

## The "Jaskinia na Kamieniu" cave as a habitat of invertebrate fauna



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**Novi izvori**  
**Kozača izvori**  
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Novi izvori  
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#### NATURAL FACTORS

• **Complex biology** – reproductive maturity, longevity (40-100 years), survivors does not breed in consecutive years, but at intervals ranging from 2 to 5 years; success of hybridisation

• Anthropogenic factors + natural factors

• Species very susceptible to overexploitation  
• Difficult to characterise from genetic and molecular point of view











Collecting plants from the edge of a lake

Water level is high enough to see an aquatic plant and a small tree in the background.

Photo: Thomas, private collection







Dr. ...  
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State of the art

Year	Author	Title	Journal
2001	Smith	...	...
2002	...	...	...
2003	...	...	...
2004	...	...	...
2005	...	...	...
2006	...	...	...
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2017	...	...	...
2018	...	...	...
2019	...	...	...
2020	...	...	...
2021	...	...	...
2022	...	...	...
2023	...	...	...
2024	...	...	...





Characters	1	2
Dactylus	Lobated margin	Lobated margin
Propodus	2 is longer than greatest width (Fig 7 most similar than the other two); subventrally 2 spines	Fig 1 more similar than the other; Fig. 3 spines
Carpus	Subventrally 2 single setose spines (1 slender)	

Prp. length (1-7):  
 1<2>3>4>5=6<7  
 1 most strong  
 2 the longest  
 5 and 6 shortest  
 4<7, 7<3



Fig 7. *Leptochela gracilis* ?

Dr. Dul Stefan



















### Statistical analysis

The average number of alleles per locus (APL), the genetic heterozygosity ( $H_e$ ) and the observed heterozygosity ( $H_o$ ) were computed using GENEX. Deviation from Hardy-Weinberg equilibrium and pairwise linkage disequilibrium between each pair of loci were tested with exact probabilities using GENEX 1.0a.

Population differentiation was estimated from  $F_{st}$  values which were calculated using ARLEQUIN 2.0 software. Significance was verified using 10,000 permutations. A random assignment analysis was performed in GENEX. The  $U_{ST}$  statistic was used to assess the partitioning of microsatellite variation and frequencies among populations and among regions.  $U_{ST}$  values were calculated as  $U_{ST} = F_{ST} / (1 + F_{ST})$ .

The TSPGA package was used to calculate the 1000 bootstrap maximum distance between populations and to perform a 10000 random permutations. Statistical support for the branching pattern was obtained with 1000 bootstrap permutations. A  $U_{ST}$  value was also performed in GENEX.









## Isophya sp.



Species of Isophya is one of the most common species of the family Isophya. It was first described by Linnaeus in 1758. It is found in Europe, North America, and Asia.



This species is found in the mountains of Europe and Asia. It is a common species in the mountains of Europe and Asia.

Distribution:  
1. Europe  
2. Asia  
3. North America



The species of Isophya is found in the mountains of Europe and Asia. It is a common species in the mountains of Europe and Asia.





## Isophya sp.



Isophya sp.



Isophya sp.



Isophya sp.

### Many European Isophya species:

- have restricted ranges, being characteristically linked to rocky and usually calcareous specific biogeographic requirements (Sveinbjörnsson et al. 2008)
- are usually found in isolated populations of low density and close habitat discontinuity partly due to their strictly arboreal plant-feeding preferences (Sveinbjörnsson et al. 2008)
- Due to the reduction of their natural habitat, these species have been strongly constrained since the second half of the previous century, being considered endangered
- *I. atyai* is protected species by national and European laws (Habitats Directive) and has isolated populations throughout their range











- Genus *Isophya* is the second richest in species from the European Phaneropteridae and one of the most problematic groups from a taxonomical point of view. The identification of species is very difficult because of their high morphological similarity, thus the male calling song remains the main tool for species delimitation.
- Many *Isophya* individuals from many populations were collected for acoustic recording in the past years from several places in Eastern and Southern Carpathians (Romania) and after an elaborate sound and morphology analysis, two new species for science were identified.
- 19 *Isophya* species are known to occur in Romania, 6 those being Carpathian endemics.



Thank you!



Thank you!









Post-log event at the edge of log-forest canopy



6000 plant and  
animal  
species;


Vertebrate  
species:  
mammals 58  
birds 230  
reptiles 5  
amphibians 11  
fish 34

the Beaver – the symbol of the Reserve









SEASONAL DYNAMICS OF THE  
GROUND BEETLES (COLEOPTERA,  
CARABIDAE) IN CEFA NATURE PARK  
(NORTH WEST OF ROMANIA)

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## Conclusion

1. The ground beetles biomass is well structured and diverse.
2. The higher activity of the ground beetles is registered in the month of April and July.
3. In the climatic conditions of Ceti Nature Park the ground beetles are active even in the winter season.





CATALOGUE OF ROMANIAN  
DIPTERANS  
(INSECTA:DIPTERA)

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