

PRELIMINARY DATA ON SMALL AND MEDIUM-SIZED MAMMALS FROM CRAIOVA MUNICIPALITY (ROMANIA)

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Abstract. This paper presents preliminary data on mammal fauna from Craiova city, since the mammals in these anthropic ecosystems are insufficiently known. The preliminary list includes 19 species of mammals identified in the course of the years 2015 to 2018. From a systematic point of view, they belong to five orders: Eulipotyphla – 6 species, Chiroptera – 2 species, Lagomorpha – 1 species, Rodentia – 8 species, Carnivora – 2 species of mustelids. Among the highlighted mammals in the Craiova city, five species are vulnerable: *Crocidura leucodon*, *C. suaveolens*, *Plecotus auritus*, *Spermophilus citellus*, *Microtus agrestis*; they are mentioned in the Red Book of Vertebrates in Romania. Three of the observed species: *Lepus europaeus*, *Meles meles*, *Putorius putorius* are species of cynegetic interest.

Keywords: urban mammals, habitat, diversity, systematic.

Rezumat. Date preliminare despre fauna de mamifere mici și mijlocii din municipiul Craiova (România). În lucrarea de față sunt prezentate date preliminare cu privire la fauna de mamifere din orașul Craiova, cunoscându-se faptul că mamiferele din ecosistemele antropice ale orașului sunt insuficient cunoscute. Lista preliminară cuprinde 19 specii de mamifere identificate pe parcursul anilor 2015-2018. Din punct de vedere sistematic sunt distribuite în cinci ordine: Eulipotyphla – 6 specii, Chiroptera – 2 specii, Lagomorpha – 1 specie, Rodentia – 8 specii, Carnivora – 2 specii de mustelide. Dintre mamiferele evidențiate 5 specii au statut de vulnerabilitate: *Crocidura leucodon*, *C. suaveolens*, *Plecotus auritus*, *Spermophilus citellus*, *Microtus agrestis*, specii ce figurează în Cartea Roșie a Vertebratelor din România. Trei dintre speciile observate: *Lepus europaeus*, *Meles meles*, *Putorius putorius* sunt de interes cinegetic.

Cuvinte cheie: mamifere urbane, habitat, sistematică, diversitate.

INTRODUCTION

Mammals constitute a group of vertebrates with great adaptability and biologic diversity. Research about mammals in Romania, which include about 100 species (MURARIU, 1984), is reunited in two syntheses papers written by MURARIU (2003), and MURARIU & GEACU (2008) respectively. After the 90s, Romanian scientific literature has been enhanced in terms of research in mammalogy, which approach mammals from different points of view: morphological, anatomical, taxonomic, ecological, geographical, genetic, paleontological, hunting, etc.

Some of the scientific research also approaches the study of mammals from different rural and urban areas (ARDELEAN & BÉRES, 2000; BAZILESCU, 1971; BAZILESCU & PÎRVESCU, 1971; BOSTAN et al., 2015; CHACHULA et al., 2013; CHACHULA et al., 2017; DONE, 2007; IFRIM & VALENCIUC, 2006; MURARIU, 2006; PARASCHIV & ARDEI, 2011; SÂNDOR & KISS, 2004).

Studies related to the nutrition of birds of prey in urban areas have led to the identification of several species of mammals, specific to those anthropic areas (BANARU & COROIU, 1997; LAIU & MURARIU, 1998; LAIU et al., 2002; MOGA et al., 2005; NISTREANU, 2007).

What motivated us to approach a research regarding on the species of this group of vertebrates, was the lack of syntheses about mammals from Craiova. The first information about mammals in Craiova is provided by BARBU & SORESCU (1970) as a result of the studies conducted on the trophic spectrum of *Athene noctua*. Subsequently, new data were provided by BAZILESCU et al. (1980), which are revised and completed by GOGA (2012). Several species of mammals collected from Craiova are cited in the fauna of Romania (MURARIU, 2000; MURARIU & MUNTEANU, 2005).

Craiova is a city located in the South-West of Romania, in the Oltenia Plain, on the left bank of the Jiu River. The city has a surface of 81.41 km² and a continental climate, with Mediterranean influences.

The research was conducted in the main parks and gardens of the city: “Nicolae Romanescu” Park, the Youth Park, “Hanul Doctorului” Park, Craiovița Lake and Park, the Botanical Garden “Alexandru Buia” (CIOBOTEA et al., 1999), the area “Tanchiștilor Lake”, in different neighbourhoods (1 Mai, Romanești, Craiovița, Brazda lui Novac, Rovine, Bariera Vâlcii, etc.). The peri-urban area was less studied (Valea Fetii, Mofleni, zona Banu Mărăcine, etc.) (Fig. 1).

The main purpose of this research paper is to publish a preliminary faunistic list regarding of the mammalian species which we have identified in different habitats in Craiova (intra-urban and peri-urban areas).

The list may constitute a starting point for other research studies which would follow changes in the faunistic community, caused by the increase in the degree of anthropization.

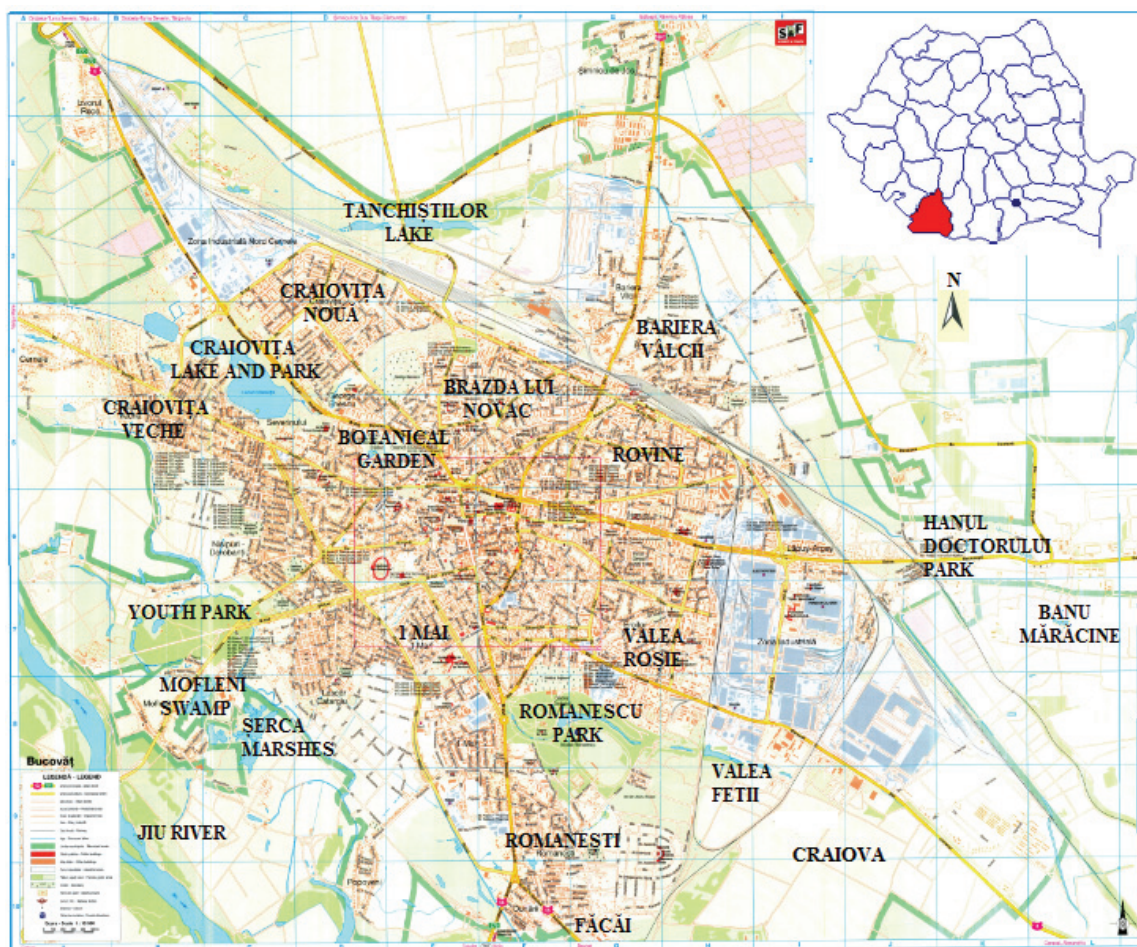


Figure 1. Map of Craiova Municipality, with the main studied areas (Printed by Druckerel Radinger; Impressum: SC Schubert & Franzke SRL, Cluj Napoca 2009). Processed. Scale 1: 16 500.

MATERIAL AND METHODS

For the research of mammals, classical methods have been used, applicable to all groups of mammals (field trips, observation, collection, photography).

The field trips in the main parks and in the main neighbourhoods of the city were performed monthly. The majority of them happened in the morning, between 7 AM and 2 PM, during spring, summer and autumn. In the winter season, the field trips were carried out between 10 AM and 2 PM. The evening research, although less frequent, was conducted between 7 PM and 9 PM. It took place in Rovine, Brazda lui Novac and Bariera Vâlcii neighbourhoods.

Direct observations were realised in the course of the years 2015 to 2018.

Part of the collected material (individuals from the families of Soricidae, Muridae and Cricetidae) was obtained with the help of barber traps. The traps were located randomly, at short distances of 3 to 7 metres one from the other, in different habitats: in forested habitat with trees and bushes, at their edge, on the edges of the paths, in open fields, meadows with ruderal vegetation, near lakes and rivulets. 70⁰ ethyl alcohol was used as a preservative. The traps were set in spring and summer during 2015-2017. They were checked at an interval of 7 to 14 days. The mammals entered the traps accidentally.

Other types of mammals were collected directly by hand: moles, bats, hedgehogs. Small mammals, once collected, were preserved for didactic purposes (they can be found in the laboratory of vertebrates zoology). 70⁰ ethyl alcohol and formalin 4% were used. Most individuals were collected by the authors, and a part was provided by students and colleagues. In the case of middle-sized mammals (rabbits, polecats, ground squirrels, etc.), observation and photography were employed as research methods. The field research and the information provided by the hunters were useful to complete the data about lagomorphs and carnivores mammals.

Small mammals were determined based on extern morphology, the aspect of the skull and the type of dentition. To identify and analyse mammals we have used the field guide (GAISLER & ZEJDA, 1995) and the scientific literature (IONESCU, 1968; MURARIU, 2000, 2004; MURARIU & MUNTEANU, 2005; POPESCU & MURARIU, 2001; VALENCIUC, 2002). The examination of the skull and dentition was realized with a stereomicroscope. A Cannon SX50 HS camera was used to photograph the species.

RESULTS AND DISCUSSIONS

Results

We hereby present the list of the identified mammals, with details regarding the places of observation and collection. For the systematics of mammals, we have used the information on the website: <https://mammaldiversity.org/>.

Order Eulipothyphla

Family Erinaceidae Bonaparte, 1838

1. *Erinaceus concolor* Martin, 1838 – The Southern white-breasted hedgehog or Eastern European Hedgehog

A discreet species, the hedgehog was observed in different neighbourhoods, during evening and night: Craiovița, Mofleni, Romanești, Valea Roșie, in the gardens and orchards of the locals, in the green areas between the buildings (Brazda lui Novac neighbourhood), in the Botanical Garden (2015), “Hanul Doctorului” Park, Romanescu Park, the Northern Ring Road of the city (the area with the groups of planted trees), Valea Fetii area, etc. It is important to mention that from 2012, there is a stable population of hedgehogs in Brazda lui Novac neighbourhood. During evening and night, they were observed in different parts of the neighbourhood, in the grassy areas between the blocks of flats.

Collecting points: Valea Roșie neighbourhood – 1 individual in June 2015, from the courtyard of some locals. Brazda lui Novac – 1 individual in May 2016, from the grassy areas behind the Pedagogical High School.

Family Talpidae Gray, 1825

2. *Talpa europaea* Linnaeus, 1758 – The common mole, The European mole

The mole is one of the common and numerous species in Craiova city. It is a subterranean species, widespread in most of the researched habitats: Romanescu Park, the Youth Park, the Botanical Garden, the area Tanchiștilor Lake, Hanul Doctorului Park etc., with less occurrences in the area near the river Jiu. Its presence is revealed by a great number of molehills, observed in the areas studied. Most of the molehills were detected in Romanescu Park and in the Youth Park. This field survey has also attested the presence of this species in the yards of the locals from different neighbourhoods (mostly on the outskirts of the city: Romanescu neighbourhood, Valea Fetii, etc).

Collecting points: Youth Park – 1 individual in May 2016, along the alley. The area “Tankiștilor Lake” – 1 individual the 28th of April, 2017, from a grassy area. The collected individuals were already dead.

Family Soricidae Gray, 1825

3. *Crocidura leucodon* (Herman 1780) – The bicolored shrew

Collecting points: Romanescu Park – 2 individuals, an adult and a young individual, on the 28th of July, 2015, in the open shrubbery area.

4. *Crocidura suaveolens* (Pallas, 1811) – The lesser white-toothed shrew

Collecting points: Romanescu Park – 1 individual on the 6th of August, 2015, 2 individuals on the 17th of July 2016 – on grassy field, at the edge of the path to the hippodrome, 1 individual on the 28th of May, 2017 – on forested areas, next to the oak trees (in the eastern side of the park, near the Ring Road of the city).

Hanul Doctorului Park – 2 individuals on the 15th of June, 2016 – on forested areas, next to the oak trees, near the water bodies.

5. *Sorex araneus* Linnaeus, 1758 – The common shrew

Collecting points: Romanescu Park – 1 individual on the 20th of June, 2015 – next to the clump of trees, in the eastern side of the park.

Youth Park – 1 individual on the 15th of June, 2016, 1 individual on the 19th of July 2017 – on forested areas, next to the oak trees, in grassy area.

6. *Sorex minutes* Linnaeus, 1766 – The Eurasian pygmy shrew

Collecting points: Youth Park – 2 individuals on the 15th of June, 2016 – on forested areas, next to oak trees, in grassy area.

Order Chiroptera Blumenbach, 1779

Family Vespertilionidae (Gray, 1821)

7. *Nyctalus noctula* Schreber, 1774 – The common noctule

The species was observed while flying, in Romanescu Park, at twilight, as well as during cloudy weather. A small population was also detected in Rovine neighbourhood, near the church and the blocks of flats around it. They took shelter in the attics of the buildings, in the bell tower of the church, as well as in tree hollows along the streets of the neighbourhood.

Collecting points: Rovine neighbourhood – 1 individual on the 28th of February, 2015 – on a grassy field, found at the bottom of a poplar tree, near the St. Constantin and Elena church.

Romanescu Park – 1 individual on the 24th of March, 2017 – collected from the grass, near an oak tree (fallen from the hollow tree).

8. *Plecotus auritus* Linnaeus, 1758 – The brown long-eared bat or common long-eared bat

We own individuals from the chambers of the Agronomic Students Complex (May 2015 – 1 individual, June 2016 – 2 individuals). Field research confirmed the presence of this species in the area, both in the attics of some buildings as in the hollow trees. Based on the field investigation and on our personal observations we can state that the species has adapted to this area.

Order Lagomorph Brandt, 1855**Family Leporidae** Gray, 1821**9. *Lepus europaeus*** Pallas, 1778 – The European hare

For the urban area of the city, the European hare is a sporadic presence. *Lepus europaeus*, a terrestrial species, was observed in the eastern side of Romanescu Park, in the area with the clumps of trees, but also in the grassy habitat, near the hippodrome (in September 2015, August 2016, March 2018). It comes from the peripheral area Valea Fetii, located in the south part of the city, at the south-eastern side of the park.

Moreover, on the outskirts of the Mofleni neighbourhood, the area of the Șerca marshes, solitary individuals were observed both in the reeds, as on uncultivated land with high grass and thistles, in June 2016 and March 2017. They probably come from the wastelands in Bucovăț, a village situated in the west of Craiova, on the right bank of the Jiu River.

Also, the species was observed in the didactic resort of Banu Mărăcine, in the area with fruit trees, and the individuals probably come from the agricultural lands of Cârcea. The locals chase them away because they gnaw the bark of trees and ruin the harvest. Individuals from the species were noticed during all seasons by the staff working at Banu Maracine resort. The discussions held with the hunters certified the presence of the hares, mostly in the peri-urban area: Făcăi area, Valea Fetii, the forested area in the north of the city, between the ring road and the outskirts Bariera Vâlceii neighbourhood, etc.

Order Rodentia Bowdich, 1821**Family Sciuridae** Gray, 1821**10. *Sciurus vulgaris*** Linnaeus, 1758 – The Eurasian red squirrel

It is an arboricolous species, common in the city, with numerous flocks in Romanescu Park. The coat of the red squirrel varies in colour, from red to dark brown. It is a delight for the locals to watch its spectacular leaps, the way in which it searches for and consumes the food, and the partners' games. Annually, in September and at the beginning of October, the red squirrel was observed burying its food in the ground (different kinds of fruit, like nuts, apples, acorns, etc). In the Botanical Garden and in the Youth Park the species is present in a smaller number.

11. *Spermophilus citellus* Linnaeus, 1766 – The European ground squirrel or The European souslik

It is a diurnal, terrestrial and gallericolous species, and it was observed in Făcăi (a peripheric area of Craiova city), near during the day, eating vegetal food. One or two specimens were observed on grassy areas, on meadows and near the foot paths, on the 12th of May 2015, the 11th of August 2015, the 28th of June 2016 and the 26th of May 2017.

Based on the field survey and on our personal observations (although scarce), we can claim that the species had a constant presence in Făcăi area throughout the years.

Family Muridae Gray, 1821**12. *Rattus norvegicus*** (Berkenhout, 1769) – The brown rat

It is a common and frequent species in Craiova, which coexists with human beings. It was observed in all the areas that have been studied. It was mostly spotted on the shores of the lakes in the parks, in the Botanical Garden, Craiovița Lake; and throughout the public sewer system. The species was also observed in the basements of the blocks of flats, in the locals' cellars, in warehouses, landfills and dumpsters, etc.

13. *Mus musculus* Linnaeus, 1766 – The house mouse

Common and frequent species, the house mouse was observed in all the anthropic habitats of the city, mostly in cellars and residential annexes. Individuals of house mice also entered the traps placed in the parks.

Collecting points: Hanul Doctorului Park: 2 individuals on the 17th of August 2015; Youth Park – 1 individual on the 19th of July 2017.

14. *Apodemus sylvaticus* (Linnaeus, 1758) – The wood mouse

Collecting points: Romanescu Park: 1 individual of juvenile mouse on the 17th of July 2016 – at the line trees, at the outskirts of the park, in the south-east part of the park. Youth Park: 1 individual on the 19th of July, 2017 – in open grassy field, towards the nursery (near Șerca brook).

15. *Apodemus flavicollis* Melchior, 1834 – The yellow-necked mouse

Collecting points: Youth Park – 1 individual on the 19th of July 2017 – on forested areas, on area besides the oaks tree.

Family Cricetidae Rochebrune, 1883**16. *Microtus arvalis*** (Pallas, 1799) – The common vole

Collecting points: Romanescu Park – 2 individuals on the 28th of July 2015, at the bottom of some shrubs, towards the hippodrome. Youth Park – 1 individual on the 28th of May 2016 – on forested areas, near oak trees.

17. *Microtus agrestis* (Linnaeus, 1761) – The field vole or short-tailed vole

Collecting points: Romanescu Park – 1 individual the 12th of August 2016 – at the line trees towards the hippodrome. Youth Park: 1 individual on the 19th of July 2017 – on forested area with oak trees.

Order Carnivora Bowdich, 1821**Family Mustelidae** Swainson, 1835**18. *Mustela putorius*** Linnaeus, 1758 – The European polecat

The information about the European polecat is insufficient, because of its crepuscular and nocturnal activity. In Craiova, it was observed in the shrubbery area of the Jiu Meadow in November 2015. The field research confirmed the fact that this species has accidental occurrences near the households at the outskirts of the city, during colder seasons (autumn, winter), being in search of food.

19. *Meles meles* (Linnaeus, 1758) – The European badger

The presence of this species in the city was confirmed by an individual that was found dead in the Hanul Doctorului Park on the 31st of March 2018. We do not have data with regard to the place this individual originated from or about the time it appeared in the area.

Discussions

The preliminary systematic list of the mammals from the intra-urban and peri-urban area of Craiova city is based on a personal database and on the bibliographic references (Table 1).

Table 1. The faunistic list of the mammals from the habitats of Craiova city between 2015 and 2018.

No	Species	Records		Habitat					
		Literature	Personal database	Parks	Neighbourhoods, Buildings, Gardens, Green Areas	Peri-urban area	Open area Meadows	Forested area with trees and shrubs	Humid area
1.	<i>Erinaceus concolor</i>	BAZILESCU et al. (1980) MURARIU (2000)	collected	HDP BG	+		+	+	
2.	<i>Talpa europaea</i>	BAZILESCU et al. (1980) MURARIU (2000)	collected	YP	+	+	+	+	
3.	<i>Crocidura leucodon</i>	BARBU & SORESCU (1970) MURARIU (2000)	collected	RP			+	+	
4.	<i>Crocidura suaveolens</i>	BARBU & SORESCU (1970) MURARIU (2000)	collected	RP HDP			+	+	
5.	<i>Sorex araneus</i>		collected	RP YP			+	+	
6.	<i>Sorex minutus</i>		collected	YP				+	
7.	<i>Nyctalus noctula</i>	BAZILESCU et al (1980) GOGA (2012)	collected	+	+	+		+	
8.	<i>Plecotus auritus</i>	BAZILESCU et al. (1980)	collected	+	+	+		+	
9.	<i>Lepus europaeus</i>		observed	RP		+	+	+	
10.	<i>Sciurus vulgaris</i>	GOGA (2012)	observed	+	+			+	
11.	<i>Spermophilus citellus</i>	BAZILESCU et al (1980)	observed			+	+		
12.	<i>Rattus norvegicus</i>	BAZILESCU et al. (1980)	observed	+	+	+	+	+	+
13.	<i>Mus musculus</i>	BARBU & SORESCU (1970) BAZILESCU et al. (1980)	collected	+	+	+	+	+	+
14.	<i>Apodemus sylvaticus</i>	BARBU & SORESCU (1970)	collected	YP RP			+	+	
15.	<i>Apodemus flavicollis</i>		collected	YP			+	+	
16.	<i>Microtus arvalis</i>	BARBU & SORESCU (1970)	collected	RP YP			+	+	
17.	<i>Microtus agrestis</i>		collected	RP YP			+	+	
18.	<i>Mustela putorius</i>	BAZILESCU et al (1980)	observed			+	+		
19.	<i>Meles meles</i>	MURARIU & MUNTEANU (2005)	observed	HDP				+	

Legend: The names of the parks where the specimens have been collected; RP – Romanescu Park, YP – The Youth Park, HDP – Hanul Doctorului Park, BG – The Botanical Garden; + observed in the parks; common for those habitats.

Between the years 2015 and 2018, 19 species of mammals were identified, distributed in 5 orders and 9 families: Order Eulipotyphla – 6 species: *Erinaceus concolor* (Family Erinaceidae), *Talpa europaea* (Family Talpidae), *Crocidura leucodon*, *C. suaveolens*, *Sorex araneus*, *S. minutus* (Family Soricidae); Order Chiroptera – 2 species (*Nyctalus noctula*, *Plecotus auritus* (Family Vespertilionidae); Order Lagomorpha – 1 species: *Lepus europaeus* (Family Leporidae); Order Rodentia – 8 species: *Spermophilus citellus*, *Sciurus vulgaris* (Family Sciuridae), *Microtus arvalis*, *M. agrestis* (Family Cricetidae), *Rattus norvegicus*, *Mus musculus*, *Apodemus sylvaticus*, *A. flavicollis* (Family Muridae); Order Carnivora – 2 species: *Mustela putorius*, *Meles meles* (Family Mustelidae).

During the research, some species were also collected that have not been recorded yet: *Sorex araneus*, *S. minutus*, *Apodemus flavicollis*, *Microtus agrestis*. We did not find any records in the scientific literature regarding the presence of the species *Lepus europaeus* in Craiova city.

Among the species mentioned in scientific literature, but not identified on the field, we list the species: *Apodemus agrarius*, *Micromys minutus* (BARBU & SORESCU, 1970), *Myotis mystacinus*, *Plecotus austriacus* (BAZILESCU et al., 1980), *Myotis myotis* (GOGA, 2012). Regarding the bats, we mention that we received information from the locals regarding their presence in different neighbourhoods of the city: the city centre, Craiovița, Cornițoiu, George Enescu, Brazda lui Novac, 1 Mai, Valea Roșie, Lăpuș-Argeș etc. The species could not be determined due to a lack of catch and of a bat detector. It is possible that they were the same species that we collected, or some of the species cited by BAZILESCU (2014), BAZILESCU et al. (1980), and GOGA (2012).

Regarding the specimens from the Muridae Family, we often observed dead specimens of *Rattus norvegicus*, *Mus musculus* in different habitats of the city, as a result deratization. The shrews were also affected by the deratization carried out by specialised staff. Therefore pest controls of rodents should be realised in accordance with the existing legislation, by selective and efficient means directed to the targeted species, so that the biological equilibrium should not be disrupted.

Most of the species were observed and/or collected from parks: clumps of trees and shrubs, at their edges, in clearings of woods (Table 1). In the neighbourhood areas dominated by buildings we remarked species of bats, *Rattus norvegicus* and *Mus musculus*. We can also add to this category the *Erinaceus concolor*, with a limited distribution, and *Talpa europaea*, observed in the locals' gardens. Lately, we have often been noticed by the locals regarding the presence of moles in their gardens. In the peri-urban area of the city (meadows characteristic to the silvostepa area, fallow ground with grassy vegetation, shrubs, cultivated lands, etc.) we observed species like *Spermophilus citellus*, *Lepus europaeus* and *Mustela putorius*. In this area species of rodents like *Crocidura* sp., *Sorex* sp., *Microtus* sp., *Apodemus* sp. etc., it is possible to exist. This statement is supported by the opening of the galleries observed. In the future, the peri-urban area of the city should be researched more thoroughly.

The majority of species were observed/collected in forested areas. A few of the mammals were collected from open areas. Throughout the investigations we have concluded that the faunistic elements characteristic to the city and which have been frequently observed all over the years were the insectivores, rodents and the species of bats.

In accordance with the Law 407/2006, three species characteristic to the peri-urban area of Craiova, *Lepus europaeus*, *Mustella putorius* and *Meles meles*, are listed in Annex 1 as species of hunting interest. Among them, *Lepus europaeus* was observed in Romanescu Park.

Regarding the conservation status of the species, five of them have unfavourable status, as being vulnerable to the anthropic and climatic impact: *Crocidura leucodon*, *C. suaveolens*, *Plecotus auritus*, *Spermophilus citellus*, *Microtus agrestis* (MURARIU, 2005). Most of the mammals observed present secure status (they are not in need of special protection).

In recent years, the infrastructure of the city has been massively expanded towards the peri-urban areas, which brought major modifications in natural biocenosis. Many of the wild species near the city became part of the city.

The frequent adjustments of the parks in Craiova had minor effects on the existing mammals. Most of the identified mammals are terrestrial, gallericolous and nocturnal, and during the day they stay underground. The cutting of some massive hollow trees affected especially the microhabitat of the squirrels and the bats, and the depositing of rubble and waste attracted the rodents, especially *Rattus norvegicus* and *Mus musculus*.

It is already acknowledged that mammals are extremely mobile and they may move long distances in search of food. Food resources available in town determine some species from the rural area to move to urban areas. For instance, the fox is one of the species that got the closest to the city. It was observed on the agricultural lands in Ghercești, Cârcea, Preajba (localities near Craiova), as well as in Făcăi, Valea Fetii, Mofleni, Popoveni (peri-urban areas of Craiova). We consider that, parallelly with climate change, but also with socio-economic changes, the presence of some wild mammal species in the urban areas becomes possible.

Though the phenomenon of the urbanisation of mammals has been a debated issue during the last decades, the topic is wide and needs more thorough research. Cities have become favourable habitats for some species of mammals, providing shelter for them (especially in winter), as well as food resources and new microclimatic conditions; each species adapts to the new conditions in its own way.

CONCLUSIONS

The results of the study have shown that the mammals fauna in the habitats of the city of Craiova is quite diverse, gathering terrestrial, gallericolous-terrestrial, subterranean, arboricolous and flying species which have adapted to the anthropic conditions.

As the data is preliminary, monitoring the mammals in Craiova must be continued for a better appreciation regarding: existent species, the dynamics in terms of the species population, the mammals' spatial distribution, the intra and interspecific relationships, the action of the disturbing factors on the populations of mammals, the mechanisms of the adaptation processes, etc.

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REFERENCES

- ARDELEAN G. & BÉRES I. 2000. Conspectul mamalofaunei Maramureșului. *Studii și Comunicări. Științele Naturii. Satu Mare*: 254-267.
- BANARU VICTORIA & COROIU I. 1997. Preliminary data on the micromammal fauna in the Someșul Mic basin (Romania) according to *Asio otus otus* L. pellets. *Studia Universitatis Babeș-Bolyai. Biologia. Cluj-Napoca*. **1-2**: 103-108.
- BARBU PROFIRA & SORESCU CONSTANTINA. 1970. Contributions concernant la nourriture de la chouette (*Athene noctua noctua* Scop.). *Analele Universității București. Seria Biologie animală*. **19**: 67-72.
- BAZILESCU ELENA. 1971. Date asupra coloniei de lilieci de la Runcu-Gorj. *Studii și Comunicări. Muzeul de Științele Naturii Bacău*: 359-363.
- BAZILESCU ELENA. 2014. *Contribuții la cunoașterea chiropterelor din Oltenia*. Edit. Antheo. Craiova. 154 pp.
- BAZILESCU ELENA & PÎRVESCU D. 1971. Contribuții la cunoașterea componenței specifice a rozătoarelor din zona Radovan – Dolj. *Studii și Cercetări*. Craiova: 171-177.
- BAZILESCU ELENA, SORESCU CONSTANTINA, CRUCE M., POPESCU M. 1980. Catalogul sistematic al colecțiilor de vertebrate din Muzeul Olteniei. *Oltenia. Studii și Comunicări. Științele Naturii. Muzeul Olteniei Craiova*. **3**: 385-401.
- BOSTAN ANDREEA-DIANA, CHACHULA OANA MIRELA, MĂNTOIU D. Ș. 2015. The behaviour of bats in urban areas of Bucharest, Romania. *Book of Abstracts. International Zoological Congress of "Grigore Antipa" Museum. CZGA 18-21 November 2015*. Bucharest: 145.
- CIOBOTEA D., BĂDESCU I., ZARZĂRĂ I., PLENICEANU V., AVRAM C., LUKACS S. 1999. *Grădinile și parcurile Craiovei*. Edit. Sud Craiova. 85 pp +55 pp. illustrate.
- CHACHULA OANA, COROIU I., MĂRGINEAN GEORGIANA. 2013. Between the conservation of cultural heritage and conservation of biodiversity – case study: bat colony (Chiroptera) from Humor Monastery, Suceava County (Romania). *Book of Abstracts. Annual Zoological Congress of "Grigore Antipa" Museum. CZGA 20-23 November 2013*. Bucharest: 210.
- CHACHULA OANA, COROIU I., MĂRGINEAN GEORGIANA, KLÜPPEL REGINA. 2017. Romania – a moment of grace in the restoration of historic monuments that host bat colonies. *Book of Abstracts. 14th European Bat Research Symposium – EBRS 1-5 August 2017*. Donostia, The Basque Country: 69.
- DONE A. 2007. Specii de lilieci în municipiul Suceava. *Miscellanea chiropterologica. Revista Federației Române de Chiropterologie*. Suceava: 38-39.
- GAISLER J. & ZEJDA J. 1995. *La grande encyclopédie des mammifères*. Edit. Gründ. Paris: 496 pp.
- GOGA IONELA CLAUDIA. 2012. *Catalogul colecției de mamifere din patrimoniul muzeului Olteniei*. Edit. Antheo Craiova. 175 pp.
- IFRIM IRINA, VALENCIUC N. 2006. *Pipistrellus kuhlii Kuhl, 1819*, a new reported species for the chiropteran fauna of Moldavia (Romania). *Travaux du Muséum d'Histoire Naturelle "Grigore Antipa"*. București. **49**: 359-363.
- IONESCU V. 1968. *Vertebratele din România*. Edit. Academiei R. S. R. Bucharest: 397-470.
- LAIU LUMINITA & MURARIU D. 1998. The Food of the long-eared owl (*Asio otus otus* L.) (Aves: Strigiformes) in wintering conditions of the urban environment in Romania. *Travaux du Muséum d'histoire Naturelle "Grigore Antipa"*. București. **40**: 13-430.
- LAIU LUMINITA, PASOL P., FENERU F., MURARIU D. 2002. The analysis of the winter food structure in *Asio otus otus* L. (Aves: Strigiformes) from Bacau and Iași towns - Moldavia, Romania. *Travaux du Muséum d'Histoire Naturelle "Grigore Antipa"*. Bucharest. **44**: 423-430.
- MOGA C. I., DAVID A., HARTEL T., COROIU I. 2005. Trophic spectrum of long-eared owl *Asio otus* during a winter lacking significant snow cover. *Biota. Journal of biology and ecology*. **6**(1-2): 43-48.

- MURARIU D. 1984. La liste des Mammifères actuels de Roumanie; noms scientifiques et roumains. *Travaux du Muséum d'Histoire Naturelle "Grigore Antipa"*. Bucharest. **26**: 251-261.
- MURARIU D. 2000. *Fauna României. Mammalia–Insectivora*. Edit. Academiei Române. București. **16**(1). 142 pp.
- MURARIU D. 2003. Bibliographia Mammalogica Romaniaae. *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"*. Bucharest. **45**: 401-477.
- MURARIU D. 2004. *Fauna României. Mammalia - Lagomorpha, Cetacea, Artiodactyla, Perissodactyla (fără specii actuale)*. Edit. Academiei Române. București. **16**(4): 5-85.
- MURARIU D. 2005. Mamifere. In: Botnariuc & Tatole (Eds.). *Cartea Roșie a Vertebratelor din România*. Edit. Academiei Române. București: 11-84.
- MURARIU D. 2006. Sistematica, ecologia, răspândirea și statutul de ocrotire al speciilor de mamifere (Mammalia) din Oltenia. *Oltenia. Studii și comunicări. Științele Naturii*. Muzeul Olteniei Craiova. **22**: 286-294.
- MURARIU D. & MUNTEANU D. 2005. *Fauna României. Mammalia – Carnivora*. Edit. Academiei Române, București. **16**(5). 223 pp.
- MURARIU D. & GEACU S. 2008. *Bibliographia Mammalogica Romaniaae*. Edit. Academiei Române. 342 pp.
- NISTREANU VICTORIA. 2007. The importance of the long-eared owl *Asio otus otus* (L.) in rodent control. *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Agriculture*. **63**: 424-429.
- PARASCHIV DALIA, & ARDEI IRINA. 2011. Synecological analysis of some rodent populations (Mammalia: Rodentia) in Sănduleni locality, Bacău county. *Studii și comunicări. Științele Naturii*. Muzeul Olteniei Craiova. **29**: 139-142.
- POPESCU ALEXANDRINA & MURARIU D. 2001. *Fauna României. Mammalia – Rodentia*. Edit. Academiei Române București. **16**(2). 214 pp.
- SĂNDOR D. A. & KISS J. B. 2004. The diet of wintering Long-eared Owls (*Asio otus*) in Tulcea, Romania. *Analele Științifice ale Institutului Național de Cercetare-Dezvoltare "Delta Dunării" Tulcea*. **10**: 49-54.
- VALENCIUC N. 2002. *Fauna României. Mammalia – Chiroptera*. Edit. Academiei Române. București. **16**(3). 166 pp.
- ***. Legea nr. 407 din 9 noiembrie 2006 vânătorii și a protecției fondului cinegetic. *Monitorul Oficial al României* nr. 944 din 22 noiembrie 2006 cu completările ulterioare (<http://legislatie.just.ro/Public/DetaliiDocument/77053>) (Accessed: March 10, 2018).
- ***. <https://mammaldiversity.org/> (Accessed: March 18, 2018).

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