

## PRELIMINARY BIODIVERSITY STUDY

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### SOS EAST PARK

“SOS East Park” is a civic campaign through which we request that City Hall create Cluj’s largest park. The proposed park occupies the surface from the first lake in Gheorgheni, next to the mall, and to the last lake, next to Selgros. It comprises the sports base, the nursery garden and the rush-bed. It is located between the Intre Lacuri neighborhood and the Becas creek, and has a surface area of [..45..] hectares, some of them already developed, and others proposed for a minimally invasive development due to the area’s biodiversity. “SOS East Park” militates for an urban natural park, given the fact that the area after the sports base and the first developed lake we find the city’s richest bird fauna.

East Park is an urban planning proposal from the 1960s, that we, as an informal civic group turned association, have once again brought to light alongside the specialists and other informal groups, such as Zona Verde Libera. Until now, our success is partial, but real. We have convinced the authorities to develop the pedestrian walkway alongside the lake instead of road traffic, however, the mall must also fulfill its initial promise of creating a park. We have partnered with the other Cluj inhabitants that have requested a large public space in the eastern part of the city, and the City Hall has accepted our express request that the sports base function on a free of charge access basis.

As a result of a SOS petition with 3,000 signatures, the City Hall promised a park on a surface of 60 hectares.

In the “SOS East Park” campaign, we are citizens of Cluj, activists, specialists, and, especially, nature lovers, who fight not only for the largest park in the city, but also for a green space of sufficient size as to be considered a real park, practically, the first park of the city. We combine civic activism and research through the PAR (Participatory Action Research) through which we propose an urban natural area. We continue the nineteenth century women’s association’s tradition, which created the central park or the scholastics’ tradition that created the university sport park in partnership with the inter-war municipality. For Cluj’s twenty-first century size, and in order to balance a city that becomes more and more busy, we need public green spaces at just sizes.

Who we are

We are interested in creating public and green spaces, in alternative mobility to car traffic, of a circular economy. We are an environment organization, yet, in our activism, we are interested in social, sports, and cultural themes as well.

The SOS East Park team is larger, but the Societate Organizata Sustenabil (SOS) was founded by four, nature-loving Cluj citizens: Adrian Costina, entrepreneur, Adrian Dohotaru, deputy and civic activist, Ioana Mica, architect, and Radu Gaciu, artist. The campaign was then joined by

Marius Jurca, photographer, Ana-Maria Corpade, geographer, and many, many more specialists and activists.

Before we became an association, we carried out several campaigns, among which SOS Lacurile Gheorgheni, through which we proposed turning the alley next to the first lake into a pedestrian walkway, and the creation of park.

The area is valuable at least from two points of view:

- It is a reserve of natural land, with a unique landscape in the area.
- It is a high biodiversity area, especially with regards to the bird fauna: according to the Cluj Bird Atlas, recently published by the Romanian Ornithological Society (SOR), the lake area in Gheorgheni is characterized by a great variety of landscapes, it being the area with the most diverse number of species in Cluj, where, during the nesting period, over 30 species can be observed.

Today, the initial East Park project is no longer possible in its integral version, as a large part of the surfaces are occupied and most of the public pedestrian routes are blocked by private projects and constructions, carried out with the purpose of real estate or commercial development between 2000-2018.

The remaining surfaces currently found under private property represent the last available reserves for creating the public green spaces necessary for the neighborhoods in the eastern part of the city.

The park could become an urban protected area in the future, thus enrolling Cluj-Napoca in a select circle of cities that have such an area.

The protected urban areas are important, as they offer ecosystem services, protect species and habitats, support economic development through sustainable touristic activities.

At European level, there are many metropolitan areas that have made this concept reality:

France: Marseille: Calanques National Park

Great Britain: London: London Wetland Centre

Romania, Bucharest - Vacaresti Natural Park

In Europe, the smallest protected urban area in terms of surface is that found in London (44 ha). Vacaresti Natural Park has a size of 182.99 hectares, being the largest protected urban area in Europe.

## BIRD FAUNA

The data obtained within the Cluj Birds Atlas Project were used as to assess the populations of nesting bird in East Park. The primary source was represented by the “atlas” data collected in a standardized manner on 500x500 m surface areas between 2014-2018. The surface area occupied by East Park is covered by the squares 08M, 08N, 08O, 08L, 08P. The auxiliary data source was constituted by the “occasional” type data, represented by non-systemic observation obtained throughout the entire year.

The East Park area is characterized by a great diversity of habitats. Here we see water surfaces (natural lakes), rush-beds, compact bushes, and a generous surface area. Between 2014-2018, over 67 bird species (Addendum 1) were observed, identified in the five 500x500 m squares covering the East Park area. Of these, 55 of them are nesting species. It is noted that approximately 75% of the 74 species of nesting species identified in Cluj-Napoca city are found here, over a relatively limited surface area! In fact, this area of Cluj is where we see the largest diversity of species: a single 500x500 m square may hold 37 species of nesting birds (Fig. 1). If we take into consideration the “auxiliary” data as well, we reach the impressive number of over 50 nesting species / square (Fig. 2)

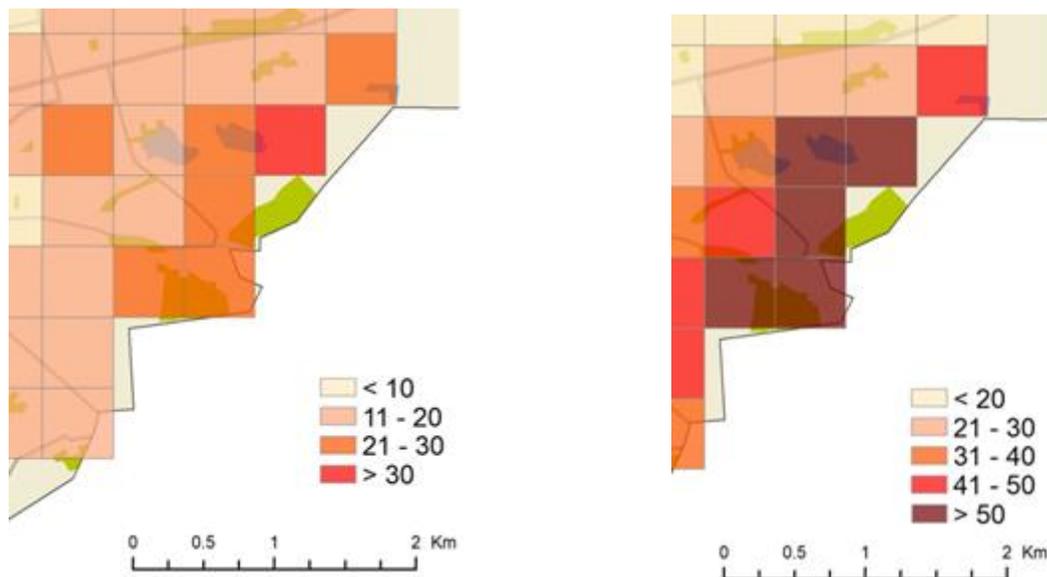


Fig 1. Distribution of nesting species / square in Cluj (atlas-type data)

Fig 2. Distribution of nesting species / square in Cluj (atlas-type data + auxiliary data)

In the warm season (April - August), we can observe humid area species that do not nest anywhere else in the city, such as

- the little bittern (*Ixobrychus minutus*),
- the great reed warbler (*Acrocephalus arundinaceus*),
- the Eurasian reed warbler (*Acrocephalus scirpaceus*),
- the sedge warbler (*Acrocephalus schoenobaenus*),

- the Savi's warbler (*Locustella luscinioides*),
- the common reed bunting (*Emberiza schoeniclus*),
- the Eurasian coot (*Fulica atra*),
- common moorhen (*Gallinula chloropus*).

The surrounding rush-bed and trees areas host species that are extinct or rare in other parts of the city, such as

- the common nightingale (*Luscinia megarhynchos*),
- the common cuckoo (*Cuculus canorus*),
- the common whitethroat (*Sylvia communis*),
- the African stonechat (*Saxicola torquatus*),
- the red-backed shrike (*Lanius collurio*)
- the Eurasian golden oriole (*Oriolus oriolus*).

In autumn and winter (when the lakes are not frozen), certain species are present here as well, such as

- the great crested grebe (*Podiceps cristatus*),
- the blackheaded gull (*Larus ridibundus*),
- the yellow legged gull (*Larus michahellis*),
- the common kingfisher (*Alcedo atthis*)
- the mallard (*Anas platyrhynchos*).

During migration, some rarer species can also be observed:

- black tern (*Chlidonias niger*),
- common tern (*Sterna hirundo*),
- little grebe (*Tachybaptus ruficollis*),
- gray heron (*Ardea cinerea*),
- purple heron (*Ardea purpurea*)
- common sandpiper (*Actitis hypoleucos*).

The natural habitats diversity in the area is also reflected by the presence of the largest colony of nesting common house martin (*Delichon urbicum*): the blocks on the northern side of the lakes are true housing neighborhoods for this species (in 2015, 287 occupied nest were counted).

Kósa Ferenc, Cristian Domșa, Benkő Zoltán, Veres-Szászka Judit: Atlasul Păsărilor Clujului, Ed. Idea Plus, Cluj-Napoca, 2017

The bird fauna - to be extended with description of birds + photographs from the folder sent by Ferenc Kosa

The expression "rare bird" is perfect when we refer to **the little bittern** (*Ixobrychus minutus*; Törpegém; Little Bittern) And this is the reason for it. It is a solitary species, with a shy and

private behavior, which, even when it is disturbed, prefers to distance itself by walking, not flying, or to stand still in the rush-bed as to not be detected. More than that, the little bittern nests in a single place in Cluj and in certain dense rush-bed areas of Lake 3 and the other water surfaces in East Park. And this is due to the fact that that habitat offers it its primary food sources: small fish, toads, aquatic insects or larvae.



The little bittern (*Ixobrychus minutus*)

The little bittern is a migrating species. It spends winters in Africa and comes back into the country the first week of May.

**The red-backed shrike** (*Lanius collurio*; Tövisszúró gébics; Red-backed Shrike), a bird particular to open areas, pastures that are abundant in shrubs (hawthorn, blackthorn, dog rose). Aside from Parcul de Est, the red-backed shrike may also be seen in the north-eastern area (the green-fields along the Somes) or on the south-western side of Cluj, towards the limit of Manastur neighborhood.

One of the characteristics that makes this species interesting is the manner in which it consumes its prey (large insects, lizards or small mammals). When food is abundant, the red-backed shrike fix their prey on the thorns of under-shrubs, so as to consume it later, when food is difficult to find. Furthermore, this habit has inspired the bird's name - "lanius" in Latin means butcher.



The red-backed shrike (*Lanius collurio*)

**Common chaffinch** (*Fringilla coelebs*, Erdei pinty, Common chaffinch) is another species that we may see in the winter at the city's feeders, including those in East Park, or on the ground, looking for food. Like the great tit, it is sedentary, it generally eats seeds and vegetal matter, however, the nestlings are fed almost exclusively with invertebrates, especially caterpillars. It is the chaffinch with the most melodious song in the city, and in folk stories, in some areas, it is said that it announces the coming of rain. The strong song is in fact used for marking nesting territory, as the chaffinch prefers spaces, big or small, to nest in.

In winter time, it is a social bird and gathers in groups. The chaffinches coming from the north spend the winter in our country and our chaffinches leave a little further south for the winter. They return rather quickly, the return dates registered between 2014-2017 being between February 7<sup>th</sup> and March 3<sup>rd</sup>.



Common chaffinch (*Fringilla coelebs*)



**Goldfinch** (*Carduelis carduelis*)

**The goldfinch** (*Carduelis carduelis*, Tengelic, Goldfinch) is the most colorful chaffinch in Cluj, both genders being similar. Its striped head, in 3 colors: red, white, and black, its brown back, and its yellow band on the black wings, makes the goldfinch impossible to mistake to other chaffinches.

With the over 350 pairs seen during the collection of data for the Cluj Birds Atlas, it is the most numerous and wide-spread species of chaffinch in our city and can be seen in the East Park area we proposed. It is a sedentary species that feeds on the seeds of plants such as xanthium or musk thistle. In autumn and winter, we can frequently see these colorful birds trying to pick seeds off of the xanthium bushes, sometimes just like small acrobats, upside down.

The **Eurasian coot** (*Fulica atra*, Szárcsa, Eurasian coot) is a species that nests on lakes and slow flowing waters, making its nests on the edge of the rush-bed. On Cluj's built-up area, it regularly nests in a single place, on Lake 3. In the winter, when the water surfaces freeze, it moves to waters which have not frozen over.

It mostly feeds on aquatic vegetation, and on invertebrates or bird eggs. It dives, and quickly comes back to the surface, and in order to fly, it needs to "run" on the surface of the water.

It is a territorial species, especially during mating season, and both the male and the female protect the nest from intruders. It has varied repertoire, that can be heard on sprig nights, near large plain lakes.



The Eurasian coot (*Fulica atra*), photograph: Kósa Ferenc

The ***Kestrel*** (*Falco tinnunculus*, Vörös vércse, Kestrel) is the most common species of birds of prey in Cluj, which can be observed both in neighborhoods, and in the city center. It nests in trees, and that is why we see it around lakes as well, where, given that it is Cluj's wildest area, it finds a habitat that nears the natural one. For nesting, it uses nest that have been abandoned by Corvidae (hooded crow, magpie) or even artificial hollows placed in an adequate manner.



*Kestrel* (*Falco tinnunculus*)

It feeds on rodents and insects, and on rare occasions with lizards. It executes a stationary flight with its tail opened as a fan, "fanning" its wings; this is where it gets its name. Its eyesight is very good and it catches its prey with its talons.

Some specimens remain here for the winter, others migrate south, and return in March. In April - May, the female already sits on 3 - 7 eggs, while the male brings it food in the nest.

The black redstart (*Phoenicurus ochruros*, Házi rozsdafarkú, Black redstart)

In the past, the species preferred rocky alpine hollows for nesting. At the beginning of the twentieth century, it became more and more frequent in localities as well, especially in industrial areas, nesting on the roofs of buildings and tall factories. It can also be seen in the East Park area, and in the city's center, where it can be seen and heard from the rooftops, smokestacks, poles or antennas, especially during the nesting period, when it seems to be trying to cover up the sounds made by cars.



The black redstart, *Phoenicurus ochruros*

Usually, it usually breeds twice per year, the hatchlings being fed by the parents with insects, up to 300 times or day. It nests in different cavities in buildings, on beams or under roofs, but also in artificial hollows. It is a migrating species which reaches Cluj at the beginning of March, so you might to able to see it while you're out on your walks.



The great reed warbler (*Acrocephalus arundinaceus*)



The Savi's warbler (*Locustella luscinioides*)



The common reed bunting (*Emberiza schoeniclus*)



Common moorhen (*Gallinula chloropus*)



The common nightingale (*Luscinia megarhynchos*)



The common whitethroat (*Sylvia communis*)

Take from:

Kósa Ferenc, Cristian Domşa, Benkő Zoltán, Veres-Szászka Judit: Atlasul Păsărilor Clujului, Ed. Idea Plus, Cluj-Napoca, 2017

No.	Scientific denomination	Popular denomination	Nesting (possible or confirmed)	Migration	Wintering	Nesting effect**
1	Accipiter nisus	Eurasian sparrow-hawk			x	
2	Acrocephalus arundinaceus)	Great reed warbler	x	x		11
3	Acrocephalus palustris	Eurasian reed warbler	x	x		15
4	Acrocephalus schoenobaenus	Sedge warbler	x	x		7
5	Acrocephalus scirpaceus	The Eurasian reed warbler	x	x		6
6	Actitis hypoleucos	Common sandpiper		x		
7	Aegithalos caudatus	Long-tailed tit	x		x	2
8	Alcedo atthis	Common kingfisher		x	x	
9	Anas platyrhynchos	Mallard	x	x	x	5
10	Ardea cinerea	Gray heron		x		
11	<b>Ardea purpurea*</b>	Purple heron		x		
12	Carduelis carduelis	Goldfinch	x		x	11
13	Chloris chloris	European greenfinch	x		x	11
14	Chlidonias niger	Black tern		x		

15	Chroicocephalus ridibundus	Blackheaded gull		x	x	
16	Coccothraustes coccothraustes	Hawfinch		x	x	
17	Columba livia f. domestica	Domestic pigeon	x		x	20
18	Columba palumbus	Common wood pigeon	x	x		1
19	Corvus corone cornix	Hooded crow	x		x	2
20	Corvus frugilegus	Rook			x	
21	Corvus monedula	Western jackdaw	x		x	5
22	Cuculus canorus	Common cuckoo	x	x		3
23	Cyanistes caeruleus	Eurasia blue tit	x		x	2
24	Delichon urbica	Common house martin	x	x		264
25	Dendrocopos major	Great spotted woodpecker	x		x	2
26	Dendrocopos minor	Lesser spotted woodpecker	x		x	1
27	<b>Dendrocopos syriacus</b>	Syrian woodpecker	x		x	2
28	Emberiza schoeniclus	Common reed bunting	x	x		1
29	Erithacus rubecula	European robin	x	x	x	2
30	Falco subbuteo	Eurasian hobby	x	x		1
31	Falco tinnunculus	Kestrel	x		x	1
32	Fringilla coelebs	Common	x	x		2

		chaffinch				
33	<i>Fulica atra</i>	Eurasian coot	x	x	x	1
34	<i>Gallinula chloropus</i>	Common moorhen	x	x	x	3
35	<i>Garrulus glandarius</i>	Eurasian jay	x		x	3
36	<i>Hirundo rustica</i>	Swallow	x	x		4
37	<b><i>Ixobrychus minutus</i></b>	<i>Ixobrychus minutus</i>	x	x		2
38	<b><i>Lanius collurio</i></b>	Red-backed shrike	x	x		2
39	<i>Larus michahellis</i>	Yellow legged gull		x	x	
40	<i>Linaria cannabina</i>	Common linnet	x	x		2
41	<i>Locustella luscinioides</i>	Savi's warbler	x	x		3
42	<i>Luscinia megarhynchos</i>	Common nightingale	x	x		9
43	<i>Motacilla alba</i>	White wagtail	x	x		2
44	<i>Muscicapa striata</i>	Spotted flycatcher	x	x		1
45	<i>Oriolus oriolus</i>	Eurasian golden oriole	x	x		1
46	<i>Parus ater</i>	Coal tit			x	
47	<i>Parus major</i>	Great tit	x		x	15
48	<i>Passer domesticus</i>	House sparrow	x		x	250
49	<i>Passer montanus</i>	Eurasian tree sparrow	x		x	24
50	<i>Phasianus colchicus</i>	Common pheasant	x		x	2



51	<b>Phoenicurus ochruros</b>	Black redstart	x	x		13
52	<b>Phylloscopus collybita</b>	Common chiffchaff	x	x		9
53	<b>Pica pica</b>	Eurasian magpie	x		x	4
54	<b>Picus viridis</b>	European green woodpecker	x		x	1
55	<b>Podiceps cristatus</b>	Great crested grebe	x			1
56	<b>Poecile palustris</b>	Marsh tit	x		x	2
57	<b>Saxicola torquatus</b>	African stonechat	x	x		2
58	<b>Serinus serinus</b>	European serin	x	x		2
59	<b>Sterna hirundo</b>	Common tern		x		
60	<b>Streptopelia decaocto</b>	Eurasian collared dove	x		x	19
61	<b>Sturnus vulgaris</b>	Common starling	x	x		25
62	<b>Sylvia atricapilla</b>	Eurasian blackcap	x	x		12
63	<b>Sylvia communis</b>	Common whitethroat	x	x		9
64	<b>Sylvia curruca</b>	Lesser whitethroat	x	x		16
65	<b>Tachybaptus ruficollis</b>	Little grebe	x	x	x	1
66	<b>Turdus merula</b>	Common blackbird	x		x	13
67	<b>Turdus pilaris</b>	Fieldfare	x		x	3

Notes \* Species written in bold are priority species

\*\* The numbers of nesting birds are given for possibly nesting species, estimated within the Cluj Birds Atlas project (minimum number of paird)

## CHIROPTEROFAUNA

### Preliminary data regarding chiropterofauna in the East Park, Cluj-Napoca

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Quoted from: **Bücs Sz.L., Stan O.** (2018): Preliminary data regarding chiropterofauna in the Parc-ul Est, Cluj-Napoca. Third National Chiropterology Conference in Romania, October 18<sup>th</sup>-21<sup>st</sup>, 2018, abstracts volume p.7.

Photographs: Szilárd-Lehel Bücs, Levente Barti, Dénes Dobrosi

Due to the intensive real estate expansion in Cluj-Napoca, including the East Park area, as well as due to the negative effects exerted upon habitats and species, we have decided to initiate a chiropterologic study, and as such, to contribute with actual data to increasing the biodiversity seen in the area.

In august 2018, we performed transects as to record ultrasounds emitted by bats that hunt around Lakes no. 1 and no. 2 in East Park, Cluj-Napoca, these being the most anthropic in the area. We recorded a total of 50 ultrasounds, respectively 17 at Lake no. 1 and 33 at Lake no. 2.



**Fig 1.** The study area in East Park, Cluj-Napoca, with illuminated alleys, shopping centers, and light pollution on the water surfaces.

Through the analysis of ultrasounds, we identified a total of **seven species of bats presents in the Lakes no. 1 and no. 2 area**, mostly being species adapted to the urban space. We identified a total of seven species of bats present in the study area, respectively *M. daubentonii*, *N. noctula*, *E. serotinus*, *V. murinus*, *P. pipistrellus*, *P. pygmaeus*, *P. kuhlii*. The recorded ultrasounds also included social sounds of the common noctule. In addition, the Daubenton's bat (*M. daubentonii*) was observed hunting above the surfaces of both lakes. Throughout the duration of the assessment, we observed an intense constant activity, the bats hunting even above the surfaces of the semi-illuminated water surfaces.

Based on the preliminary study, and if we take into consideration the area's placement, we can affirm that **East Park offers feeding habitats for a high diversity of bat species, respectively 7 out of the 32 in Romania.** By comparison, Vacaresti Natural Park is used as a feeding habitat by at least 8 bat species (Mantoiu D. - com. pers.). This diversity is explained even through the fact that several bat species are well adapted to the urban environment (ex. *N. noctula*, *P. pipistrellus*), tolerating a certain level of illumination and disturbance, and certain species (ex. *V. murinus*) actually prefer to hunt under the lamp posts' light.



**Fig 2.** Species of bats identified throughout the preliminary study in East Park (from left to right): Daubenton's bat (*Myotis daubentonii*), common noctule (*Nyctalus noctula*), Serotine bat (*Eptesicus serotinus*), parti-colored bat (*Vespertilio murinus*), common pipistrelle (*Pipistrellus pipistrellus*), Soprano pipistrelle (*Pipistrellus pygmaeus*), Kuhl's pipistrelle (*Pipistrellus kuhlii*).

However, we consider that the number of bats identified in East Park within the present study is at a minimum value for the area, due to the fact that these results have been obtained only through the assessment of the most anthropic of the Park's lakes. The other water surfaces and habitats in the north-eastern corner of the area present a low anthropic degree, without being surrounded by buildings, and their artificial illumination level being low. As such, for 2019 and after the continuation of the study using various methods (automatic recording throughout the entire night, net capture, identifications of natural and anthropic shelters etc.), we foresee an increase in the number of bat species present in the East Park habitats.



**Fig 4.** Towards the less wild, less anthropic area in the north-eastern corner of the Park.

LEPIDOPTERA FAUNA

**Butterflies with day activity in "East Park" (Cluj-Napoca)**

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## Introduction

The population of day butterflies is declining all over the world, as a result of the loss and degradation of habitats (Thomas 2016). From the analysis of the monitoring data from 19 European countries, most of them from the European Union, it was demonstrated that the 17 species of daytime butterflies chosen as indicators for grasslands (European Grassland Butterfly Indicator) recorded an almost 50% decline between 1990-2011 (van Swaay et al. 2008, 2013). Although this decline has slowed down in the last 5-10 years, the authors draw attention to the fact that the general climate temperature increase, favoring the development of daytime lepidopteres, masks the general decline of the daytime butterfly populations (van Swaay et al. 2016).

A total of 200 species of daytime lepidopteres have been registered in Romania (Székely 2008, Rákósy 2013), of which, approximately 10-15 species are considered extinct from Romania's fauna (Rákósy 2003, Rákósy et al. 2003). In Cluj-Napoca, 140 species have been noted, however, between 1975-2005, only 129 species were noted once again (Goia & Dinca 2006).

*The decline of the daytime lepidoptere fauna in Cluj's urban area is reflected in the drastic decrease of the number of species: if, before 1975, the literature data indicated a rich fauna in the Cluj built-up area, with **109** species noted; between 1975-2005, this number diminished to only 36 species (Goia & Dinca 2006).*

## Materials and methods

In the East Park area, we designated a transect with length of 3.3 km, which was separated into 100 m long segments (however, under certain conditions - habitat modifications - shorter sequences), the butterflies being registered separately on each segment. The inventory of daytime activity butterflies on the mentioned transect was performed on May 12<sup>th</sup> and 23<sup>rd</sup>, respectively on June 20<sup>th</sup>, 2018, between 10:00-17:00. Data were recorded on habitat, anthropic degree, and climate condition throughout the assessment period, as well.

## Results

### Characterization of the life environment on the 3.3 km transect from "East Park" area

The surfaces of the transect is covered in wood vegetation over 19.84% on average. This vegetation covers the transect's surface in shade that barely varies throughout the day, between 21.51-24.19%.

The grassy vegetation occupies the surface of the transect in proportion of 35.53%. The average height of the vegetation varies between 33.83-41.03 cm, depending on the visiting period. Nectar sources for daytime lepidoptere were recorded over 81.81-90.90% of the transect.

Aside from the wood and grassy vegetation, the surface of the transect was significantly covered in nude soil, 30% on average, with asphalt, and concrete along the access paths, 10.60%, with rush-bed at the ridge of the lakes, in a proportion of 3.28%, respectively 0.75% water surfaces.

### **Qualitative - quantitative composition of lepidopteres with day activity in “East Park” (Cluj-Napoca)**

During April-June, upon the occasion of four visits on site, a number of **33 daytime lepidoptere species** were recorded (Superfam. Hesperioidea and Papilionoidea), to which we add **another 4 species with daytime activity** from the Heterocera group (heliophile species).

Although the number of daytime lepidoptere species in the “East Park” area is relatively great for such a short research period, a relatively reduced surface area and with an anthropic impact, the number of assessed specimens remains relatively reduced, in general, even really reduced: 41 specimens and 19 species on May 12<sup>th</sup> (2.15 specimens/species), respectively 25 specimens and 16 species on May 23<sup>rd</sup>, 2018 (1.56 specimens/species). June was more generous: on June 20<sup>th</sup> 2018, 120 specimens and 20 species of daytime lepidopteres were recorded (6 specimens / species).

Only 5 species presented populations that were greater in number: *Celastrina argiolus* (37 specimens), *Pieris napi* (17 specimens), *Inachis io* (17 specimens), *Coenonympha pamphilus* (13 specimens) and *Pieris rapae* (10 specimens). In the case of the other 32 signaled species, the total number of specimens noted on the site visits in May and June remained bellow 10.

The sole species that stands out would be *Kretania (Plebeius) sephirus*,, observed on May 23<sup>rd</sup>, 2018 in the “East Park” area. Although the single specimen observed was not determined with 100% accuracy, the presence of said species raises questions as the species (nationally protected through GEO 57/2007, updated) generally lives in xero-thermophile grasslands with steppe characteristics, the host plant being species of *Astragalus*: *A.monspessulanus*, *A.excapus* and *A.dasyanthus* (Rákosy 2013). The certain presence of a population of isolated colony of said species in the “East Park” may be proven only through directed research.

*Cupido (Everes) alcetas* is a species protected through GEO 57/2007, updated, however proving the presence of the species requires capturing the specimens and studying the genital enclosure as to separate the related and very similar species, *C.decolorata* (Rákosy 2013). At least one of the two taxa is present in this area. According to the legislation in effect, the collection of the protected specimens is prohibited, with the exception of the cases in which a derogation is obtained from the central authorities for environment protection. During the

assessment period, we did not dispose of such a derogation, and therefore, we did not collect the specimens of the species presumed to be "*Plebeius sephirus and Cupido alcetas*".

## Discussions

Based on the preliminary data, we can affirm that, in the "East Park", the anthropic degree has reduced the surface area favorable for the development and maintenance of a biodiversity of lepidoptere communities, compared to the less affected areas. Striping the soil of grassy vegetation, the concrete and asphalt access paths, and certain waste storages have reduced the surface area of potential habitats for the normal development of the life cycle of daytime lepidopteres. Aside from losing the surfaces of potential habitat, the anthropic implications probably contribute to the fragmentation and isolation of less mobile daytime lepidoptere populations.

The relatively high wood vegetation coverage degree (19.84%) in the transect's area contributes to the decrease of the potential habitat for most daytime lepidopteres, especially those bound by open grasslands. However, the dense wood vegetation contributes to the area's general biodiversity, and directly to vegetation, but indirectly to the ornithological fauna and other critter groups. Some daytime lepidopteres are actually bound to the shrub vegetation, on which they carry out their biological cycle (Székely 2008, Rákósy 2013). This explains the presence of a significant population of the *Celastrina argiolus* species. Other daytime lepidopteres that are loyal to wood vegetation habitats are *Glaucopteryx alexis*, *Gonepteryx rhamni*, *Pieris napi*, *Araschnia levana*, *Pararge aegeria*, *Polygonia c-album* (Székely 2008, Rákósy 2013) and other, are present in "East Park".

The presence of the nude soil over a significant surface in the "East Park" researched area (30%), as well as the presence of humid areas, explain the presence of certain daytime lepidoptere species bound to this natural component, respectively *Erynnis tages*, *Carcharodus alceae*, *Cupido alcetas*, *Brenthis daphne* (Székely 2008, Rákósy 2013) etc. Other species of daytime lepidopteres, observed in "East Park" are present every where, even in the ruderal areas, such as *Inachis io*, *Colias alfacariensis*, *Pontia edusa*, *Pieris rapae*, *Everes argiades* etc., and are also present in other parks and green spaces on Cluj-Napoca's territory.

## Proposals

This study represents only a first step in becoming aware/having knowledge of the daytime lepidoptere communities' biodiversity in the Cluj-Napoca "East Park" area. The reduced research period and area of this year does not allow us to issue final and concrete conclusions. However, based on the preliminary conclusions, contoured as a result of these assessments, we propose the following:

- The continuation of the assessment and monitoring of daytime lepidoptere communities as to assess the biodiversity of the grasslands in the "East Park", respectively, expanding the research over the entire vegetative period (March-October,

and especially April-September). We propose carrying out the assessment at least bi-weekly.

- The assessment of lepidoptere communities outside, and in the immediate vicinity of the area called “East Park”, and, depending on the human resources, expanding the assessment over farther natural areas. In the context of the expansion of the Colonia Sopor built area, the “East Park” area shall probably remain a refuge for a daytime butterfly fauna, and these butterfly populations shall diminish in size and isolate as a result of the construction of the aforementioned area. The assessment of the lepidoptere communities in the vicinity of “East Park” area shall allow us to understand the dynamics of the populations within the park.
- The evacuation of any kind of waste stored on the premises of “East Park”, respectively, ensuring a regular control as to stop this phenomenon and to stop the action of setting waste on fire in this area.
- **Maintaining the grassy and wood vegetation in a state that is as natural as possible, respectively, forbidding stripping the vegetation layer. Certain areas shall require local cleaning of the wood vegetation as to create intra and inter-population migration corridors.**
- **Maintaining a the anthropic impact as low as possible, avoiding the creation of conditions for mass tourism, uncontrolled and degrading weekend tourism.**

## MAMMELS

### Observing mammal species in East Park

In order to demonstrate the presence of mammal species on the East Park territory, the Zona Verde Libera group used a photo-trap. This is represented by a camera composed of a movement sensor, and a camera. The camera activates when the sensor perceives movement, automatically snapping a photograph and/or recording a video. The photo-trap is an excellent instrument used to document the activities of species that usually hide or are sensitive to human presence.

The camera was installed in several areas on the park's territory, at different moments. Upon choosing the observed spaces, we took into consideration the traces found that indicated the presence of certain species, respectively, we try to place the photo-trap alongside routes that animals use when going in search of food. Most mammal species that are present in East Park are active at night, due to the biorhythm and to the human presence throughout the day -, that is why the photo-trap was installed in the evening and checked in the morning. The data obtained in this manner demonstrate only the presence of those respective species, and not the number of specimens pertaining to each species.



The map indicates the places in which the photo-trap was installed.

### The animals in East Park -

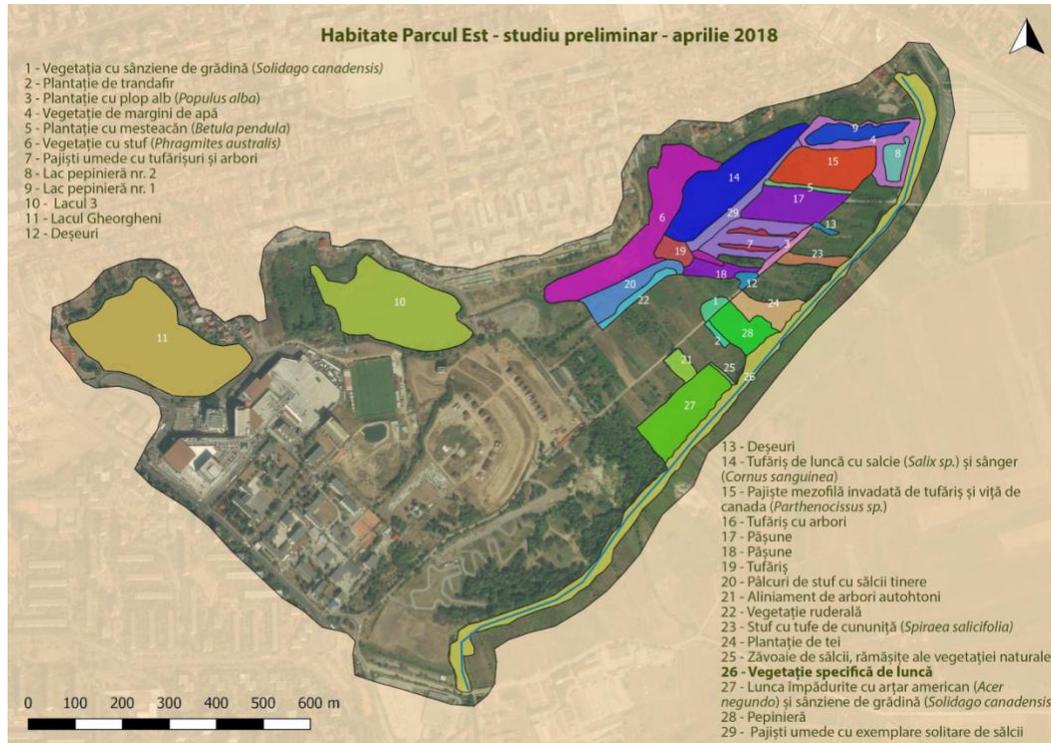
**Otter - *Lutra lutra***

**Deer - *Capreolus capreolus***

**Boar - *Sus scrofa***

## FLORA

### Plants East Park - plants and habitats - preliminary study



As students involved in the project (with the aid of specialists), we proposed creating a list of species found in East Park, that is a first map of the habitats. In April 2018, we noted (Szabó Anna, Sándor Dorottya, Miholcsa Zsombor) 150 plant species (this list is far from being complete) and several representative habitats.

We obtained information regarding the past of the park's flora from an article from the '40s; according to this article, the land was covered by a halophile grassland (with high humidity and moderate salt concentration), of which only a small part has been preserved in the present. The city's lakes have been surrounded by halophile and halo-tolerating plants, with associations dominated by weeping alkaligrass (*Puccinellia distans*). A data of significant botanical interest was the presence of milk parsley (*Peucedanum palustre*), noticed by Vince Borbás, respectively the presence of the great fen sedge, *Cladium mariscus*, species, noticed by Landoz. Not far from East Park, in Baile Someseni, we found sea milkweed (*Glauca maritima*), considered one of the most special plant species in Transylvania. (Nyárády 1941) Unfortunately, at the present time, we do not have data on these plants; it is likely that they have disappeared due to the reduction of the area, that is the transformation of the habitats. No very rare or protected plant species was found on the East Park's territory, however, **the diversity of the flora is exceptionally great in urban context, which can be seen from the large populations of birds, butterflies, dragonflies, small mammals, and bats.**

The current image of the park is defined through varied and complex areas of tree plantations, grasslands turning into rush-beds, respectively humid areas, with transition vegetation between them, following the succession grassland - shrubs - trees. A truly spectacular habitat is the semi-natural rush-bed with *Phragmites australis* (reed) found on the north-western side of the park, and surrounded by a water surface that is full of duckweed (*Lemna minor*). The reed offers a safe, habitat, food, and space for reproduction not only for the birds, but for reptiles, amphibians, and fish. A reed similar in size means an advance state of succession; it is foreseen that wood plants will be growing here as well in the next decades. The reeds function as a natural water purifying system: they consume the excess nitrogen accumulated in water, and the microorganisms that live at their roots and in the withered leaves contribute to the degradation of accumulated nutritive substances, thus impeding water quality degradation.

Likewise, worth mentioning is the diversity of the water vegetation. A representative example of this type of habitat is the flora around the two fishing lakes. Here, the reed areas are enriched with cat tail (*Typha latifolia*), and a great multitude of dicotyledonous plants can be seen here, which are characteristic to the lake areas. The reed aspect is also defined by the purple flowers of the purple loosestrife (*Lythrum salicaria*) or by two types of loosestrife: the one with the tall stem and beautiful yellow flowers (*Lysimachia vulgaris*), and the one that grows with its stems glued to the ground, with small, yellow flowers (*Lysimachia nummularia*). The lipped plants are present in the humid areas (Lamiaceae): here we find bugleweed (*Lycopus europaeus*) with white flowers and serrated leaves or wild mint (*Mentha longifolia*), with soft leaves of a gray-green color and with a pleasant, slightly bitter aroma. They are not rare plants; however, their presence indicates a good quality bank habitat.

The Becas creek is surrounded by wood vegetation. There are many shrubs that create a shaded habitat, with humid air. The birds predominantly consume wild cherry fruits (*Prunus avium*), hackberry (*Prunus padus*), elderberry (*Sambucus nigra*), guelder rose (*Viburnum opulus*) or dogwood (*Cornus sanguinea*). We also see a vast representation of fen: we see splendid small hills with greater pond sedge (*Carex riparia*), accompanied here and there by other species of fen, such as *Carex acutiformis* or *Carex spicata*.

Aside from large shrubs, we also see more limited areas of tree plantations. The native species are only seen in a sporadic manner, as ornamental tree or fruit trees were the ones preferred here: locust tree (*Robinia pseudoacacia*), walnut (*Juglans regia*), black poplar (*Populus nigra*). The line of adventive plants does not end with wood ones; we often see sea buckthorn (*Hippophaë rhamnoides*), foreign to the region, or the wild olive (Russian olive / oleaster / silver berry) (*Eleaagnus angustifolia*), which is an invasive species. *The presence of invasive with grassy stems is explained through the fact that certain parts of the park suffered repeated alterations to its habitats, which favors their growth. Most species represented species of this type are Canadian goldenrod (Solidago canadensis), sunroot (Helianthus tuberosus), woodbine (Parthenocissus quinquefolia, P. inserta) that grows up onto the treetops, or wild cucumber (Echinocistis lobata). A intervention as to stop the extremely rapid spread of these plants would be justified.*

The more vast grassland areas are often used for horse grazing, which impedes the spread of shrubbery, thus ensuring that the certain spaces remain open. On the grassland areas where the horses are not grazing, rose bushes (*Rosa* spp.) or hawthorn bushes have started to grow (*Crataegus* spp.). The grasslands are surrounded by high hygrophile weeds, which enriches the diversity of the habitats even further. Our favorite tree, called "the old willow" (*Salix alba*), located in the grassland on the western side of the park, is over a century old. The older poplars or willows are often seen here, having survived various adventures throughout history.

The list of plants noted (April 2018) in "East Park" Cluj Napoca >

<i>Acer campestre</i>	<i>Cirsium vulgare</i>	<i>Hippophaë rhamnoides</i>
<i>Acer negundo</i>	<i>Clematis vitalba</i>	<i>Humulus lupulus</i>
<i>Acer platanoides</i>	<i>Convolvulus arvensis</i>	<i>Impatiens</i> sp.
<i>Acer pseudoplatanus</i>	<i>Cornus sanguinea</i>	<i>Juglans regia</i>
<i>Acer saccharinum</i>	<i>Crataegus hybrid</i> <	<i>Lactuca serriola</i>
<i>Achillea millefolium</i>	<i>monogyna</i>	<i>Lamium album</i>
<i>Aegopodium podagraria</i>	<i>Crataegus monogyna</i>	<i>Lamium amplexicaule</i>
<i>Agropyron repens</i>	<i>Cucubalus baccifer</i>	<i>Lamium purpureum</i>
<i>Ajuga reptans</i>	<i>Dactylis glomerata</i>	<i>Lathyrus tuberosus</i>
<i>Alliaria petiolata</i>	<i>Daucus carota</i>	<i>Lemna minor</i>
<i>Amorpha fruticosa</i>	<i>Dipsacus laciniatus</i>	<i>Ligustrum vulgare</i>
<i>Antriscus sylvestris</i>	<i>Echinochloa crus-galli</i>	<i>Linaria vulgaris</i>
<i>Artemisia vulgaris</i>	<i>Echinocystis lobata</i>	<i>Lotus corniculatus</i>
<i>Asarum europaeum</i>	<i>Eleagnos angustifolia</i>	<i>Lycopus europaeus</i>
<i>Berberis vulgaris</i>	<i>Epilobium hirsutum</i>	<i>Lysimachia nummularia</i>
<i>Betula pendula</i>	<i>Equisetum</i> sp.	<i>Lysimachia vulgaris</i>
<i>Bidens frondosus</i>	<i>Euonymus europaeus</i>	<i>Lythrum salicaria</i>
<i>Brachypodium sylvaticum</i>	<i>Eupatorium cannabinum</i>	<i>Malus domestica</i>
<i>Brassica napus</i>	<i>Euphorbia cyparissias</i>	<i>Malva sylvestris</i>
<i>Bryonia alba</i>	<i>Festuca gigantea</i>	<i>Marrubium peregrinum</i>
<i>Calystegia sepium</i>	<i>Festuca pratensis</i>	<i>Mentha longifolia</i>
<i>Capsella bursa-pastoris</i>	<i>Festuca rupicola</i>	<i>Myriophyllum spicatum</i>
<i>Cardaria draba</i>	<i>Forsythia x intermedia</i>	<i>Partenocysus</i>
<i>Carex acutiformis</i>	<i>Fraxinus excelsior</i>	<i>quinquefolia</i>
<i>Carex hirta</i>	<i>Fumaria schleicheri</i>	<i>Parthenocissus inserta</i>
<i>Carex riparia</i>	<i>Galega officinalis</i>	<i>Pastinaca sativa</i>
<i>Carex spicata</i>	<i>Galium aparine</i>	<i>Phragmites australis</i>
<i>Ceratophyllum</i> sp.	<i>Galium mollugo</i>	<i>Pimpinella saxifraga</i>
<i>Chaenomeles X superba</i>	<i>Galium verum</i>	<i>Plantago lanceolata</i>
<i>Chelidonium majus</i>	<i>Geranium pratensis</i>	<i>Plantago major</i>
<i>Cichorium intybus</i>	<i>Geranium robertianum</i>	<i>Poa pratensis</i>
<i>Cirsium arvense</i>	<i>Geum urbanum</i>	<i>Poa trivialis</i>
<i>Cirsium canum</i>	<i>Glechoma hederacea</i>	<i>Polygonum mite</i>
<i>Cirsium oleraceum</i>	<i>Heracleum sphondylium</i>	<i>Populus alba</i>

<i>Populus nigra</i>	<i>Rosa canina</i>	<i>Taraxacum officinale</i>
<i>Potentilla anserina</i>	<i>Rubus caesius</i>	<i>Thlaspi arvense</i>
<i>Potentilla reptans</i>	<i>Salix alba</i>	<i>Tilia platyphyllos</i>
<i>Prunus avium</i>	<i>Salix fragilis</i>	<i>Tussilago farfara</i>
<i>Prunus padus</i>	<i>Salix triandra</i>	<i>Typha latifolia</i>
<i>Prunus spinosa</i>	<i>Salix viminea</i>	<i>Ulmus sp.</i>
<i>Pulmonaria mollis</i>	<i>Sambucus nigra</i>	<i>Urtica dioica</i>
<i>Pulmonaria obscura</i>	<i>Silene vulgaris</i>	<i>Valeriana officinalis</i>
<i>Quercus robur</i>	<i>Solidago canadensis</i>	<i>Veronica hederifolia</i>
<i>Ranunculus auricomus</i>	<i>Sonchus arvensis</i>	<i>Veronica persica</i>
<i>Ranunculus ficaria</i>	<i>Spiraea media</i>	<i>Viburnum lantana</i>
<i>Ranunculus repens</i>	<i>Spiraea salicifolia</i>	<i>Viburnum opulus</i>
<i>Ranunculus sclereatus</i>	<i>Spiraea x vanhouttei</i>	<i>Vicia angustifolia</i>
<i>Reynoutria sp.</i>	<i>Stachys sylvatica</i>	<i>Vicia cracca</i>
<i>Rhamnus cathartica</i>	<i>Stellaria media</i>	<i>Vicia grandiflora</i>
<i>Robinia pseudacacia</i>	<i>Symphytum officinale</i>	<i>Vicia tetrasperma</i>
<i>Rorippa sp.</i>	<i>Tanacetum vulgare</i>	

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#### Reconstruction of the aquatic ecosystem - Ana Corpade

This is an opportunity that has arisen as a result of the assumption of objective proposed within the European Strategy for Biodiversity. The people's quality of life evidently depends on the natural capital, that offers them certain resources, such as soil, water, climate, plants and animals etc. However, the ecosystems, habitats, and species, thus, suppliers of said resources which are important to man, are constantly subjected to degradation due to the beneficiaries of these resources, represented by the human component. The assessment of changes induced by man within ecosystems is, as such, a need that is more and more urgent in order to understand where these changes occurred, at what scale, and where and how must we intervene. The European Union has understood this need and has created the strategic framework for it by means of the 7<sup>th</sup> Action Program for the Environment. In essence, the EU has assumed the implementation of existing strategies in the field of natural capital protection, the improvement and application of legislation in this respect. The key element of fulfilling these objectives is the European Strategy for Biodiversity (2011), that takes over the AICHI targets established at global level within the Biologic Diversity Convention (1992). Other important directives aiming, in part, at natural capital protection objectives are the Habitats Directive, the Birds Directive, the Water Framework Directive, the Marine Environment Framework Directive, the Air Quality Directive.

The Biodiversity Strategy has 6 targets and 20 actions. Target no. 2 aims at maintaining and reconstruction the ecosystems and services they provide. In order to fulfill this objective, member states must map and assess the state of the ecosystems based on ecosystem classes. The final purpose is that of creating policies and instruments that will contribute to the protection and reconstruction of ecosystems, in accordance with targets established by the European strategy for biodiversity, that is, that the state of 15% of degraded ecosystems at European level be remade until 2020. Within the European Commission's *Mapping and Assessment of Ecosystems and their Services* (2016), the **lake ecosystems** are included for analysis under the fresh water ecosystems category, which includes rivers and lakes.

Between March 2016 - December 2017, the Ministry for the Environment, in partnership with the Romanian Academy's Institute for Economic Research, carried out the project "Development of administrative capacity of the Ministry for the Environment, Waters, and Forests with regards to implementing the policy in the field of biodiversity". Among the first results of the project:

- Elaboration of a study that shall define, classify, take inventory, and allow for the prioritization of investments in the reconstruction of degraded ecosystems;
- Elaboration of a GIS data base of degraded ecosystems, of a procedure to monitor said ecosystems, and the update and management of the data base before the project was finished.

Based on the results of the aforementioned project, the applicant's guide was published for consultation for a call for projects within POIM, AXIS 4, OS 4.1. *"Increasing the degree of protection and preservation of biodiversity through adequate management measures, and the reconstruction of degraded ecosystems"*. The lake ecosystems around the Gheorgheni lakes shall be eligible within this announcement for projects, being assessed as degraded lake ecosystems.

The activities which can be funded for the lake ecosystems are:

- Activities with the purpose of maintaining and improving the biological quality of the aquatic ecosystem in terms of the affected vegetation and water fauna;
- Activities aiming at reconstructing the riparian ecosystems affected by the erosion phenomenon or other degradation factors, including the aquatic landscape.