

Grzegorz Zawadzki<sup>1</sup>, Mateusz Jackowiak<sup>2</sup>, Dorota Zawadzka<sup>3</sup>

<sup>1</sup> Department of Forest Protection, Institute of Forest Sciences, Warsaw University of Life Sciences – SGGW, Nowoursynowska 159, 02-776 Warsaw, Poland, e-mail: grzegorz\_zawadzki@sggw.edu.pl

<sup>2</sup> Central Laboratory for Environmental Analysis-CentLab, Institute of Environmental Protection-National Research Institute, Krucza 5/11D, 00-548, Warsaw, Poland, e-mail: mateusz.jackowiak@ios.gov.pl

<sup>3</sup> Department of Forest Sciences, University of Łódź, Branch in Tomaszów Mazowiecki, Konstytucji 3 Maja 65/67, 97-200 Tomaszów Mazowiecki, Poland, e-mail: dorota.zawadzka@uni.lodz.pl

## RAVENS BREEDING IN WARSAW IN THE 21<sup>TH</sup> CENTURY

### ABSTRACT

In 2021, after a 65-year interruption, the Raven *Corvus corax* was found nesting again in the Royal Baths Park in central Warsaw, Poland. In addition, from 2021 to 2022, eight certainly or probably occupied breeding territories were found in forests and parks in the peripheral zone within the administrative borders of Warsaw. The synurbanization of the Raven in Warsaw is slow, as in other large Polish cities.

The Raven *Corvus corax* is a bird species widespread throughout Poland, showing a moderate increase in recent decades. Formerly it nested exclusively in forests, but now inhabits a diversity of landscapes and avoids only heavily urbanized areas (Chylarecki et al. 2018). As a result of intense persecution, the Raven became extinct in west and central Poland in the early 20th century, remaining sparse in the east. Due to protection in the 2nd half of the 20th century, the Raven recovered in numbers and colonized previously abandoned areas (Dobrowolski et al. 1962; Tomiałojć and Stawarczyk 2003; Zawadzka 2006). In the 1950s, the first breeding in the centre of large cities, including Warsaw and Krakow, was recorded (Dobrowolski et al. 1958), but synurbanization stalled and the Raven quickly abandoned breeding sites in the centre of large cities (Luniak et al. 2001), despite an evident increase in numbers and recolonization of the western part of Poland (Bednorz 1991; Zawadzka 2006).

For many decades, Ravens in Poland nested only in forests or extend parks in peripheral and suburban areas, without colonizing the inner city zone (Zawadzka 2006, Zawadzka and Zawadzki 2014). The number of breeding pairs was low, from a few to no more than a dozen. Such a stable long-term distribution was observed in Warsaw (Luniak et al. 2001), Łódź (Głubowski et al. 2009), Olsztyn (Nowakowski et al. 2006), Poznań (Ptaszyk 2003), Wrocław (Tomiałojć et al. 2020), Kielce (Wilniewicz et al. 2022), and other cities (reviewed in Zawadzka and Zawadzki 2014), persisting through

the first two decades of the 21st century. The reasons for the lack of colonization of urban areas by such a highly adaptable species were not fully understood. One hypothesis suggested a strong competition with Crows *Corvus cornix*, whose synurbanization occurred much earlier and resulted in high densities in large cities (Tomiałojć 2009). On the other hand, for Ravens food is less abundant in the centre of large cities, due to regular cleaning by city services, than in peripheral zones (Zawadzka and Zawadzki 2014).

On May 18, 2021, we observed three young Ravens, just capable of flight, which were fed by a parent in the Royal Baths Park in Warsaw. The birds were in the vicinity of a nest located in the crown of a silver spruce near the Belvedere. In 2022, the Ravens began breeding again but failed. We found a second new breeding pair also in 2021 in the “Bielansky Forest” reserve, in the northern part of the city, and a third pair nesting in the “Stefan Starzyński Kabacki Forest” reserve. However, in 2022 only a pair of territorial Ravens was observed near the nest places in the last mentioned reserve. A fourth raven nest was found in summer 2021 in the “Sobieski Forest” Reserve, but it remained unclear whether it was actually occupied. Furthermore, occupied home ranges were observed from 2020 to 2021 in the Bródnowski Forest, the Młociński Forest, and in forest parks Henryków and Dąbrówka in Białołęka Dworska, but no nests could be detected. Except for the breeding site in the Royal Baths Park, and partially in the “Bielansky Forest” reserve, all other breeding sites of the Raven were located in forest complexes of the outskirts of Warsaw.

The last breeding of a Raven in the Royal Baths Park was recorded in 1956, and in the Bielański Forest in 1957, during the period of recovery of the Raven population after World War II (Dobrowolski et al. 1958). Therefore, Ravens returned to breed in the center of Warsaw after a 65-year interruption. Most of the nesting areas are forest complexes under reserve protection on the outskirts of Warsaw. The only place where breeding has been confirmed in the strict city center is the Royal Baths Park. The return of Raven to Warsaw may be related to lower human activity and less anthropopressure in 2020 and 2021, associated with the Covid-19 pandemic. It will be interesting to see whether the breeding of the Raven in Warsaw, especially in the Royal Baths Park, will again prove to be a short episode or whether the species has permanently settled in the center of the capital and more breeding pairs will follow.

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