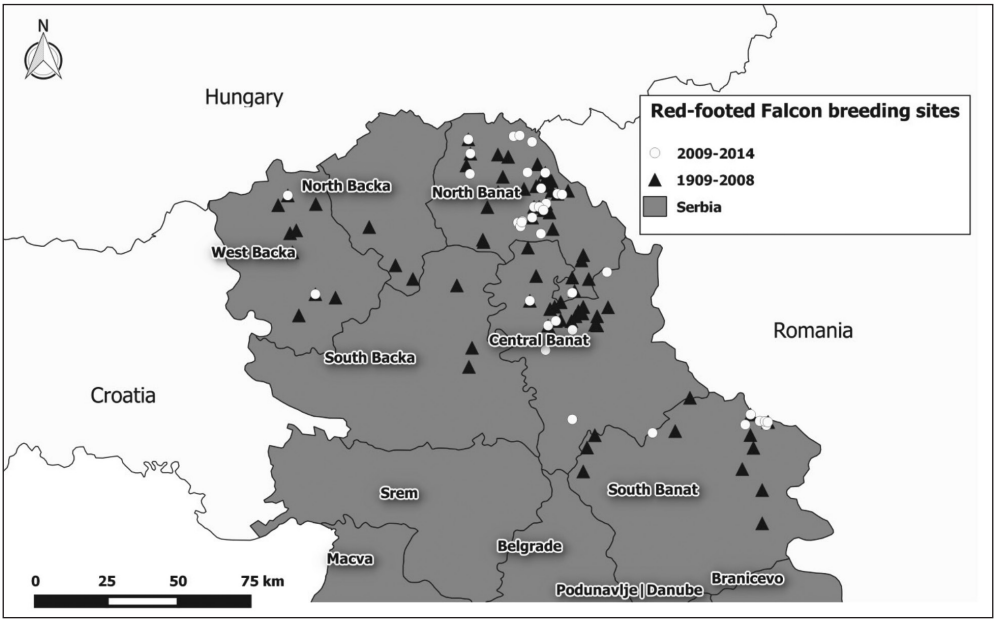

Figure 1. Spatial distribution of the historic and current Red-footed Falcon breeding sites in Voivodina (partially based on the data of Purger 1996, 2008, Žuljević 1998, Đapić 2002). Today, the majority of the population can be found in North and Central Banat

1. ábra A historikus és a jelenlegi ismert kék vércse költőhelyek elhelyezkedése a Vajdaságban (részben Purger 1996, 2008, Žuljević 1998, Đapić 2002 alapján). A populáció jelentős része ma Észak és Közép-Bánátban található

cons from the 1930s (Király 1993), confirming breeding near Senta (over 100 pairs) and Kanjiža (Magyarkanizsa, approx. 50 pairs) in rookeries found in riparian forests along the River Tisza (Gergelj *et al*. 2000). Mikuska (Gergelj & Šite 1989, Gergelj & Šoti 1990, Gergelj *et al*. 2002) regularly observed the species at the Kapetanski rit (Kapitány rét) in the 1960s indicating the probability of Red-footed Falcons breeding in nearby rookeries. Furthermore, Red-footed Falcons were known to breed in south-east Serbia (Šumadija area), near Negotini (Matvejev & Vasić 1973). However, the breeding distribution soon was only restricted to Voivodina. A survey of raptors in Voivodina carried out in 1977–1996 showed that the species was present in 64 UTM squares, and breeding was confirmed in 46 of these. The bulk of the population was found along the river Tisza in northern parts of Banat County. The surveying team concluded that despite probable large inter-annual fluctuations, the population is stable or even slightly increasing and expanding its range (Ham & Rašajski 2000). A specific survey of Voivodina conducted to map Red-footed Falcon colonies recorded 308 pairs in 1990, while only 128 in 1991 (Purger 1995, 1996, Purger & Mužinić 1997). Repeating the survey after 10 years revealed a total of 116 pairs in 2000 and 61 pairs in 2001 (Purger 2008). In agreement with these findings, our previous survey suggests that a drastic population collapse occurred in the 1988–2003 period (Puzović *et al*. 2003). Central Banat County had an estimated 150–200 breeding pairs in the ‘90s, however only 20–30 pairs

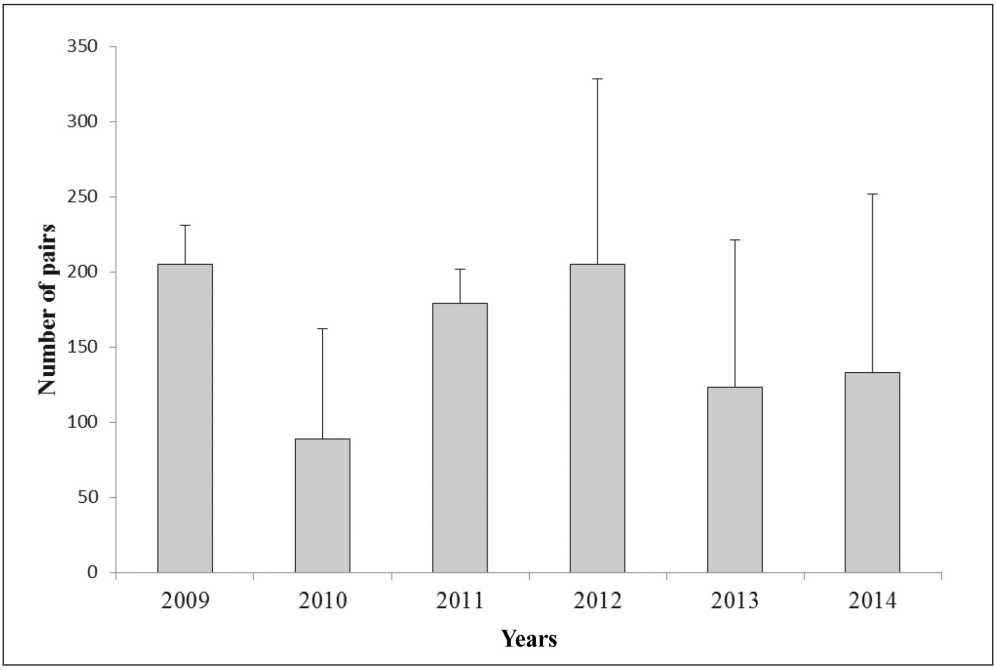

Figure 2. Number of observed (bars) and estimated (whiskers) Red-footed Falcon breeding pairs in Voivodina. Large inter-annual fluctuations occur in the breeding population size

2. ábra A megfigyelt (oszlopok) és a becsült (vonal) kék vércse párok száma a Vajdaságban. A párok számában nagymértékű évek közötti ingadozás figyelhető meg

were present a decade later (Gergelj 2003). The most apparent decrease was observed in the northern Banat, the once stronghold of this species. The number of breeding pairs decreased considerably at the large breeding colonies such as near Jazovo (Hódegyháza), Crna Bara (Feketetó) and Banatski Monoštor (Kanizsamonostor) (Ružić *et al.* 2009). In some cases complete colonies disappeared (Gergelj 2003).

In general, based on the above described sporadic data, the population substantially decreased both in numbers and in breeding range *(Figure 1)* in the past 20 years in Voivodina. Sparked by the negative tendency, recent Red-footed Falcon conservation facilitated efforts through reorganizing monitoring activities and active conservation measures in the region. Here we describe the results and activities carried out in these new initiations.

Establishing artificial colonies

Several thousand rook pairs are still breeding in Voivodina, thus, in theory nest site shortage is not a limiting factor for the Red-footed Falcon population. However, as in Hungary, the frequency of rookeries shifting to urban settlements is increasing (Fehérvári *et al.* 2009), making active conservation measures necessary to maintain the falcon population. We have erected over 350 nest-boxes in various locations, primarily choosing sites that had historic breeding records, or were pin-pointed by landscape scale habitat modelling as suitable breeding

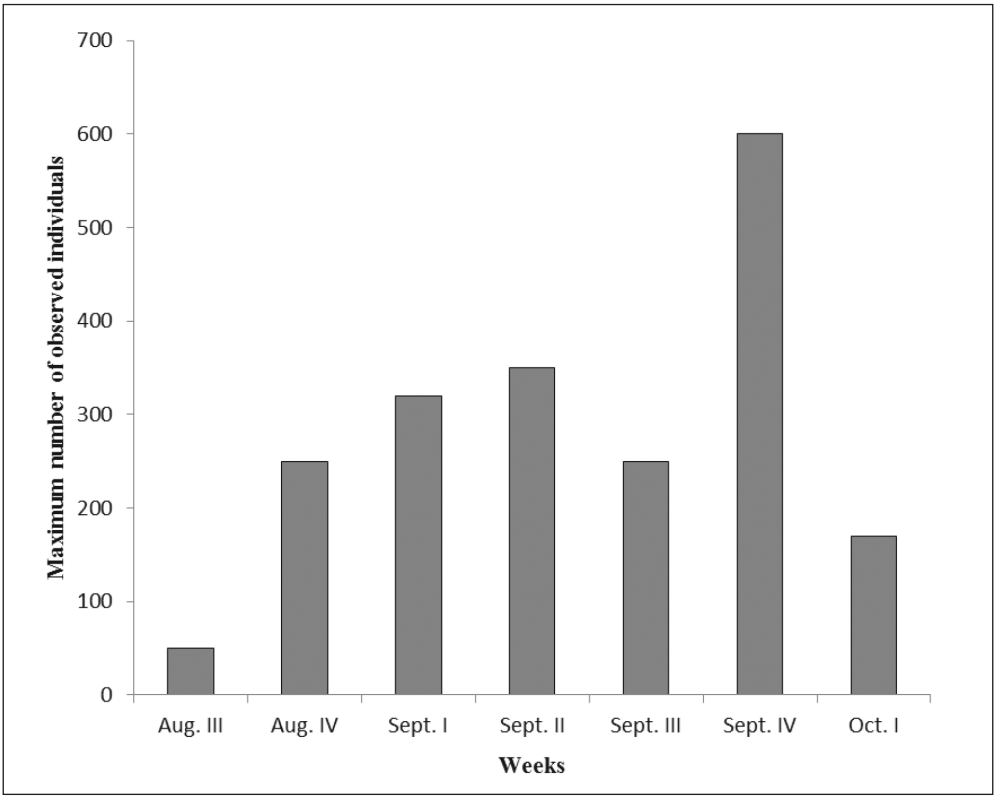

Figure 3. Maximum number of counted birds of weekly surveys carried out at the Mokrin pre-migration roost-site between 2010–2012

3. ábra A maximum kék vércse egyedszám a mokrini kék vércse gyülekezőn 2010–2012 között

sites (Fehérvári *et al.* 2012). Predominantly we used 2 nest-box designs; 1) the box most often used in Hungary (see Kotymán *et al.* 2015): 2.C.B. box, and 2) a relatively large box that in shape resembles the previous type, however with approx. twice the base area and with multiple openings (Tucakov nest-box). Our observations suggest that occupancy rate is similar in the first two box types.

Monitoring activities

We carried out several partial surveys on Red-footed Falcons since 2009 to locate breeding pairs and potential suitable habitats for artificial colonies *(Figure 1)*. Our results reflect high inter-annual fluctuations; however, the population seemed to be overall stable between 2009–2014 *(Figure 2)*. The mean number of observed breeding pairs was 156 ± 47 SD. One of our intriguing findings was that we recorded a small colony (4 pairs, near Jazovo) breeding in natural tree cavities. Csornai (Gergelj 2003) reported that Red-footed Falcons used willow tree cavities on the edges of riparian forests along the River Tisza. We believe that this type of breeding was not uncommon prior to river and forestry control measures along the rivers, when sufficient number of

Birds ringed in Voivodina and recovered elswhere				
Year of ringing	**Year of recovery**	**Place of ringing**	**Place of recovery**	**Type of recovery**
2011	2014	Vrbica (Egyházaskér)	Békéssámson, Hungary	Re-sighted as a breeding individual
2011	2012	Padej (Padé)	Sagu-Hunedoara Timisana, Romania	Re-sighted
2012	2013	Jazovo (Hódegyháza)	Görbeháza, Hungary	Re-sighted as a breeding individual
2011	2011	Vrbica (Egyházaskér)	Kosice, Slovakia	Re-sighted
Birds ringed in foreign countries and recovered in Voivodina				
Year of ringing	**Year of recovery**	**Place of ringing**	**Place of recovery**	**Type of recovery**
2009	2011	Királyhegyes, Hungary	Stanišić (Őrszállás)	Re-sighted as a breeding individual
2011	2014	Sanmartin, Romania	Margita	Re-trapped at the colony
2011	2014	Mezőcsát, Hungary	Vrbica (Egyházaskér)	Re-sighted as a breeding individual
2008	2012	Tiszafüred, Hungary	Mokrin	Re-sighted at roost site
2008	2011	Jászboldogháza, Hungary	Mokrin	Re-sighted at roost site

Table 1. Foreign recoveries of ringed Red-footed Falcons in Voivodina and recovered individuals ringed in elsewhere

1. táblázat Külföldön gyűrűzött és a Vajdaságban megkerült kék vércsék adatai

hollow trees was present. Our monitoring work also discovered the first pre-migration roost site (Fehérvári *et al.* 2014, Palatitz *et al.* 2015) in Serbia, near Mokrin (Agošton 2009, Gergelj *et al.* 2012). Coordinating with the Hungarian annual roost-sites surveys (Palatitz *et al*. 2015) we counted the number of roosting birds in 2010–2012 *(Figure 3)*. In 2013 the birds did not use this site for roosting, and we had no information on other alternative sites in Serbia in that year. In 2014 we discovered a new site near Kanjiža (Magyarkanizsa) where a total of 700 individuals were observed to roost in a small forest-patch at Kapetanski rit (Kapitány rét) on 2015.09.03.

Ringing

Individual marking of Red-footed Falcons has a long history in Voivodina. The first documented records of nestlings ringed derive from 1909, when Mrs. Károly Fernbach marked birds breeding in the colonies found within their estate near Aleksa Šantić. A total of 295 individuals were ringed in the period 1909–1932 (Schenk 1935, Matvejev 1938, Keve and Szijj 1957). Furthermore, Keve & Szijj (1957) estimate 450 ringed individuals between 1933 and 1945; however, only a small proportion of the data survived the Second World War. For instance Richárd Csornai ringed a total 71 clutches and a few

adults (277 individuals) from 1933 to 1937 (Csornai 1952). Additional 164 birds were ringed until 1990 in the former Yugoslavia. Ringing was carried out within the scope of the Belgrade Ringing Centre, after the Yugoslav war in the early ‘90s. Since then a total of 441 individuals were ringed. We started ringing birds with individual coded colour rings in 2010, and since then over 300 individuals received these read-rings. Ring recovery data is available from 2009–2014. We have records of 5 foreign recoveries from Voivodina *(Table 1)*, all birds found in the breeding period within the Carpathian Basin. These records indicate that the Red-footed Falcon population breeding in Voivodina is an integral part of the Carpathian Basin population, and as such successful conservation of the species can only be achieved if stakeholders and professionals closely cooperate in all countries within this region.

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