

## First data on nesting of the Common Raven (*Corvus corax* Linnaeus, 1758) in cities of Bulgaria

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**Abstract.** In the period 2018-2022, nesting of Common Raven (*Corvus corax* Linnaeus, 1758) pairs was established in the cities of Montana, Varshets and Sofia. In 2021, possible nesting was detected for one Common Raven pair in the city of Vratsa.

**Key-words:** Common Raven nesting, cities, Bulgaria.

### Introduction

For Bulgaria, the Common Raven is not listed as a nesting species in cities, according to Nankinov (1981), Nankinov (1982), Michev *et al.* (1986), Donchev & Iankov (1989), Iankov (1992), Daskalova *et al.* (2007), Ivanov (2011), Vasilev (2003), Kyuchukov (2002). In the present study, single Common Raven pairs were observed nesting in the cities of Sofia, Montana, Varshets, and possibly Vratsa. According to the data obtained within the current study, the first single Common Raven pairs to nest in cities of the Midwestern and Northwestern Bulgaria began around the middle of the second decade of the XXI century.

In Western and Northern Europe, Poland in particular, around the mid-20th century, the first more frequent reports of the Common Raven nesting in cities are known from the mid XX century. Although in these parts of Europe the urbanisation processes observed for this species have started more than 50 years ago, it continues to nest rarely in cities (Zawadska & Zawadski 2014).

### Results and Discussion

In 2015-2016, a Common Raven was repeatedly observed feeding at the Sofia Zoo. In February 2017, two ravens were observed for the first time in this zoo. The birds perched next to a caged raven feeding on meat from the cages of carnivorous mammals which were accessible for the birds (pers. comm. Nikolay Trenev). In this period, ravens were often found in the Borisova Gradina gardens, near the zoo, but there was no evidence of nesting. In 2018-2019, a pair of ravens was observed again on the territory of the zoo. They have displayed a nesting behavior in the neighbouring area of the of the Borisova Gradina gardens. In February-April 2021, a pair of ravens was again seen there and, at the beginning of March 2021, the birds were observed to carry materials for nest construction in the Borisova Gradina. In May 2021, the pair of ravens and 3 juveniles flew out of a nest in the same gardens. In the middle of January 2022, first nest construction of the pair of ravens was registered in Borisova Gradina. On 07 February 2022, kleptoparasitism was detected in the pair of ravens who were building their nest using material stolen from a nest of a Magpie (*Pica pica*) in the zoo. The Common Raven nest was located in a dense forest

park area of the Borisova Gradina gardens, where coniferous and deciduous trees aged 50-60 years predominate. The nest was built on the top of a Scots Pine (*Pinus sylvestris*) at a height of about 21 m, at 610 m above sea level. In February 2022, the pair of ravens chased away a Goshawk pair (*Accipiter gentilis*) which nested for many years in the same area. Around 07 March 2022, the ravens began to incubate and, around 28 March 2022, three chicks hatched in the nest. On 06 May 2022, all three fledglings left the nest and were observed in its vicinity. After 20 May 2022, the three young ravens and their parents were seen feeding at the zoo. Here, the young birds have been observed to allow people coming closer to them, down to a distance of about 20-25 m, unlike the adults who in principle are much more cautious. On 30 May 2022, one young raven was found dead, drowned in a lake at the zoo. During the breeding period of 2021, two occupied raven nests were discovered in the city of Montana, in two industrial zones located at about 140-200 m above the sea level, the distance between the two zones in a straight line being 2.5 km. There are currently very few businesses operating in these industrial areas. In both breeding territories, the nests were located on non-operational concrete chimneys with a total height of 53 m above the ground surface. On these chimneys, the nests were built on additional metal structures.

Concerning the first pair of ravens in the town of Montana, the nest is situated in the northern industrial zone, on a concrete chimney 50 meters above the ground. Delivery by the birds of building materials for construction of the nest was observed around 17-23 February 2021. The incubation at this couple started around 10 March 2021 and lasted until 01-05 April 2021, when three juveniles hatched. On 10, 12 and 13 May 2021, it was found that one juvenile is taking off from the nest every day, whereas one of the juveniles is ca. four days younger than the other two. These three juveniles left the nest at an age of about 40-42 days. For another 15 days, the three young ravens and their parents were observed around the nest, after which they left the area. The adult birds were feeding the juveniles in this nest primarily on food scraps from pet farms, which are located at about 2 km away from the nest, on the edge of the city. It has been observed less frequently that adult ravens enter the central urban part of the city of Montana in search of food. Here, the ravens were found roosting on the roof of a block of flats, about 500m away from the nest. In this area, the birds were probably looking for food: usually dead feral pigeons (*Columba livia* var. *domestica*) and food waste left by people. On one occasion, a small rodent brought by the parents for feeding the young was registered. In 2022, in Montana, this pair of ravens nested again on the same chimney. On 17 January 2022, this nest was destroyed by a stormy wind. The pair then rebuilt the nest, at the same location, around 07-15 February 2022. For unclear reasons, this pair began to incubate very late, on 30 April 2022. The incubation lasted about 21 days, and two young hatched around 20 May 2022. Both chicks fledged on 28 June 2022, i.e. 39 days after hatching.

For a second pair of ravens in Montana, an incubating bird was found in a nest on 18 March 2021, in the western industrial zone of the city. This nest was built at a height of 50 m above the ground surface, and nearby there was another nest used in previous years. An unfinished nest of ravens located on a metal structure, at a height of 20 m, was also found on the same chimney. On 25-30 March 2021, it was observed that the pair has left the nest. In 2022, no nesting pair of ravens was found here.

In 2019, a pair of ravens was first observed to be nesting in the city park of Varshets. The ravens nest is located in the forest section of the park, at about 440 m above the sea level, in an old silviculture with a predominance of Scots Pines and Black Pines (*Pinus nigra*), standing in a straight line at about 500 meters from the city center of Varshets. The nest is built at a height of about 22 m from the ground surface, in the upper part of the dense crown of the White Pine. This section of the park is very rarely visited by humans, because it is difficult to walk after several storms which took place over the last 10 years. During the period 2019-2021, the nesting of this pair of ravens has been observed every

year. The adult birds were observed to feed mainly on open grasslands in the western direction. In those areas, livestock animals are grazing and small livestock farms are located in the city outskirts. The number of fledged juveniles was three in 2019 and 2020, and two in 2021. It was found that the hatchlings of this pair left the nest around 25-30 April 2019 and 2021, and around 03-07 May 2020. In March 2022, a pair of ravens nested again in the park of Varshets. On 31 March 2022, the nest was destroyed by a strong storm, after which the pair did not proceed to re-nesting.

On the 30 March 2021, in the northern part of Vratsa, a pair of ravens was observed feeding repeatedly in a cemetery park. The birds flew away westwards, where a large industrial area is situated, but no nest was found there. It is possible that the nest was located in an area to which there was no direct visibility in these large-scale industrial areas, which are closed for outsiders. On 15 June 2021, two adults and two juveniles were detected to fly low above the north-west parts of Vratsa. During the breeding period of 2022, no ravens were observed in Vratsa.

### Conclusion

The observed nesting of the Common Raven in cities of Western Bulgaria in the period 2018-2022 is considered to be a new stage in the adaptation of this species to the synanthropic environment. For the period 1950-1984, Michev *et al.* (1986) indicated that, for the territory of Bulgaria, the Common Raven nests on rocks and trees in the remote parts of cities. In "Birds of Sofia", Nankinov (1982) reported the Common Raven as nesting in mountainous areas, far from the cities. According to information collected in Bulgaria until 1986, Donchev & Iankov (1989) listed the Common Raven in the "seasonal sinanthropic" category, with a tendency of increasing sinanthropisation through pairs (or individuals) in single localities, often during the winter and rarely in the period of wandering. New data on the species from the beginning of the XXI century from Daskalova *et al.* (2007), Ivanov (2011), also does not indicate nesting of the Common Raven in an urban environment. According to data from the late XX and the early XXI century, the species is defined as a "passive sinanthropic" for areas around the city of Sofia (Stoyanov *et al.*, 2005), where it was discovered to nest on electric poles. Nesting of ravens on metal electric poles is the first and very important stage of breeding in anthropogenic environment in Bulgaria. In this type of nesting, the species is passing for the first time from natural habitats, such as rocks and trees, to anthropogenic structures such as electric poles located in various types of landscapes. Another important point associated with nesting on power poles is that such Common Raven pairs become accustomed over the years to the surrounding anthropogenic environment: people, roads, settlements, etc. Nesting of the Common Raven on electric poles was first observed in different regions of Bulgaria in the late 1980s and 1990s (Milchev 1994; Simeonov & Georgiev 1992; Stoyanov *et al.* 2005). This type of ravens' nesting became more frequent in the first and second decades of the XXI century, in various regions of Bulgaria (personal data; Daskalova *et al.* 2007, 2020; Ivanov 2011). The large city parks in Sofia and Varshets are also an important prerequisite for nesting of the species in these cities. Availability of nearby food sources (such as farms and the Sofia Zoo) is another reason why the ravens are starting to breed in cities. Furthermore, an important factor about the Common Raven is that, after the conservation measures taken in Bulgaria during the last four decades, the species has steadily increased its population and distribution range. In the development of this process, the Common Raven is not only occupying an expanding number of natural habitats suitable for nesting, but also began to nest increasingly often in anthropogenic landscapes. Therefore, in Bulgaria, the Common Raven should now be reclassified from "passive synanthropic" status (Stoyanov *et al.*, 2005) up to the next higher category, "initial sinurbanist", according to the categorisation of Donchev & Iankov (1989).

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