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Status of Rose-ringed Parakeet *Psittacula krameri* (Scopoli, 1769) (Psittaciformes: Psittaculidae) in Romania

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Abstract: In Romania, rose-ringed parakeets *Psittacula krameri* (Scopoli, 1769) came from the pet trade and captivity (birds were either deliberately released or they escaped). Most observations are in the urban parks of Bucharest or near them but individuals have also been reported in counties like Bihor, Brașov, Brăila, Călărași, Cluj, Dolj, Galați, Harghita, Iași, Ilfov, Mureș, Prahova and Timiș. The first individuals were seen in 2009 in Tineretului Park, Bucharest. Breeding was confirmed in May 2016 when two adults were reported feeding two or maybe three juveniles. Rose-ringed parakeet numbers fluctuate in Bucharest from 2010 to 2023, with the highest number being recorded in 2013, when 19 individuals were observed. In 2023, the highest number of gathered birds was four individuals and other four birds being present in other parts of the city, summing eight birds. It is currently unknown how many individuals come from captivity and how many from successful breeding in the wild. Additional surveys are required to determine the precise size of the free-ranging population and to oversee their integration into the avian fauna of Romania.

Key words: *Psittacula krameri*, invasive species, bird distribution, urban birds, bird adaptations, monitoring

Introduction

Many non-native organisms, including birds, are often restricted to human-altered environments in the area where they have been introduced. Urban environments, where the human footprint is very strong, are new and unstable ecological systems, offering the possibility for some species, even non-native ones, to occupy new niches. Elton (1958) believes that environmental changes are essential to understanding the success of invasive species. This is reflected in the greater success of invaders in modified environments than in natural environments (Sax & Brown 2000). Alien species fit this pattern well because their establishment is directly related to disturbance, preferring more disturbed land classes like urban or agricultural areas (Case 1996, Marcolin et al. 2023). Diamond & Veitch (1981) noted this in New Zealand, where non-native birds are very abundant in human-altered habitats but absent in unaltered forests.

Rose-ringed parakeet *Psittacula krameri* (Scopoli, 1769) is the most widespread parrot species worldwide (Butler 2003, Mori et al. 2013a, 2013b) and is abundant in its natural range (Cassey et al. 2004). The species has conquered new territories, reaching geographical areas completely dif-

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ferent from its natural range. The high percentage of new nesting colonies has led to the appearance of problems for native biodiversity (Menchetti & Mori 2014), with this species being in competition with native ones for food and nesting space. The presence of rose-ringed parakeets can reduce the feeding rate and increase the vigilance of native species (Clergeau & Vergnes 2011, Peck et al. 2014).

Materials and Methods

Study area

Romania is located in the southeastern part of Europe. The capital and the largest city is Bucharest (București), located in the southern part of the country (N44°25' E26°6'). According to a 2023 report by the National Institute of Statistics (INS 2023), the city has a population of 2.162.281 inhabitants and an area of 239 km². It has a continental climate with an annual precipitation of 615 mm and an average annual temperature of 10–11°C (Ioja 2009). Bucharest and the area around the city have a low percentage of protected areas (Ioja et al. 2010a). Urban green space occupies 2275 ha in Bucharest, while urban parks represent 29.9 % of this and approximately 3 % of the total area of the city, 3.5 m² per inhabitant (Pătroescu et al. 2004). Urban parks have an uneven distribution in the city (Sandric et al. 2007) and peripheral green areas do not offer adequate services compared to urban parks (Ioja et al. 2010b).

Data collection

In order to assess the situation of the rose-ringed parakeet for the whole country, national ornithological databases were consulted, as well as Facebook groups where photos of individuals of the species were posted. Another method of collecting information was directly from the field through a synchronous count carried out in the parks of Bucharest between November 2019 and February 2020, one visit per month, with the help of volunteers from the Romanian Ornithological Society. Articles were also searched through Google Scholar using the keywords "*Psittacula*", "*krameri*" and "Romania".

The analysed ornithological databases were Ornitodata (2023), Rombird (2023) and OBM (2023), and two Facebook pages "Fauna României – Conservarea prin educație" and "Păsările în primplan (Birds in the foreground)".

Data analysis

All the information was centralised in a csv-type file, where each observation was assigned a unique code, which was applied to the photos associated with the relevant observations. The observations contained the date, number of individuals observed, their gender, the name of the observer, the city where the observation was made, the area in the city, GPS coordinates, the accuracy of the location, the type of food consumed (if this information existed), the activity of the individuals, the source of the information, comments on the observation. We also recorded whether the observation is a duplicate, with many observations being present in more than one source. Data was visualised and analysed in QGIS (QGIS Development Team 2023).

Results

Distribution and numbers

There have been 318 observations of the species gathered from the whole country since 2010 (Fig. 1). Rose-ringed parakeets were seen in 14 counties in Romania (Fig. 2), mostly near the big cities. The majority of observations came from Bucharest, most of them being concentrated in the southern part of the city (Fig. 3), where birds were seen flying in small flocks and successful breeding was confirmed.

Although the first sightings of the species were in 2009 in Bucharest, there are no records showing the number of individuals or the exact place and time of observation. The first documented sighting was in 2010, with six birds reported in Carol Park (Rombird 2023). The observer mentions that solitary individuals were observed in previous years, but this time there is a flock of six. From 2010 until now, there have been sporadic observations in the whole country and fluctuations in the number of individuals present in Bucharest (Fig. 4). In the winter of 2013, the largest group was reported in Tineretului Park, composed of 19 birds. Then followed a sudden drop and then a climb to 11 birds, followed by a hold at 8 for two years. These high numbers were reported in the coldest periods of the year, autumn and winter, when the birds form a flock and choose a certain area for wintering. In 2017, six individuals, which formed three pairs, were observed on the island of Tineretului Park from January to November. In 2018–2020, on the same island, 4 individuals were constantly reported; 2 formed pairs. In 2021, the population of rose-ringed parakeet in Bucharest suffered a big drop, with only solitary individuals being seen in various places of the city. 2022–2023 showed a small increase, with up to 3 or 4 birds seen together in Tineretului Park, one of them being a blue morph, and other solitary birds observed in other regions, mostly in the eastern part of the city, summing 8 birds for the whole city.

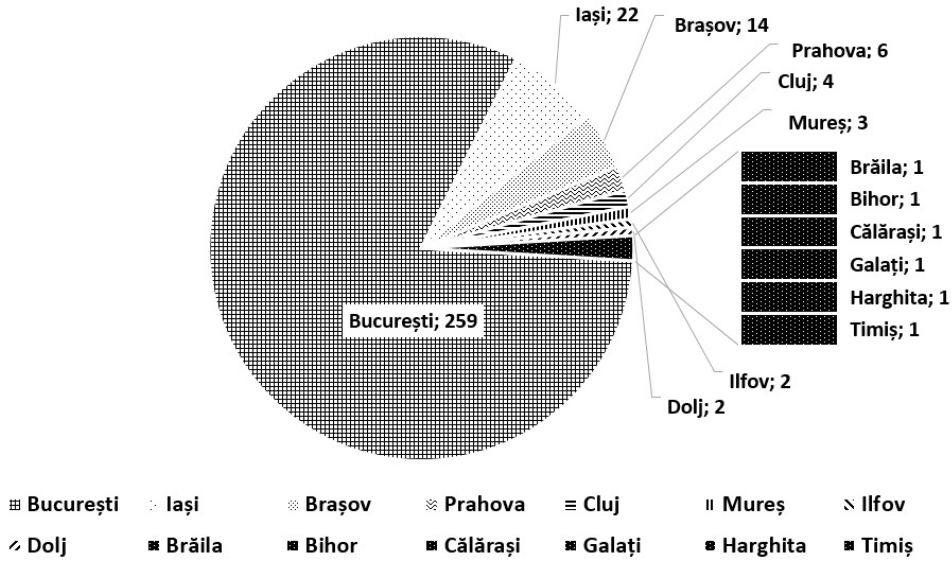

Fig. 1. Number of observations for each county where the rose-ringed parakeet was seen (n=318).

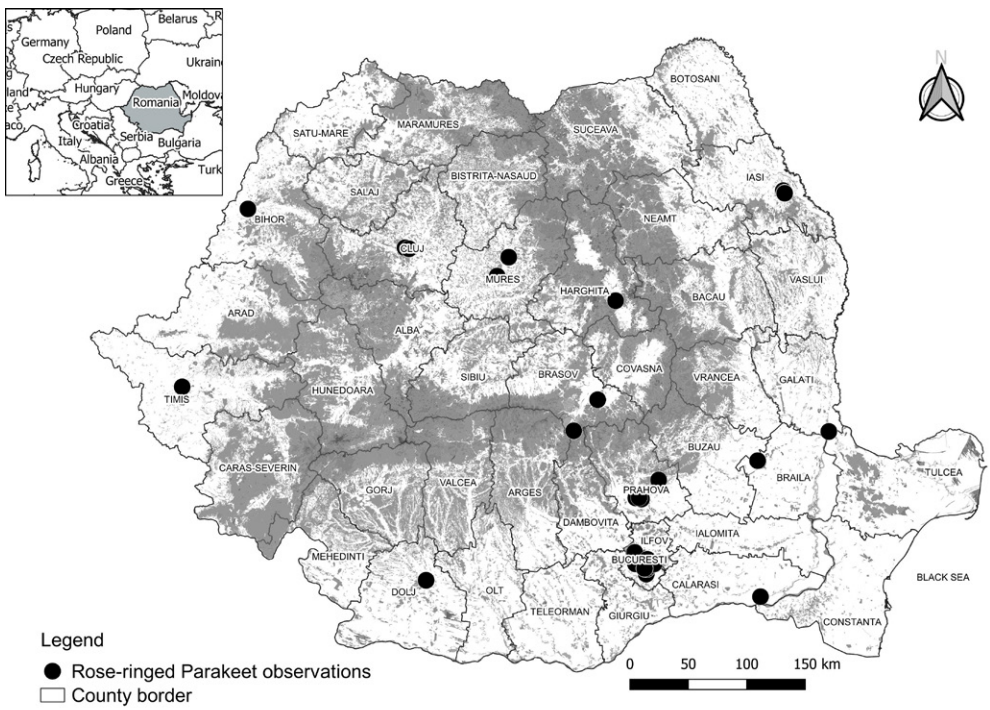

Fig. 2. Distribution of rose-ringed parakeet observations in Romania.

Movements

It can be seen that most of the observations are made in Tineretului Park due to a small population established since 2009 (Rombird 2023). Individuals were occasionally observed in Carol Park and Văcărești Natural Park (PNV), which most likely came from Tineretului Park. Following the synchronous monitoring in the large parks of Bucharest from November 2019 to February 2020, we were able to observe the movement of birds between the three parks. The birds use the three parks for feeding; they rarely appear in the PNV, but Tineretului Park, more precisely the Southern island in the park, is used as a roosting and breeding place. It is not known, however, whether the birds observed in other regions of the city belong to the population established on the island in the park; most likely, they are solitary individuals, newly escaped, that stayed for several days in the observed places before being seen again after a few days.

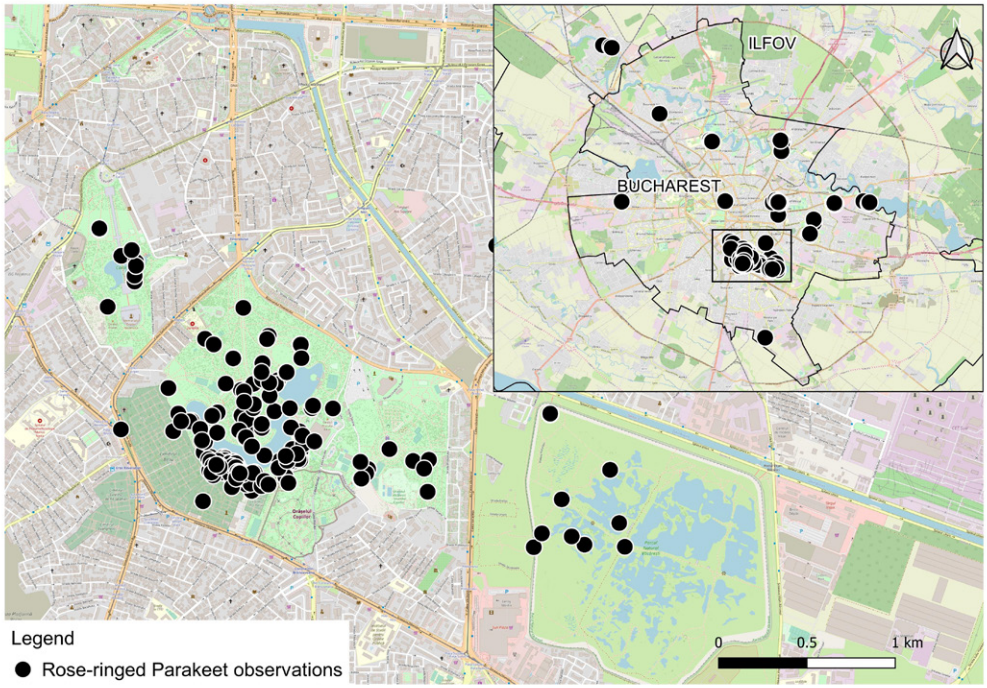

Fig. 3. Distribution of rose-ringed parakeet observations in Bucharest, Romania.

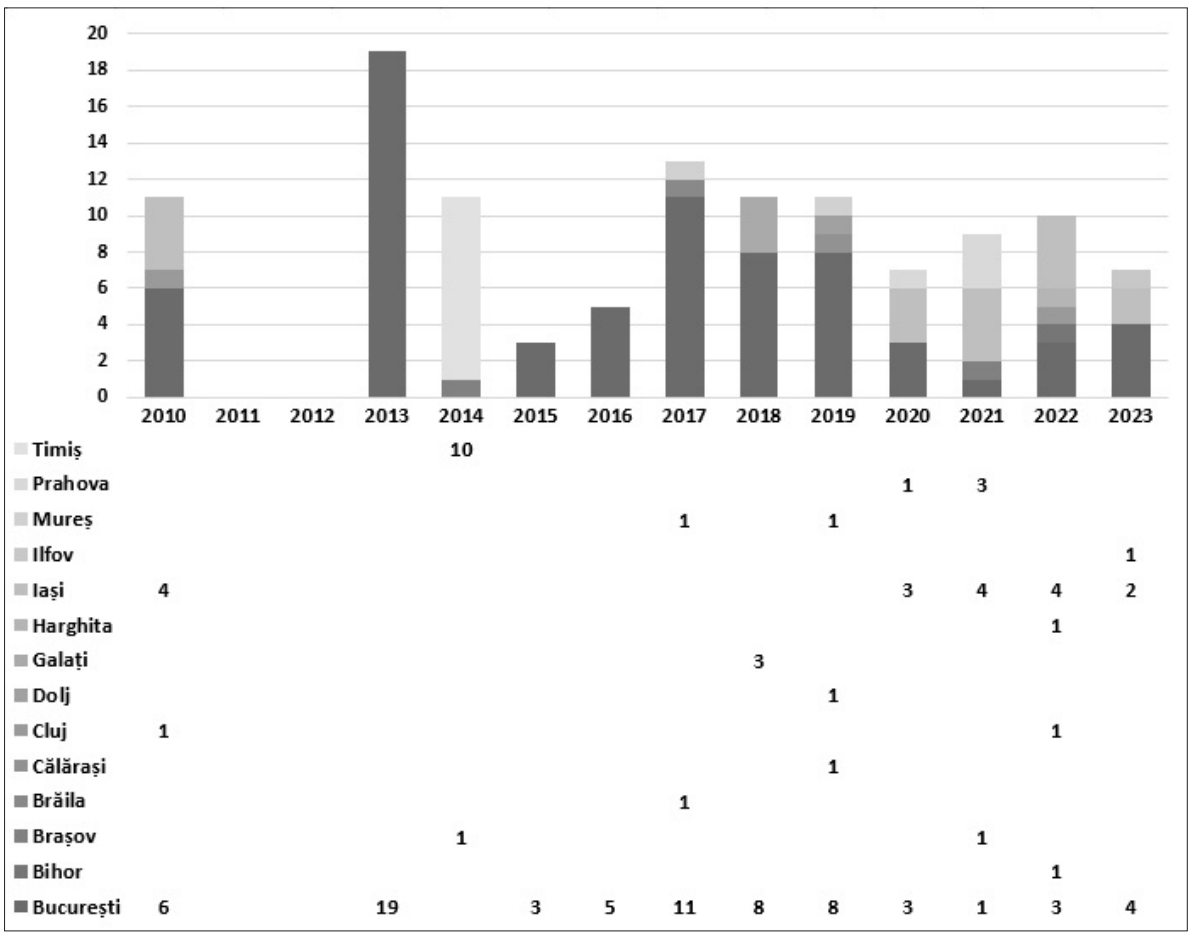

Fig. 4. Maximum number of rose-ringed parakeets observed at a time in a flock since 2010.

Discussion

An analysis of all European publications for the rose-ringed parakeet shows that 154 populations are known from 37 reviewed countries, with a minimum estimate of 85,120 individuals. Among the 37 countries analysed, 10 have the majority of the population that has grown considerably in the last 40 years (Pârâu et al. 2016).

In the Balkan Peninsula, the species is established in Greece and occasionally seen in Bulgaria, with no successful breeding attempts, and in Croatia as an incidental species (Nikolov et al. 2016). It is present in Slovenia as well (Panjković et al. 2021).

In the last 10 years, there has been no significant increase in the population size of the rose-ringed parakeet in Romania at both local and regional level. Nevertheless, it has been recommended a permanent monitoring of the species (presence, numbers and reproductive success) by the environmental authorities but also by environmental NGOs. The goal of the monitoring is to intervene as quickly and efficiently as possible in eradicating the species in order to prevent the impact on the environment and human activities that have been escalating in many European countries (Menchetti et al. 2016).

The only observations that can relate to the successful nesting of the species were made on the island of Tineretului Park. The first evidence appears on May 29, 2016 (Ornitodata 2023), when a pair is reported feeding two or maybe three chicks. From the images, we estimated that the chicks were around 60 days old according to photographic documentation of chick development by Braun & Wink (2013). Another observation was made in May 2017 when two chicks were photographed emerging from the nest hole, also on the island of Tineretului Park. We estimated that they were about 50–60 days old. The trees they used for nesting were dried poplar trees (*Populus* sp.), about 8 m high. We cannot say for sure how many individuals come from captivity and how many from successful breeding in the wild.

In January 2020 appear the first observations attesting the presence of the rose-ringed parakeet in Iaşi. A maximum of four individuals were observed, of which one pair was already exhibiting nesting behaviour, occupying and preparing a tree hole for nesting.

In the natural range of the species, temperatures required for nesting are over 20°C in February–March (Hijmans et al. 2005). For comparison, in Bucharest, the average temperatures in February–March are between -6°C and 10°C and, in winter nights, they might reach -20°C – temperatures, which the small population of rose-ringed parakeet from Tineretului is resisting. The species adapts so well that individuals have been observed consuming ice (Rombird 2023). From personal observations (as well as from the photos related to the observations from the analysed databases), several types of food were identified that the species especially preferred in Tineretului Park but also in other parks in the city. Most frequently, in Tineretului Park, rose-ringed parakeet are observed feeding on bald cypress *(Taxodium distichum)* cones, walnut (*Juglans* sp.) nuts or seeds of European ash *(Fraxinus excelsior)*. Occasionally, birds have been observed consuming parts of thuja (*Thuja* sp.) or golden rain tree (*Koelreuteria* sp.). During the winter, the species has also been observed at the artificial feeders placed by the Romanian Ornithological Society (SOR) in Tineretului Park, which are filled by SOR volunteers with seeds of common sunflower *(Helianthus annuus)*.

The rose-ringed parakeet is very territorial during the nesting and fledgling periods. We observed in April 2016 how a male parrot chased away starlings (*Sturnus vulgaris*) that settled near the nest. On another occasion, in September 2018, we observed how three hooded crows (*Corvus cornix*) chased away an adult from a walnut tree, and in November 2018, a pair of rose-ringed parakeet were alarmed at the sight of a common buzzard (*Buteo buteo)* that was flying over. Rose-ringed parakeet are very aggressive with other birds at artificial feeders set up in parks, mostly in the wintertime when the feeders are full of sunflower seeds (Drăgan, unpublished observation).

It is not known why the population from Tineretului Park has decreased and no predators of the species have been identified. A study shows that the long-eared owl (*Asio otus*) can occasionally feed on rose-ringed parakeets (Mori et al. 2020). Exactly on the island where the parakeets roost and in its immediate vicinity, several individuals of long-eared owl were observed during the winter, using the conifers in the park to roost. It seems that the only known threat to the species are humans trying to capture the birds by using traps made from sticks with glue, mostly because the birds are sold at a high price (Drăgan, unpublished observation).

Parrots are very common at pet shops in Bucharest and other cities in Romania, being among the best-selling birds as pets. Other escaped species have also been reported in Bucharest, such as budgerigar (*Melopsittacus undulatus*), lovebird (*Agapornis* spp.), cockatiel (*Nymphicus hollandicus*), Alexandrine parakeet (*Psittacula eupatria*) and even the scarlet macaw (*Ara macao*) (Drăgan, unpublished observation).

Further surveys are necessary to estimate the exact size of the reported rose-ringed parakeet free populations and to monitor their integration into the Romanian bird fauna.

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