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Breeding range extension of the Peregrine Falcon (*Falco peregrinus* L.) in the Pannonian Plain

Original Article

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Abstract:

During three consecutive winter/spring seasons in the period 2018-2020, the breeding territory of Peregrine Falcon was monitored at an abandoned quarry on Fruška Gora Mt., (UTM DR 00; 45.165527 N, 19.803396 E) at Vojvodina Province, Northern Serbia. Described record represents the first confirmed nesting of Peregrine Falcon in this part of the country and provides evidence of the further expansion of breeding distribution range of this species in the Pannonian Plain.

Key words:
Falco peregrinus, Fruška Gora, nesting, Peregrine Falcon, Vojvodina Province

Apstract:

Širenje areala gnežđenja sivog sokola (*Falco peregrimus* L.) u Panonskoj niziji

U periodu zima/proleće tokom tri uzastopne godine (2018-2020), praćeno je gnežđenje sivog sokola u napuštenom kamenolomu na Fruškoj gori (UTM DR 00; 45.165527 N, 19.803396 E) u Vojvodini (severna Srbija). Opisani nalaz predstavlja prvi potvrđen slučaj gnežđenja sivog sokola u ovom delu zemlje koji pripada Panonskoj niziji, a koji ukazuje na dalje širenje gnezdećeg areala ove vrste.

Ključne reči:
Falco peregrinus, Fruška gora, sivi soko, Vojvodina, gnežđenje

Introduction

The Peregrine Falcon (*Falco peregrinus*) has a widespread, nearly a cosmopolitan distribution, except extreme polar and tropical regions including New Zealand as well as high mountain ranges and many oceanic islands (Cade, 1982; Ferguson-Lees & Christie, 2001; White et al., 2013). Depending on geographical location and environmental conditions, it establishes their eyries in a variety type of habitats including cliffs, rocky outcrops, trees, ground mounds and, in a recent time artificial structures (Cade, 1982; Ratcliffe, 1993; Banks et al., 2003). Since the dramatic decline after World War II caused by the widespread use of organochlorine pesticides, its populations has recovered in most parts of former distribution range (White et al., 2002; Ratcliffe, 1993; Rizzolli et al., 2005; Prommer & Bagyura, 2018). The current European nesting population is composed of three subspecies: *F. p. calidus* in remote tundra areas of North-eastern Europe, *F. p. peregrinus* in most parts of the continent, including the British Islands and *F. p. brookei* situated mostly in the Mediterranean, including interior Balkan Peninsula (White, 1994; Ferguson-Lees & Christie, 2001). However, there were no clear boundaries between *F. p. peregrinus* and *F. p. brookei* and in some areas, hybridisation could occur (Zuberogoitia

Fig. 1. Trachyte quarry "Srebro" near village Stari Ledinci – breeding eyrie of Peregrine Falcon (*Falco peregrinus*). The yellow circle indicates the position of the nest from 2020.

et al., 2009; Wink, 2018). According to the most recent data, the European population extent lies between 14,900 and 28,800 breeding pairs with an increasing trend (BirdLife International, 2015).

In Serbia, during the first half of the 20th century, Peregrine Falcon sporadically bred in the rocky areas, mainly in the western part of the country (Matvejev, 1950, 1964). The similar situation persisted during the rest of 20th century with slight changes in population abundance and density (Marinković & Grubač, 2000; Puzović et al., 2003; Grubač, 2018). Historically, in Northern Serbia (Vojvodina Province), there are no evidence-based breeding records, although few authors reported occasional breeding in low numbers (Marčetić & Medaković, 1954; Marčetić, 1957; Antal et al., 1971), but with insufficient information and lack of irrefutable proofs (Pelle et al., 1977; Mikuska, 1982; Pelle, 1990; Šćiban et al., 2015; Grubač, 2018). In the recent period, Peregrine Falcon breeds in Serbia only in hilly and mountain regions with cliffs and gorges south of Danube and Sava Rivers (Grubač, 2018). The population is estimated to 51-63 breeding pairs with a moderate decline (Puzović et al., 2015).

Results

Since 2010, we have been visiting central and eastern parts of Fruška Gora Mt. near Novi Sad (Vojvodina Province, Northern Serbia) for birds mapping. On 4th March 2019, central parts of Fruška Gora Mt. was surveyed, more precisely, the area between main ridge road (Partizanski put) and Stari Ledinci village. Near one forest clearing, in close vicinity of abandoned trachyte quarry "Srebro" (UTM DR 00; 45.165527 N, 19.803396 E) one specimen of Peregrine Falcon, was unintentionally disturbed by our appearance. The Peregrine perched on the lateral branch of European Beech (*Fagus sylvatica*) close to the quarry edge and feeding on a Feral Pigeon (*Columba livia f. domestica*). The abandoned trachyte quarry "Srebro" is situated around 1 km south from village Stari Ledinci (Petrovaradin municipality) in the territory of National Park "Fruška Gora" at approximately 274 m above sea level. The quarry has an erratic shape; most resemble an ellipse with approximate dimensions 450 × 140 m. The height of the vertical cliffs varies from 15 to 80 m. Deep-water cover the bottom of the quarry, forming the Ledinačko Lake (**Fig. 1**).

The observed individual had a dark cap, whitish breast and bluish-grey mantle, which are characteristics of an adult bird. Shortly after, another larger individual of Peregrine Falcon was repeatedly calling from the opposite, south-faced cliff. Dark brown plumage and profoundly marked breast were showed that this specimen was in their second year. The bird was sitting on the protruding rock in the middle of the cliff, around 40 m high from the water surface. The observed Peregrines were probably a pair in suitable habitat within the breeding season. Thus, in the following weeks, the pair was monitored using a spotting scope and binoculars. These visits were conducted every 3 to 10 days, usually in the morning hours until the end of May. The observations have been obtained from a distance of 250-400 m away from Peregrines to avoid disturbance. The pair spent most of their time on the western part of a quarry where the vertical cliffs are broadest and highest. Both individuals were usually sitting and preening or occasionally aggressively chasing away the Common Buzzards (*Buteo buteo*) and Common Ravens (*Corvus corax*) from the vicinity of the quarry. Between 8th and 17th March of 2018, a Peregrine's copulation was observed on nine occasions. The copulation took 8.5 sec on average (ranged 6-12 sec). The act of copulation in 66% of cases took place on the lateral branch of a partially dead, around 10 m tall tree, which grew out from one of the cracks between cliffs. During our visit on 10th April, the female of Peregrine Falcon was observed sitting low on a cliff shelf. Therefore, we suspected that the female was incubating, although we did not observe eggs. At the same time, male patrolled in soaring flight above the quarry and defended eyrie from one specimen of Common Buzzard and two

Common Ravens. The height of the cliff with potential nest ledge was around 60 m above the lake level. The scrape was approximately 20 m from the clifftop with estimated dimensions of 30 × 20 cm. The cliff with potential nest had a southwest aspect and with an angle of approximately 80°. During visits in April, it seemed that potential nesting attempt had failed apparently due to frequent human disturbance or less likely that no eggs were laid at all. However, the scrape was empty with only a few body feathers from Peregrine's female. In 2018, the pair of Peregrine Falcons was noticed the last time on 28th April.

Fig. 2. Incubating Peregrine Falcon (*Falco peregrinus*) female in the occupied Raven nest in northern cliffs of trachyte quarry "Srebro" during March of 2020

Meanwhile, due to significant improvement of weather conditions from April onwards, approximate 50-100 visitors were regularly hiking, camping and even burning fire in the proximity of potential nesting scrape. As the Peregrine Falcon is a strictly protected species in Serbia, the Provincial Institute for Nature Conservation was informed about the situation. Unfortunately, no conservation measures have been made for the restriction of visitors since March of 2020. During two short visits in late May, the specimens of Peregrine Falcon were not observed inside the quarry or in its surroundings. During two our visits in March and three visits in April of 2019, only adult male was observed on the described location. The fate of the immature female remains unknown.

Proven eggs laying and incubation on the abandoned quarry finally happened in 2020. On 7th March, Peregrines were sitting close to each other, watching the surrounding and periodically preening. Both birds clearly showed adult morphological features. From time to time, they showed aggressive behaviour towards the pair of Common Raven who, in the end, left the quarry. Later in the same morning, the male brought a small passerine bird as prey to the female. That was the start of courtship behaviour with many display flights, which continued at least 45 minutes and culminated in copulation on four occasions. Copulations lasted from seven to 13 seconds and occurred on the tree at the western part of the quarry. Shortly after that, the female took off from the copulation tree and landed on abandoned Raven's nest, after a circular flight in the northern slopes of the quarry. It was the first sign that a pair of Peregrines had selected an old stick nest for laying eggs instead of cliff crevice or crag. The position of the nest was in the shade on the northern cliff-face, below rock vault, around 22-25 m from water level. One week later, on 14th March, a female was observed on incubation posture at the same Raven's nest (**Fig. 2**).

When the female was briefly absent from the nest, it was possible to see at least two eggs inside the nest. Hence, it was assumed that she laid the first egg between 8th and 10th March. On 17th April, the female was sitting on the old Raven's nest. However, she was not in such a low posture like at the beginning of the incubation period. Therefore, we supposed that the chicks had already hatched, which was confirmed an hour later when the female shortly left the nest to pick up prey from the male. Three chicks, 4-6 days old, were observed. Accordingly, the incubation lasted approximately 29-31 days. After taking a prey (Feral Pigeon) female landed on the nest and fed the chicks and herself around 15 minutes. Shortly after that, she continued brooding on puny chicks. At the same time, male spent most of its time outside of the quarry. However, between 25th April and 3rd May, the nesting attempt had failed, but reason stays unclear. The nest depression was empty, and no adult birds were observed.

During the study period, specimens of Peregrine Falcon were observed hunting a different prey, mostly small or medium-sized birds. However, because of long-distance and unfavourable environmental conditions (fog and intense sunlight), the prey was rarely identified to the genus or species level. In three occasions that was a Feral Pigeon, in two occasions Common Blackbird (*Turdus merula*) and once the prey was Starling (*Sturnus vulgaris*), Common Chaffinch (*Fringilla coelebs*), Song Thrush (*Turdus philomelos*) and European Green Woodpecker (*Picus viridis*). According to the moustache, breast colour and spot density, it appears

that all three observed specimens of Peregrine Falcon phenotypically corresponded to the nominal subspecies *Falco peregrinus peregrinus*, which is typical subspecies in most parts of Central Europe.

Discussion

The findings described in this article present the first documented evidence of a Peregrine Falcon nesting in Vojvodina Province and at the same time the northernmost breeding site of this species in Serbia. Consequently, the territory defending and breeding attempts at the same locality in three consecutive years indicated presumably satisfactory habitat quality and suggested site fidelity. The colonisation of the Fruška Gora Mt. by breeding individuals of Peregrine Falcon has been expected for more than one decade (Stojnić & Puzović, 2008), but without concrete evidence until 2018. Thus, these nesting attempt(s) represent evidence of extension of the species nesting range in the Pannonian Basin and Serbia. The described nesting site is approximately 140 km east from Slavonski Brod in Croatia (Budinski, 2013), 130-160 km south from pairs in the Baranya county in Hungary (https://www.pecsiujsag.hu), and around 100 km from the breeding location near Valjevo in central Serbia (Stojnić & Puzović, 2008). In Hungary, the first breeding pair was confirmed 23 years ago, after at least 33 years of absence (Bagyura 1997). In Croatia, single data was collected in 2009, and few pairs are breeding near the capital city of Zagreb (Budinski, 2013). Recently, there are no new published data from continental parts of Croatia. However, the situation of the Peregrine Falcon in Hungary is much better, and recently has more than 70 active eyries (Prommer & Bagyura, 2018). There is no breeding evidence from the Romanian part of the Pannonian Plain, although some pairs nest at the border of the area at Apuseni Mt. (Komáromi et al., 2009).

The laying dates, landscape, location and other notes presented in this paper generally coincide with previous data reported across Pannonian Plain and Europe (Ratcliffe, 1993; Carlier, 1995; Moore et al., 1997; Prommer & Bagyura, 2018). Dimensions of potential nesting crag from the year 2018 are significantly smaller than reported earlier (Ratcliffe, 1993). This female choice may be related to the insufficient supply of crags and crevices, which is the case at this quarry. Although the diet sample is small, the combined observations from different years suggest notable flexibility and wide trophic niche by Peregrines on the Fruška Gora Mt.

As Peregrine Falcon established first pair and Fruška Gora Mt. and also regularly hosts floaters from increasing Central European stock (Prommer & Bagyura, 2018), we expect that breeding population would continue to rise in the future and expand its range through other suitable locations on Fruška Gora and rest of the Vojvodina Province (e.g. Titel hills, Vršac Mt). Together with the discovery of a new breeding site, it is necessary to implement strict conservation measures to protect its breeding territory.

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