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ORNITHOLOGICAL NOTE ON THE ATYPICAL BREEDING OF THE SPECIES *STREPTOPELIA DECAOCTO* (FRIVALDSZKY, 1838) IN THE URBAN HABITAT OF THE CITY OF CRAIOVA (ROMANIA)

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ABSTRACT

This article documents an uncommon breeding case of the Eurasian collared dove (Streptopelia decaocto) in an urban environment, specifically referring to nesting in a flowerpot containing ornamental plants, located on a balcony approximately 6 meters above ground level, in the Rovine district of Craiova, Romania. The main aspects of breeding are presented: nest building, egg laying, incubation, hatching, and the stages of development of the chicks until they leave the nest. The observations were made between July 26 and August 27, 2023. The data presented complement the information in the specialized literature regarding the adaptive behavior of this species in the context of urbanization. The observations described may also be relevant to understanding the dynamics of synanthropic species or may be useful for urban biodiversity management.

INTRODUCTION

Streptopelia decaocto (the Eurasian collared dove) is taxonomically classified within the order Columbiformes, family Columbidae, alongside pigeons and turtle doves.

It belongs to the Indo-African faunal type (Munteanu 1974), with the species originating in the southern and southeastern regions of Asia – including India, Sri Lanka, and Myanmar (formerly Burma) (Smith 1987, Romagosa & McEneaney, 1999, as cited in Fielder et al. 2012). From there, *Streptopelia decaocto* underwent a remarkable natural westward expansion, being present in the Balkans as early as the 19th century (1837). Beginning in the period 1900–1930, the collared dove continued its expansion, gradually occupying various ecological niches in the Near East, northern Africa, and much of Europe, including Romania. The rapid expansion of this species into Europe was rigorously documented by Stresemann & Nowak (1958) and later by Nowak (1965, 1991) – authors cited by van Grouw (2022), who analyzed the natural colonization route from Asia Minor to the Balkans and onward to Central and Western Europe. In the 1970s, the collared dove spread throughout Europe, becoming a constant presence in urban areas as a sedentary and abundant species. It was later introduced to North America, Central America, the Caribbean islands, and Japan (https://en.wikipedia.org/wiki/Eurasian_ collared_dove).

In Romania, the collared dove was first recorded in the southern regions of the country, specifically in Oltenia and Muntenia, by the biologist Călinescu (1933). Initially, the collared dove was confused with the Barbary dove (*Streptopelia risoria*; previously *S. risorius*), a domestic species originating from Africa, which is derived

from *S. roseogrisea*. Subsequent research has shown that *Streptopelia decaocto* and *S. risoria* are distinct species, but they are capable of interbreeding with each other as well as with other columbid species, resulting in hybrids (Radu 1954, 1967a). Valuable information on the distribution, biology, ecology, and ethology of the collared dove comes from studies conducted in the mid-20th century by Linția (1955), Radu (1954, 1958, 1963, 1967a, 1977 – 1979), Pașcovschi (1969), and others.

The colonization of Romania by the collared dove occurred during the interwar decades, starting in the southern part of the country, particularly in the Danube region. The dispersal routes extended from the southeast to the northwest (Radu 1977 – 1979). Between 1920 and 1950, the collared dove rapidly expanded its range (Munteanu 2012), and today it is one of the most widespread bird species in Romania, as a result of its great ecological and ethological adaptability to the anthropic habitat (Radu 1963; 1977 – 1979, 1979). It is frequently found in lowland, hilly, and plateau regions, and less commonly in mountainous areas, where it has been recorded at about 1300 m altitude (Comșa, cited in Radu 1967b), often along river valleys. It is found in both urban and rural settlements, as well as their surroundings, being a typically sedentary and synanthropic species. Since the 1990s, *Streptopelia decaocto* has been reported in numerous scientific publications authored by researchers from different regions of the country, such as Papadopol and Petrescu (1990), Munteanu (1998), Ardelean & Béres (2000), Stănescu & Pârvulescu (2008), Croitoru (2008), Ilie & Marinescu (2015), and others.

The abundance of collared dove populations in Romania is relatively high, with population numbers fluctuating over time (Ciochia, 1992), depending on climatic conditions, human activity, predation, and other factors. Although it is difficult to estimate, an approximate number of 170,000–340,000 nesting pairs has been recorded in the atlas of birds of community interest in Romania (Fântână et al. 2022).

In Oltenia, the first records of the collared dove belong to Călinescu (1933), who reported the presence of the species in Calafat, mentioning that it entered the area around 1877. From the first record of the species until the 1950s, published data on its presence in the region are few and fragmentary, due to the historical context marked by war and economic instability. The species was known to local people in the settlements of the lower Danube valley (since the 1930s) but was not yet well documented. Starting in the second half of the 20th century, amid accelerated urbanization and the expansion of residential areas, the species became common in anthropogenic areas. During the same period (starting in the 1960s), ornithological research in the Oltenia region intensified, becoming more numerous and scientifically valuable. As such, the presence of the collared dove in this region of the country was reported by several ornithologists, including Tălpeanu (1963, 1971), Popescu (1972), Grossu & Popescu (1977); they recorded it in rural and urban habitats of the mountainous areas, along river valleys and in adjacent depressions, observing it at altitudes of up to 500 – 700 meters. Important mentions were made by Papadopol (1984, 1986), Cătuneanu (1985), and others. After 2000, the species has been reported in studies conducted by Orzață (2012), Ridiche (2012), Bălescu and Ridiche (2013, 2020), Ridiche and Bălescu (2012), Ridiche et al. (2014), etc. The list does not end here; from the time of the initial reports until the present, the species has become widespread in almost all localities in the area. The Eurasian collared dove is also recorded in the catalogue of the Oltenia Museum Craiova (Bazilescu et al. 1980), and the data were later revised by Ridiche (2011). It is specified that the oldest exhibit in the collection of the Oltenia Museum Craiova was collected from the locality of Bumbești (Gorj) on 21 April 1967.

In Craiova municipality, it is a common, sedentary, breeding species (Bălescu 2000, 2005 – 2008, 2021, Ridiche & Munteanu 2015), found in all city habitats: parks, the Botanical Garden, neighborhoods, squares, residents' tree-filled courtyards, cemeteries, the airport area, and lands on the outskirts of the city. It is observed in pairs and small groups.

The remarkable adaptation to the anthropogenic environment has favored not only the colonization of cities but also the emergence of unusual breeding behaviors. Initially, in its natural habitat, about 95 % of nesting occurred in trees and shrubs. Over time, this hereditary behavior was gradually replaced by the preference for existing artificial structures; thus, over 80 % of nesting cases are currently associated with buildings, with nests being installed on balconies, in flower boxes, in holes in walls, on beams, on electrical boxes, behind business signs, and in raised sign letters, etc. (Radu 1960, 1984, Papadopol & Petrescu, 1990).

This ornithological note presents some behavioral aspects regarding the atypical breeding of the collared dove in the Rovine district of Craiova city. With a total area of 81.41 km², Craiova, a lowland city, is located in southwestern Romania on the left bank of the Jiu River. The climate is temperate continental with Mediterranean influences. The Rovine district is located northeast of the city center.

MATERIAL AND METHODS

Nest monitoring was carried out in the Rovine district, from an apartment located on the 2nd floor of an apartment building at a height of 6 m above ground level. The nest was placed in a flower pot situated on the windowsill of an enclosed balcony. The pot measured 18 cm in diameter and 12 cm in height, providing a stable base for nest construction. The main methods used in monitoring the breeding of this species consisted of observation, photography, and filming. Daily observations took place between 26 July and 27 August 2023. A Canon SX70HS camera was used to record breeding behavior. Most of the photographs and videos were taken from inside the enclosed balcony. Documentation was based on data synthesized from the specialized literature and by consulting the electronic ornithological platforms.

RESULTS AND DISCUSSIONS

The main breeding stages of the collared dove (*Streptopelia decaocto*) pair, observed between July 26 and August 27, 2023, are presented below in chronological order. The species is monogamous and does not exhibit visible sexual dimorphism, which makes sex identification in the field difficult. To establish the contribution of each partner in the breeding process, I relied on data from the specialist literature (Radu 1960, 1984; Fielder et al. 2012).

On Friday, July 26, nest construction took place. It was completed in a single day through the cooperation of both partners. Initially, the male probed the balcony windowsill. The female chose one of the four geranium pots, placed on the second floor of the apartment building, at a height of 6 meters above the ground. She ignored the noise from nearby cars and passersby. The male gathered materials for nest building: dry twigs and branches. The female carried out the actual construction, arranging the twigs inside the flower pot, including during the evening hours (around 7:00 PM), a behavior typical for the breeding period, especially in summer months when daylight duration is extended.

On Saturday, July 27, the nest was completed: a simple but effective structure, measuring 18 cm in length and 12 cm in width, and featuring a small recess for the eggs. That morning, the opening of the window startled the adult, which flew

out of the nest and temporarily took refuge in the branches of a nearby manna ash (*Fraxinus ornus*). It returned immediately after the window was closed and did not leave the nest again.

On Sunday, July 28, at 8:00 AM, the situation repeated itself just like the previous day. On this occasion, the first egg was observed (Fig. 1). Incubation began immediately after the first egg was laid. The pair quickly adapted to the noises in the breeding microhabitat and no longer left the nest when the window was opened. Therefore, the second egg could not be observed directly, but the presence of the adult at the nest and its incubation behavior indicate that it was laid on this day.

Between July 30 and August 10, no major changes were recorded; the pair of collared doves remained at the nest, undisturbed; both parents were observed alternating incubation shifts, the male during the day (Fig. 2), the female at night – a typical behavior for this species, in which both sexes actively participate in incubation.

On Saturday, August 10, around 8:30 PM, after approximately 14 days of incubation, the head of the first chick was observed.

The next day, August 11, at 7 PM, the second chick was observed; although it was covered by the adult, its position was noted: on its back, with its beak facing upwards, thus facilitating feeding by the adult female.

On both days, the adult remained at the nest and continuously covered the chicks. I did not notice the exchange of partners.

On August 12, during the morning, about 15 days after the first hatching, both chicks could be photographed (Fig. 3). At 5:50 PM, the chicks were left alone again and did not move from their initial position. After 15 minutes, the adult returned to protect them. The chicks had cream, beige-yellowish down, and their beak, legs, and skin showed a dark, blackish hue; during the first four days, their eyes remained closed and they did not change the position in which they had been left by the adult.

During the period 12–15 August (for four days), the nidicolous chicks, helpless and frail, defenseless, remained constantly under the protection of the parents; alternately covered them (Fig. 4) and remained at the nest during the night; feeding of the chicks began immediately after hatching, through direct regurgitation of 'pigeon milk' into the chicks' beaks; this nourishing secretion appears in both sexes about 48 hours before the end of the incubation period (Radu 1973). This type of food is vital during the first days of life, ensuring the initial development of the chicks even before their eyes open. Although the feeding of the two chicks is delayed by one day, this did not significantly affect their development.

Starting on August 16, 2023 (Wednesday), the chicks were left unattended for longer periods during the day (Fig. 5). Only one adult, most likely the male, was frequently observed near the nest; it returned to feed the chicks and then remained briefly to cover and protect them (Fig. 6). The duration of stay was: in the morning from 7:30 to 8:40; 11:00 to 12:00; in the afternoon from 14:40 to 15:00; and in the evening between 17:30 and 19:30. After this hour, the male left the nest, and the chicks were left alone throughout the night without parental supervision. This marked the first night the chicks spent without an adult present.

On Thursday, August 17, 2023, the adult visits to the nest were mainly for feeding, after which it left the chicks alone. The time intervals spent at the nest were: 6:30–7:30; 8:40–8:55; 9:43–10:20; 12:15–12:30; 14:40–15:05; 17:45–18:00. During these periods of time, besides feeding, the male also partially covered the chicks, a behavior typical of parental care.

Friday, August 18, 2023 – the adult's presence at the nest was greatly reduced, with five short periods of stay recorded: 7:00–7:15; 9:30–9:45; 11:10–

11:20; 15:00–15:20; 17:30–17:50. Starting from the morning of this day, active manifestations were observed: movements in the nest, position adjustments, cleaning, then mutual touches with beaks, etc. These activities were carried out with a gap of about one hour between the chicks. Various exploratory and socialization behaviors represent forms of interaction that can be associated with the recognition and practice of motor coordination.

Saturday, August 19, 2023, the male was observed at the nest twice, exclusively for feeding the chicks: in the morning from 6:45 to 7:05 and in the evening from 17:40 to 17:46. For the rest of the day (Fig. 7) and throughout the night, the chicks were left completely unattended.

On Sunday, August 20, 2023, the situation repeated itself like the previous day, with the difference being the feeding intervals: in the morning, from 10:50 to 10:56, and in the afternoon, from 14:20 to 14:26. The presence of the first gray feathers, still short, is noted (Fig. 8). This physiological stage marks the beginning of the transition to the juvenile stage.

Over the next 5 days: Monday, August 21, 2023 – Friday, August 25, 2023, the male's arrival time at the nest varied: in the morning, the arrival was recorded at the earliest at 7:50 and at the latest at 9:30; in the evening, between 17:00 and 18:30. The chicks continue to receive food through regurgitation (Fig. 10). In parallel, the lack of continuous protection from parents causes the chicks to adapt to environmental conditions on their own - a process essential for survival. This parental behavior of gradual withdrawal, reflects the species' strategy to stimulate juveniles' autonomy before leaving the nest.

During this period, the chicks experienced visible development: the plumage became predominantly gray, and the remiges and rectrices emerged. In the absence of adults, the observed behaviors focused on resting/sleeping, individual and mutual preening, stretching, fluttering, wing flapping, and also observing what was around them (Fig. 9, Fig. 11). The chicks proved to be alert and adapted, accepting human presence without signs of panic, showing curiosity, and even allowing close-range photography, which suggests a high degree of habituation. Despite the absence of their parents during the day, the chicks maintained a calm posture, stayed close to each other, and displayed no aggressive behavior. In response to the appearance of potentially threatening stimuli, they reacted by moving closer to one another and retracting their necks into their bodies, suggesting an instinctive form of passive defense. Although they did not accept food or water (offered directly by the observer), each day brought a new stage of learning and adaptation to the urban environment, in the absence of direct contact with the adults.

Saturday, August 26, 2023, was the last day the adult was observed feeding the juveniles, with both visits taking place in the morning (8:30 AM) and in the afternoon (4:15 PM). Thus, the total duration of the post-hatching feeding period spanned approximately 17 days, during which the juveniles, although still flightless, received regular parental care. During this time, they developed plumage closer to that of adults, but without a visible ring.

Sunday, August 27, 2023, was the last day they stayed at the nest. In the morning, at 9:30, the first juvenile – apparently the more courageous one – left the flower pot and moved onto the balcony windowsill. The first juvenile alternated between the edges of the balcony and the pot area, where the other juvenile did not dare to leave the pot (Fig. 12). The latter came down only in the evening (around 7:30 PM). Both stayed for about another hour. From around 8:45 PM, neither juvenile was observed anymore – a sign that both had permanently left the nest and taken flight.

Five days after leaving the nest, one of the collared doves – the adult female – briefly returned to the balcony area, carefully inspecting the place and stopping for a few minutes on the windowsill before resuming its flight. Although nesting conditions remained unchanged (presence of flower pots and absence of disturbance), the pair did not return to breed the following season. However, two collared doves – possibly descendants of the same lineage – have become accustomed to frequently visiting the balcony, where they fearlessly feed on various food scraps placed on the windowsill by the owner. The observed behavior indicates fidelity to the microhabitat and an obvious adaptation to human presence, characteristic of synanthropic species.

Breeding in a pot of geraniums on a balcony windowsill, represents an atypical choice – but not uncommon – for the collared dove. The species is known for its high tolerance to urban disturbances and its ability to exploit available nesting sites, even when these are not ecologically ideal.

Summarizing the data, the following aspects can be noted:

– the repeated presence and probing of the chosen nesting site;
– the presence of a rudimentary nest, made up of thin twigs, characteristic of the species;
– the female's laying of two eggs approximately one day apart;
– the hatching of the first chick on the 14th day after incubation of the first egg; the second chick hatched the following day; this is in accordance with the normal incubation period for *Streptopelia decaocto*;
– on the 6th day after the hatching of the second chick, the parents left them alone during the night;
– the adults left the nest for shorter or longer periods of time to prepare for the nutritional needs of the chicks;
– the chicks were cared for over a period of 17 days, during which they were fed; in the first days by both parents, then only by one, the male;
– the chicks stayed in the nest for 18 and 17 days respectively from the moment they hatched, until they took flight;
– both juveniles left the nest at the same time;
– the breeding process (from nest observation until the juveniles' departure) lasted 33 days.

The factors favoring the choice of the flowerpot as a nesting site were the following**:**

– its shape, which provided a safe space for the eggs and chicks, preventing them from falling off the balcony;
– reduced visibility for predators – due to: the nest placed at a height of 6 meters above the ground, the flowerpot positioned in the corner of the balcony, the chicks camouflaged by plant stems, and the presence of some trees (maple, walnut) in front of the apartment building; thus, the nest and the chicks could not be easily spotted by predators;
– the absence of competition with other species for the same breeding space.

The Rovine district, a structurally diverse urban environment, supports the coexistence of several breeding species, including columbids (*Columba livia domestica, Columba palumbus*), strigids (*Athene noctua*), picids (*Dendrocopos syriacus*) (Bălescu 2021), and numerous passerines (e.g., *Parus major, Sturnus vulgaris, Pica pica, Corvus monedula, C. frugilegus, C. cornix, Passer domesticus, P. montanus*, etc.) (Bălescu & Ștefănescu 2017). Among these species, starlings, tits, sparrows, and pigeons also use buildings and various wall cavities for nesting. However, the observed nest was not subject to interspecific competition.

As a result of urbanization and the transformation of natural habitats, an increasing number of synanthropic species have altered their traditional nesting patterns, adopting alternative behaviors and using artificial structures as support for breeding, demonstrating adaptive intelligence

Success of breeding (the survival of both chicks until fledging) confirms the adaptive efficiency of the species in the urban environment. The absence of avoidance behavior towards human presence and the tolerance of nearby daily activity are characteristic traits of this species. Breeding success was positively influenced by favorable climatic conditions.

The constant presence of individuals in the neighborhood where they nest reflects the species' fidelity to this urban habitat. Their feeding on the windowsill, as well as their resting behavior on the nearby tree branches, indicates a strong connection to this space, suggesting the possibility that the collared doves may return and resume breeding in this location. Observations indicate the collared dove's affinity for apartment block neighborhoods (nests placed on balconies, above air conditioning units, and on utility pipes running along the exterior walls of the buildings).

It is worth noting that, in recent years, a decrease has been observed in the breeding population of the collared dove, to the detriment of the wood pigeon (*Columba palumbus*) and also of domestic pigeons (*Columba livia domestica*). Beginning between 2012–2014, *Columba palumbus* remained throughout the summer in the city's parks and gardens, as well as in the green spaces of the neighborhoods, adapting very well to the existing conditions. In Craiova, it has shifted from being a winter visitors species (Bălescu 2005a) to a sedentary species (Bălescu 2021). The two species have the same preferences for habitat, nesting, feeding regime, occupying the same ecological niche. In recent years, competition has been observed in the green spaces between apartment blocks (and beyond) between *Streptopelia decaocto* and *Columba palumbus* (a larger, gregarious species that lives in flocks) which is gradually attempting to take the place of the collared dove. One of the causes of the increase in population numbers is considered to be the outbreak of the COVID-19 pandemic and the restrictions imposed on the human population. The expansion of the wood pigeon at the expense of the collared dove has also been reported in other studies (Gache 2020).

Despite the increasingly evident competition with *Columba palumbus*, the Eurasian collared dove (*Streptopelia decaocto*) remains a present and reproductively active species in the urban green spaces of Craiova municipality. Its ability to adapt to the conditions offered by the built environment, as well as its flexibility in choosing a nesting substrate, supports the continued presence of this species in residential areas. Such observations, carried out consistently in urban environments, contribute to a better understanding of the population dynamics of synanthropic birds and their ecological interactions in an ever-changing context.

The observation of an active *Streptopelia decaocto* nest placed in a flower pot on a block apartment balcony confirms the species' tendency to use artificial structures for breeding in the urban environment. This behavior has become a frequent form of breeding.

CONCLUSIONS

The documented case reflects the adaptive behavior of the Eurasian collared dove in an urban environment.

The use of a flower pot on the windowsill of an enclosed balcony for breeding demonstrates the species' ecological adaptation and its ability to exploit unusual opportunities for nesting.

The lack of avoidance behavior toward human presence and tolerance of daily activity near the nest reflect the high level of synanthropy of the species and its ability to coexist with humans in the built environment. The observed behavior supports the idea that *Streptopelia decaocto* continuously expands its ecological plasticity in urban environments, exploiting the opportunities offered by artificial structures and favorable microclimates.

This increased adaptability may, over time, lead to changes in the traditional seasonal and spatial breeding patterns.

Such individual observations can contribute to a better understanding of urban ecology and the impact of urbanization on avian fauna.

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Figure 1. 28.07.2023. First egg laid

Figure 2. 06.08.2023. Male at the nest

Figure 3. 12.08.2023
Chicks 1-2 days after hatching

Figure 4. 13.08.2023
Protection. Covering the chicks

Figure 5. 16.08.2023
Chicks waiting for their parents

Figure 6. 16.08.2023
Feeding by regurgitation

Figure 7. 19.08.08.2023. Resting

Figure 8. 20.08.20. 2023
Transition to juvenile stage

Figure 9. 23.08.2023
Grooming activities

Figure 10. 24.08.2023
Feeding flightless juveniles

Figure 11. 25.07.2023
Resting

Figure 12. 27.08.2023
Last day. Departure

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