CONFERENCE MATERIALS

CONSERVATION AND ECOLOGY OF THE COMMON HAMSTER, A CRITICALLY ENDANGERED RODENT

27TH MEETING OF THE INTERNATIONAL HAMSTER WORKGROUP

POLAND, JAWORZNO 23-25.10.2020

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Polskie Towarzystwo Ochrony Przyrody SALAMANDRA

WFOŚiGW w Katowicach

Editing and layout: Andrzej Kepel

Language consultation: Justyna Kubacka

Cover design: Borys Kala

Cover photo: Adriana Bogdanowska

Meeting logo: Urszula Eichert

Published by: © Polskie Towarzystwo Ochrony Przyrody „Salamandra”
(Polish Society for Nature Conservation “Salamandra”)
Stolarska 7/3, 60-788 Poznań, Poland
www.salamandra.org.pl, biuro@salamandra.org.pl

Co-financed by: Adam Mickiewicz University, Faculty of Biology
Voivodeship Fund for Environmental Protection and Water Management in Katowice

Available also at: http://salamandra.home.pl/27MIHW/wp-content/uploads/2020/11/27MIHW-materials.pdf

Citation: Kepel, A. (ed.). 2020. Conservation and ecology of the common hamster, a critically endangered rodent. 27th Meeting of the International Hamster Workgroup, Jaworzno, 23–25.10.2020, Conference materials. PTOP Salamandra, Poznań: 44 pp.

ISBN: 978-83-954508-0-8

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Financial support:	Adam Mickiewicz University, Faculty of Biology Jaworzono City Hall Polish Society for Nature Conservation "Salamandra" Voivodeship Fund for Environmental Protection and Water Management in Katowice
Meeting webpage:	http://www.salamandra.org.pl/27MIHW

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Invitation to the conference

Dear European hamster researchers,

I am genuinely pleased to invite you to the international scientific conference covering topics such as the active protection of the European hamster (*Cricetus cricetus*), which will be held between 23–25 October 2020. It is not by coincidence that this conference is co-organised by the Faculty of Biology of the Adam Mickiewicz University in Poznań, because the leading ecologist and researcher who is actively involved in the conservation of the European hamster in Poland is Prof. Joanna Ziomek. Most extensive programme of active protection of the European hamster in Poland has been for many years implemented and supported by the Jaworzno City Hall, hence the choice of the conference place.

Similarly to the previous meetings, the conference will facilitate exchange of information and views on the factors leading to the decline of the European hamster population as a result of habitat destruction or fragmentation, e.g. due to agricultural development. The rapidly progressing climate changes, which may lead to a negative impact on the biodiversity of the entire biocenosis, are also important. The European hamster, categorised by the International Union for Conservation of Nature (IUCN) as critically endangered on a global scale, has become a symbol of these changes. A field, treated as an ecosystem, is not only a collection of crop plants, which form a significant part of crop biomass, but also all the other plants and organisms living in this environment. Since species and their communities form a network of mutual relationships, even a small modification in one element of the ecosystem triggers other changes. In the recent years, nature conservation has been increasingly discussed and written about from the viewpoint of landscape structure and biodiversity – the factors that are extremely important for the various organisms inhabiting fields and for their role in the ecosystem.

In Poland, the European hamster is a strictly protected species and is part of the agro-ecosystem biodiversity. A long-term programme of monitoring of farmland habitats and the identification of the main environmental factors affecting this species is especially important for its conservation and maintenance of its population viability. These problems are often discussed only in a narrow group of specialists. Broader studies that thoroughly detail the biology, ecology and the role and importance of the European hamster in agro-ecosystems, addressed to a wider group of wildlife specialists, are rare. The organisers set themselves the goal of preparing a formula of a scientific conference that would address not only the current numbers and population status of the European hamster, in the context of its habitat requirements, but also how the species shapes biodiversity resources. The large group of invited guests from Poland and abroad guarantees an interesting discussion and useful exchange of various scientific ideas.

I wish you a successful meeting and fruitful discussions.

Beata Messyasz, PhD, DSc
Dean of the Faculty of Biology
of the Adam Mickiewicz University in Poznań

Welcome to the participants

Dear participants of the 27th Meeting
of the International Hamster Workgroup,

Almost everyone knows and recalls these lovely animals, Syrian hamsters. Liked and kept in millions of homes, they teach children love for animals and responsibility. And yet, so few of us have heard of their fantastic cousins – European hamsters. I am one of those for whom our native European hamster was an extraordinary discovery. And the fact that it lives right next to us, in the fields and balks of Jaworzno, was a huge surprise to me.

I accepted your proposal, made by scientists and conservationists, to give hamsters a chance for the survival and growth of their population, not as a curiosity but as a serious challenge. Luckily, there are many nature lovers among my workfellows, who took up the topic immediately and pursued it with passion. The hamster, an adorable animal that can also be very brave when the need arises, received a warm welcome from the inhabitants of our city, who also showed an understanding for the efforts to protect it. This animal is important to us for one more reason, which is rarely disclosed, but important to Jaworzno. Maybe I will tell you about it one day, preferably when we meet at the next occasion to celebrate our joint effort. When hamsters will make a large family, stay with us for good, find a good place to live and feel that Jaworzno is their fantastic home.

I would like to thank all those of you who work on it with such determination and commitment and wish you a lot of warmth and gratitude in human and hamster hearts.

Paweł Silbert
Mayor of Jaworzno

Jaworzno, 23 October 2020

Foreword from the organisers

Estimates by European hamster scientists show that without large-scale and effective remedial measures the species could disappear from the wild in less than 20 years. In 2020, on the initiative of the researchers from the International Hamster Workgroup (IHW), the conservation status of the European hamster in the IUCN Red List was changed from the least concern (LC) to the critically endangered (CR). Consequently, scientists are expected to accelerate research and seek solutions to counteract the progressive decline of the species. It is also necessary to take definitive active and passive management measures in all the countries within the European hamster's area of occurrence. Finally, it is crucial to cooperate with specialists from non-governmental institutions and organisations, to educate and involve the public and to obtain support from state and local nature protection authorities. This cannot be done without adequate funding.

For more than a quarter of a century, new scientific facts, answered research questions, successes of the active protection of the European hamster, as well as problems and limitations of various actions aimed at understanding and conserving the species have been presented and discussed annually during meetings of the International Hamster Workgroup. It is the second time that Poland has been the organiser of an IHW meeting. The jubilee 20th Meeting, under the theme *The European hamster – new problems and prospects of their solution*, was held between 15–17.11.2013 in Poznań, at the Faculty of Biology of the Adam Mickiewicz University. The 27th Meeting, entitled *Conservation and ecology of the common hamster, a critically endangered rodent*, was scheduled for 23–25.10.2020 in Jaworzno.

In this city, the first and to date the only programme of active protection of the European hamster in Poland is being implemented. In the 270-hectare protected area, created for the species, measures are being taken to strengthen and preserve an isolated hamster population of the philogeographic lineage *Pannonia*. Developing methods to protect isolated populations of the species will allow to conserve many other isolated sites. During the planned field session of the Meeting, we wanted to present to IHW members the conservation activities that we are carrying out in cooperation with the local self-government and farmers. We wanted to show how the European hamster lives in an area with suboptimal habitat conditions, resulting from several conversions of the farmland. As part of another field session, we also intended to show the areas in Poland (near Kraków), where the hamster is present in higher densities and the habitat is optimal. Unfortunately, the outbreak of the pandemic caused by the SARS-Cov-2 virus thwarted our plans. On March 12th, when we issued the first conference announcement, the number of COVID-19 cases detected in Poland was 20/day.

During the conference, it was already over 13,600/day and was growing rapidly. For this reason, we were forced to divide the conference into two parts: the Polish one, organised as an in-person meeting in Jaworzno, and the international one, conducted exclusively on-line on the Teams platform provided by the Adam Mickiewicz University in Poznań.

The Polish Day was held on October 23rd, and its organisation was a great challenge due to the obligation to observe all the sanitary restrictions. We greatly thank the Jaworzno City Hall, which assumed the burden of the technical organisation, and the Museum of Jaworzno History, which kindly provided a venue for this part of the conference. The culmination of the day was the unveiling of a statue to a European hamster in the Jaworzno market, which will not only draw the attention of the city inhabitants to their unique animal neighbours but also commemorate this exceptional conference. The mouth of the bronze hamster is covered with a mask, and the animal is putting the title of the 27th IHW Meeting on a scroll of paper with a goose quill. On the day following the Polish meeting, a restriction on gatherings over five people was introduced across Poland.

The international part took place on the 24th and 25th of October. A total of 109 people registered for the conference. In the end, more than 90 participants from 11 countries were able to take part. We greatly regret that we were not able to hold evening private conversations with music and refreshments, which is as important as official presentations and plenary discussions. The Jazz Club “Museum” in Jaworzno would be a great place for that. We hope that this shortcoming will be compensated for in the coming years, during meetings in Germany (2021), Ukraine (2022)...

We thank everyone for their participation in the 27th IHW Meeting: the speakers for preparing interesting talks and the debaters for their constructive exchange of thoughts. We thank the members of the Scientific Committee for their expert assistance and chairing the scientific sessions. We hope that the exchange of information on the latest research achievements and interesting discussions will contribute to increasing the effectiveness of current and future conservation measures.

During the discussions, the Meeting's participants jointly formulated a position calling for decisive action to prevent the extinction of the European hamster. The position, entitled: the 27thMIHW Conference Resolution, is addressed to authorities such as the Council of Europe, the European Commission, and the national and regional nature conservation bodies of the states in which this critically endangered species occurs.

We hope that all of us stay healthy and the hamsters find their due place in the hearts of people and the minds of decision-makers. See you!

Joanna Ziomek
chair of the 27thMIHW Scientific Committee
Adam Mickiewicz University, Department of Systematic Zoology

Andrzej Kepel
chair of the 27thMIHW Organising Committee
president of the Polish Society for Nature Conservation “Salamandra”

The unveiling of a bronze statue of a common hamster on the Jaworzno Market Square, to commemorate the 27th Meeting of the International Hamster Workgroup (23.10.2020) (photos by Andrzej Kepel)

Introduction to the International Hamster Workgroup

The idea to bring together hamster experts was first born during the 1993 conference of the German Society for Mammalian Biology in Tübingen (GER). During this conference, it became obvious that the common hamster had been a scientifically neglected species for nearly ten years. In terms of species conservation, an urgent need was felt to shed more light on its population decline, the knowledge of which, at that time, was shared by only a few people.

In January 1994, the first meeting was held at the guest house of the University of Heidelberg. During this initial meeting, the dramatic and ongoing decline of *Cricetus cricetus* in the Netherlands and Germany was discussed and all the participants agreed that further actions were needed. Already in October 1994, a second meeting was held in Heidelberg, because autumn is a better time for field biologists, who can then present new data from the most recent season. The principal aims and purposes of the group, notably to promote hamster research and conservation, to offer an opportunity for exchanging experiences, to support the protection of the species and to provide advice for administrations, agencies and authorities, have not been changed since then. In the following years, the group grew steadily, and more countries joined and attended the meetings. The International Common Hamster Workgroup also became an interface for scientists and conservationists, often stimulating new research and conservation strategies.

In the recent years, it has turned out that the decline of *Cricetus cricetus* is not only a problem of the "western range countries" like France, Germany, the Netherlands and Belgium, but continues also in the east. Again, the International Common Hamster Workgroup has provided a platform for scientists from the Czech Republic, Poland, Russia and Ukraine to present their findings and to get in contact with colleagues concerned with similar problems or research issues.

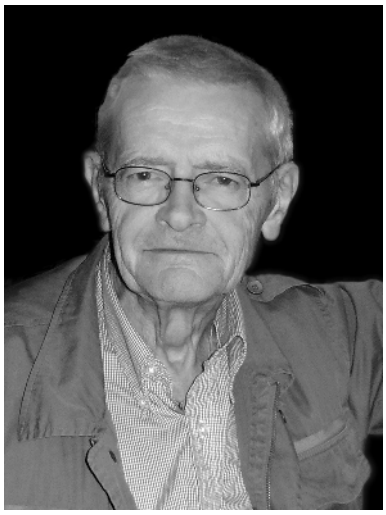
One of the major outcomes of our group is the recent assessment of the common hamster's Red List status for the IUCN (https://www.iucnredlist.org).

Apart from 2008, yearly meetings were held in various countries, organised by volunteers and often without or with very little financial support. The International Hamster Workgroup is not an organised association like the IUCN or WWF, or any other NGO. It is a network of scientists and conservationists united in their commitment to protect this species from extinction. As a consequence, vivid exchange of information takes place even beyond the meetings.

Ulrich Weinhold
Institut für Faunistik

This article was first published on the website of the Institut für Faunistik (http://institut-faunistik.de).

In memoriam of Gábor Oszvald Nechay (1942–2020)



Gábor Nechay was born on May 27, 1942 in Budapest. He graduated from the University of Agricultural Sciences in Gödöllő (now: Szent István University) as a certified agricultural and plant protection engineer. From 1967 to 1980, he worked as the head of the Ecotoxicology Laboratory of the Plant Protection Station in Tanakajd and Fácánkert, where he was mainly involved in the research on the common hamster and the common vole. Later, he also contributed to the study and conservation of the white-tailed eagle, the Hungarian meadow viper and the otter. From 1980, he worked for the National Nature Conservation Authority, and from 1988 he was the Special Senior Advisor of the Department of the International Conventions on Nature Conservation at the Ministry of Environment and Water, until his final retirement in 2004. In addition to his main field of interest, zoology, he was highly skilled in several areas of nature conservation. Over time, he became one of the key experts of the Hungarian nature conservation. With his innovative approach, he shed new light on a number of conservation issues. In addition to his office work, he taught at Szent István University, wrote books and gave lectures. He was a unique person not only as a professional but also in his private life.

The "Status of Hamsters..." (Nechay 2000) is still one of the most frequently cited studies on the subject of hamsters. In 2000, he received the Pro Natura award, which is granted to people who carry out outstanding activities for nature conservation in Hungary. In 2003, he organised the 11th Meeting of the International Hamster Workgroup in Budapest.

He died on September 28, 2020, at the age of 79, and was laid to rest in Gödöllő-Máriabesnyő. He was a great leader in our field, and his contributions will always be remembered.

Tamás Cserkész
Hungarian Natural History Museum

Selected international publications:

Nechay G (1973) Seasonal incidence of larval *Hydatigera taeniaeformis* infection of *Microtus arvalis* in Hungary. Parasitol Hung 6: 117–129.

Nechay G, Hamar M, Grulich I (1977) The Common Hamster (*Cricetus cricetus* L.): a Review. EPPO Bull 7: 255–276.

Kemenes I, Nechay G (1990) The food of otters *Lutra lutra* in different habitats in Hungary. Acta Theriol 35: 17–24.

Nechay G (2000) Status of Hamsters *Cricetus cricetus*, *Cricetus migratorius*, *Mesocricetus newtoni* and other hamster species in Europe vol 106. Nature and environment. Council of Europe Publishing, Brussels.

Photo from the collection of the Nechay family

Programme of the Meeting

23.10.2020 – DZIEŃ POLSKI [THE POLISH DAY]

9:30-10:00 *Rejestracja uczestników, poczęstunek* [*Registration of participants, a welcome coffee and snack*]

10:00-10:15 **Otwarcie konferencji** [Conference opening] *Diana Kościuk, Head of the Department of Environmental Protection, Jaworzno City Hall*

Sesia I [Session I] *prowadząca [chair]: Prof. Joanna Ziomek, A. Mickiewicz University, Poznań*

10:15-10:40 Magdalena Hędrzak, Urszula Eichert, Joanna Ziomek – **Monitoring chomika europejskiego (*Cricetus cricetus*) w Polsce – założenia i rezultaty** [The monitoring of the common hamster (*Cricetus cricetus*) in Poland – objectives and results]

10:40-11:05 Aleksandra Zarzycka, Marcin Brzeziński, Katarzyna Bińkowska – **Wpływ warunków glebowych na rozmieszczenie oraz zimową przeżywalność chomika europejskiego (***Cricetus cricetus***)** [The influence of soil properties on the distribution and winter survival of the European hamster (*Cricetus cricetus*)]

11:05-11:30 Sylwia Szczutkowska – **Wymagania dotyczące ochrony chomika europejskiego a inwestycje drogowe w Polsce** [European hamster protection requirements and road investments in Poland]

11:30-11:55 Paulina Strejczek-Jaźwińska, Piotr Wężyk, Jakub Jaźwiński, Monika Winczek – **Wykorzystanie bezzałogowych statków powietrznych w poszukiwaniu nor chomika europejskiego (*Cricetus cricetus*)** [The use of unmanned aerial vehicles in finding burrows of the European hamster (*Cricetus cticetus*)]

11:55-12:30 *Przerwa kawowa* [*Coffee break*]

Sesja II [Session II] *prowadząca [chair]: MSc. Urszula Eichert, A. Mickiewicz University, Poznań*

12:30-12:55 Andrzej Kepel, Marta Kepel – **Wykorzystanie doświadczeń z programu ochrony susła moręgowanego do aktywnej ochrony chomika europejskiego i *vice versa*** [Building on the experience from the European ground squirrel conservation programme to actively protect the common hamster, and vice versa]

12:55-13:20 Maria Janicka, Czesław Janicki – **Osuwiska a zanikanie populacji chomika europejskiego (*Cricetus cricetus*) na przykładzie historycznego stanowiska w Przytkowicach (Pogórze Wielickie)** [Landslides and a decline of the common hamster (*Cricetus cricetus*) population – a case study from Przytkowice (Wieliczka Foothills)]

13:20-13:45 Joanna Ziomek, Iwona Melosik, Urszula Eichert, Andrzej Kepel – **Czy chomik europejski pozostanie trwałym elementem jaworznickich pól? Podsumowanie programu ochrony chomika europejskiego na obszarze Jaworzna** [Will the European hamster remain a permanent element of the Jaworzno fields? A summary of the European hamster protection programme in the city of Jaworzno]

13:45-14:10 Urszula Eichert, Marcin Tosza – **Czy słyszałeś kiedyś o chomiku europejskim? Szerzenie wiedzy w polskim społeczeństwie** [Have you ever heard of the common hamster? Raising public awareness in Poland]

14:10-14:40 **Dyskusja podsumowująca** [Concluding discussion]

14:40-15:15 *Obiad* [*Lunch*]

15:15-15:45 **Odsłonięcie figurki chomika europejskiego na Rynku w Jaworznie** [The unveiling of a statue to a common hamster on the Jaworzno Market Square]

24.10.2020 – ONLINE MEETING

9:30-9:45 *Logging in of participants*

9:45-10:00 *Guidelines about the online platform Microsoft Teams*

10:00-10:10 **Official opening of the conference international part**
Prof. Jakub Kosicki, Vice-Dean for Science and International Cooperation of the Faculty of Biology, Adam Mickiewicz University, Poznań

Session III Recent status and legal aspects of common hamster's protection

chair: Dr Urlich Weinhold, Institut für Faunistik

10:10-10:35 Mikhail Rusin, Rosalind Kennerley – **The European hamster in the IUCN – the road from Least Concern to Critically Endangered**

10:35-11:00 Hendrik Schoukens: **EU law and the extinction of the common hamster: does there exist a binding and enforceable duty to restore endangered species?**

11:00-11:25 Sylwia Szczutkowska – **European hamster protection requirements and road investments in Poland**

11:25-11:45 Tamás Cserkész, Mátyás Prommer, Balázs Szelényi, Attila Németh, Gábor Csorba – **A critically endangered pest: the recent status of the common hamster in Hungary**

11:45-12:10 *Coffee break*

Session IV Captive breeding programmes and hamsters' conservation, part I

chair: Dr Mathilde Tissier, Bishop's University

12:10-12:35 Stefanie Monecke, Susanne Thimm, Klaus Grün – **FeldhamsterPro – a new breeding software for the common hamster**

12:35-13:00 Susanne Thimm, Dietlind Geiger-Roswora, Anja Pflanz, Christian Chmela, Michael Stevens, Manfred Aletsee, Jörg Kritschker, Clara Stücker, Ute Köhler, Stefanie Monecke – **The common hamster breeding and reintroduction programme in North Rhine-Westphalia – the current state of the art**

13:00-13:25 Mikhail Rusin, Pavlo Matsiboruk, Viktoria Bilivska, Yegor Yakovlev, Marina Shrvyria – **Starting a breeding programme for the European hamster in Ukraine**

13:25-13:50 Julie Fleitz, Lorène Garnier, Jonathan Jumeau, Mathilde L. Tissier, Yves Handrich – **Improving the success of restocking programmes: effects of a pre-release training period on the anti-predator behaviour of adult and juvenile common hamsters**

13:50-14:30 *Lunch break*

14:30-15:30 **Discussion on funding for common hamster research projects**
chair: Prof. Stefanie Monecke, Ludwig Maximilian University Munich

Session V Captive breeding programmes and hamsters' conservation, part II

chair: Prof. Stefanie Monecke, Ludwig Maximilian University Munich

15:30-15:55 Florian Kletty, Caroline Habold – **How agricultural transition can help hamster conservation and bring many other benefits?**

15:55-16:20 Lorène Garnier, Julie Fleitz, Yves Handrich – **An effectiveness test of different barrier types for the European hamster**

16:20-16:45 Andrzej Kepel, Marta Kepel – **Building on the experience from the European ground squirrel conservation programme to actively protect the common hamster, and vice versa**

16:45-17:10 Marcin Tosza, Urszula Eichert – **Have you ever heard of the common hamster? Raising public awareness in Poland**

17:10-17:30 **Discussion**

25.10.2020 – ONLINE MEETING

9:45-10:00 *Logging in of participants*

Session VI Distribution and monitoring of common hamsters populations

chair: Dr Maurice La Haye, Dutch Mammal Society

10:00-10:25 Alexey V. Surov, Pavel L. Bogomolov, Natalia Yu. Feoktistova – **Three methods to estimate the abundance and distribution of the common hamster (*Cricetus cricetus*)**

10:25-10:50 Magdalena Hędrzak, Urszula Eichert, Joanna Ziomek – **The monitoring of the common hamster (*Cricetus cricetus*) in Poland – objectives and results**

10:50-11:15 Paulina Strejczek-Jaźwińska, Piotr Wężyk, Jakub Jaźwiński, Monika Winczek – **The use of unmanned aerial vehicles in finding burrows of the European hamster (*Cricetus cricetus*)**

11:15-11:45 *Coffee break*

Session VII Common hamster ecology and genetics

chair: Prof. Alexey V. Surov, Severtsov Institute of Ecology and Evolution

11:45-12:10 Aleksandra Zarzycka, Marcin Brzeziński, Katarzyna Bińkowska – **The influence of soil properties on the distribution and winter survival of the European hamster (*Cricetus cricetus*)**

12:10-12:35 Maria Janicka, Czesław Janicki – **Landslides and a decline of the common hamster (*Cricetus cricetus*) population – a case study from Przytkowice (Wieliczka Foothills)**

12:35-13:00 Tobias E. Reiners – **The genetic heritage of the common hamster in Europe – putting the puzzle back together**

13:00- 14:00 **Concluding discussion and closing of the conference**

Abstracts of Meeting presentations

The European hamster in IUCN – the road from Least Concern to Critically Endangered

Mikhail Rusin*[1], Rosalind Kennerley[2]

[1] Kiev Zoo, Ukraine
[2] Durrell Wildlife Conservation Trust, UK

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In the 2008 IUCN Red List assessment, the European hamster (*Cricetus cricetus*) was listed as Least Concern (Kryštufek et al., 2008), despite the statement that it had declined in almost all the European range states. One of the assumptions made was that it was considered abundant in Ukraine, however, this statement was far outdated and was questioned in 1998 (Gorban et al., 1998). One can conclude that the LC assessment was based on old data and did not include new results from field studies. In 2011, the IHWG prepared the reassessment, but it was not accepted. At the same time, a number of articles appeared discussing the status of it in different countries (Ziomek & Banaszek, 2007; Tkadlec et al., 2012; Rusin et al., 2013; Korbut et al., 2013). A keystone publication was published by Surov et al. (2016). Despite all these data, it was again reassessed as LC (Kryštufek et al., 2016). The reason for this was that it was decided that an algorithm be used to identify LC species that needed more thorough investigations. Unfortunately, the European hamster was amongst the many LC species which were not selected and therefore was automatically fast-tracked through the process, meaning that no significant checks were made before it was published again as LC.

An additional point of note is that the standard practice of IUCN Red List reassessments suggests that authors of the previous assessment are those contacted primarily to find out if they want to remain as assessors and/or if they have other people to suggest as assessors.

In 2018 we started a new round of reassessment. Long and complicated work lies behind this process. We discussed whether the hamster met the Vulnerable or Endangered status. Finally, the IUCN Red List unit clearly explained that the data and rationale we provided met the criteria CR3ac. Could this be too conservative an estimate? Only detailed studies on reproduction from all of the species' range can tell. The CR status clearly raises attention to the studies and conservation of the hamster. It is time to provide new knowledge, develop wider conservation actions and to shift the attitude to coexistence with European hamsters.

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EU law and the extinction of the common hamster: does there exist a binding and enforceable duty to restore endangered species?

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In spite of being listed as a protected species under EU law, the common hamster (*Cricetus cricetus*) finds itself on the brink of extinction in several EU Member States. One might be inclined to qualify this continued decline as yet another stark illustration of the many shortcomings of the EU Habitats Directive, which is often heralded as one of the cornerstones of the EU's environmental policy. Against this backdrop, the common hamster could be presented as a victim of the lack of compliance of many Member States with the protection duties set out by the EU Habitats Directive.

Whereas this line of argumentation certainly has some merits, it fails to acknowledge the prevailing approach to the EU Habitats Directive as a guardian of the *status quo* rather than a catalyst of active and comprehensive restoration actions. Since its entry into force, the EU Habitats Directive has been predominantly used to protect Natura 2000 sites or species from imminent dangers and further encroachment, often to good effect. However, it is submitted that this conservative reading is ultimately flawed, since a correct understanding of the EU Habitats Directive should place more emphasis on its underlying restoration rationale. To merely confine conservation efforts to actions aimed at avoiding further decline is not only pointless from an ecological point of view – since it often leads to deathbed conservation for species with low population numbers – but also stands at odds with the recent case-law of the Court of Justice of the European Union. In recent decisions, amongst others regarding the conservation of the common hamster, EU judges have repeatedly underscored their willingness to let the restoration rationale prevail over the more traditional understanding of the EU Habitats Directive. To be sure, Article 12(1) of the EU Habitats Directive does not contain a direct reference to comprehensive restoration efforts, nor does it contain an obligation to reintroduce species or to designate recolonisation sites.

Even so, I submit that the latter provision can still be used as a powerful legal instrument to effectively force Member States to implement robust restoration programmes, amongst others for the dwindling populations of common hamsters. The upshot is that, while we might not arrive in time for saving the common hamster across its current range, progressive litigation aimed at enforcing these restoration mandates could also help as a welcome reminder of the significant legal risks that authorities face when delaying the issuance of comprehensive restoration plans for critically endangered species. In order to achieve such impact, environmental NGOs will also need to refocus their litigation strategy from merely reactive legal proceedings to more proactive strategies.

European hamster protection requirements and road investments in Poland

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Poland is a country with a dynamically developing transport network. Modern roads are needed. Yet, by disrupting the continuity of habitats and ecological corridors, they are becoming the most serious threat to the protection of landscape connectivity on a national and European scale.

The Association Workshop for All Beings monitored the road projects planned and implemented between 2019 and 2020 in the Małopolskie Voivodeship, which cross the habitats of a population of the European hamster (*Cricetus cricetus*). It must be noted that this population belongs to a unique phylogeographic lineage. The results of the monitoring showed that the requirements for the protection of these animals were neglected.

This is because the road construction permits were granted based on an unjustified claim that the favourable conservation status of the species occurring at the planned road construction site would be ensured by the obligation to execute derogation decisions.

This faulty procedure for issuing permits exempts the contracting party and the nature and environmental protection authorities from the requirements of the Environmental Impact Assessment Directive:

- to conduct a reliable, comprehensive inventory of the European hamster;
- to carry out a proper assessment of the impact that a road project would have on the European hamster population;
- to implement appropriate minimisation measures such as wildlife crossings and roadside fences designed specifically for hamsters.

In none of the road construction projects conflicting with hamster sites were the protection requirements of these animals included. Every single one of these roads will create a barrier preventing free migration of these animals due to the lack of an appropriate number of well-designed crossings for hamsters.

An additional problem stems from the flawed provisions of the derogation decisions themselves, the implementation of which may generate additional mortality of the European hamster.

It was possible to consolidate this practice of applying the law because, under national law, non-governmental organisations and the public were deprived of effective means of control and access to justice.

In addition to exposing the problem, this presentation is a proposal to create a cross-sectoral platform of cooperation that would support the efforts of Polish social and environmental organisations to protect the hamster in the process of designing and implementing infrastructure projects.

A critically endangered pest: the recent status of the common hamster in Hungary

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The common hamster (*Cricetus cricetus*), recently uplisted to *Critically Endangered* by the IUCN, has been included in Annex IV of the Habitats Directive (HD) of the European Union since 1992. Hungary, however, has a derogation to implement its HD-related obligations concerning the common hamster due to the damage it causes in arable fields, and the species can be legally harvested. In this study, we describe the mapping of the current distribution area, density and trend of the Hungarian population. To collect data, we carried out field surveys, sent out a questionnaire and performed (online, telephone and personal) interviews with agronomist consultants of the Hungarian Chamber of Agriculture.

We also describe the historical changes in the spatial distribution of the hamster in Hungary through seven time intervals and the temporal trend from 1918. Comparing the recent distribution map with former ones makes it clear that the hamster can be found in more places now than during the latest survey in 2004. In the central and southern parts of East Hungary, hamsters cause significant damage in croplands, forcing the farmers to use rodenticides or hire professional fur trappers, who can harvest 1000–2000 hamsters/day during the main season. Approximately ten years ago, hamsters also started to colonise settlements; they enter houses and cause damage in gardens. This makes people use various countermeasures, which results in killing over 100 animals in some gardens annually.

Despite the apparent expansion of the species suggested by the recent data, the population size likely fell below the detection threshold in several regions in Hungary. In these regions, protection is justifiable and specific conservation measures are needed.

In summary, the protection of the species in Hungary is a complex and controversial issue, as on the one hand, the hamster is a keystone species, e.g. prey of the imperial eagle (*Aquila heliaca*) and the steppe polecat (*Mustela eversmanii*), on the other hand, however, it is an agricultural pest in some regions of East Hungary, causing significant economic loss to farmers and conflicts with local inhabitants.

FeldhamsterPro – a new breeding software for the common hamster

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Common hamsters are still rapidly declining all over the distribution area. Therefore, the number of conservation breeding stations for the common hamster is increasing. In the LANUV conservation breeding station we started a conservation breeding programme in 2017. The founder animals were a mix of wild animals and animals from the Dutch breeding centre. To reduce inbreeding, we regularly exchange hamsters with the Dutch breeding centre. Presently, we breed about 200 hamsters per year. So far, we have released hamsters at four German and four Dutch sites.

In order to keep track of the increasing number of hamsters in the colony, of released or exchanged animals, of pedigrees, inbreeding coefficients, health and diseases, growth curves, reproductive states, maintenance and, last but not least, the requests from the releasing sites, good book-keeping and administration are essential.

Based on a breeding software for guinea pigs from Gruen-Development, we developed a tailored breeding database for common hamster conservation breeding stations. It provides an overview of the animals in the colony and their current state (pup, standard, released, to be released, unsuitable for breeding and dead) as well as detailed datasheets per animal, including diary, pedigree, mating, offspring, reproductive state and health data. Furthermore, it has several features that make daily routines easier, such as weighing lists and cage cards.

Breeding is facilitated by the calculation of inbreeding coefficients for all the combinations or individual animals, by collecting data on body weight and reproductive state, by the option to breed several lines, and by the calculation of parturition dates. For smooth and quick compilation of groups that should be released, potential animals can be marked as soon as they are ready for release and the final choice can be fixed in transport lists.

Lists and addresses of release sites, other stations, veterinarians and other contacts complete the database. Our breeding software might be a good option for other breeding stations as well.

The common hamster breeding and reintroduction programme in North Rhine-Westphalia – the current state of the art

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After a dramatic population decline, the North Rhine-Westphalia state started a common hamster (*Cricetus cricetus*) breeding and reintroduction programme in 2017. Before that time, the last North Rhine-Westphalian hamsters were live-trapped in 2016 and brought to the Dutch breeding colony, where they could be bred with Dutch hamsters. In 2017, we could start with these animals and their offspring. The close collaboration with the Dutch colleagues has continued.

In 2017 and 2018, we built a colony. By the end of 2018, we had about 260 animals. Twenty-nine litters were born in 2019, and 40 litters were born in 2020. In September 2018, the first 12 animals were released into outdoor enclosures in an area, which was recultivated after coal mining. We wanted to test whether the artificially stratified soil is suitable before we release larger numbers of hamsters. Ten out of the 12 animals survived, which was very promising. However, the project was stopped on the political level beyond our influence. The 10 animals plus their offspring were then translocated mainly to Aachen.

Presently, we have a total of three releasing sites in North Rhine-Westphalia. The oldest one is close to Aachen, where, since 2018, mainly hamsters from the Dutch breeding colony have been released. In May and June of 2019, an area close to Pulheim could be repopulated with 129 hamsters. In September 2019, the release of another 74 animals followed in the Rommerskirchen area.

In spring 2020, both the population in Aachen, and the new one in Rommerskirchen almost collapsed. Aachen suffered from heavy rainfall, especially in February, which may have been the reason in this area. In Rommerskirchen, the late release at the end of September might have played a role. One week after release, 42 of the 74 common hamsters (56.8%) showed no activity within the pre-drilled initial burrows and presumably left the release plot or got predated. In April 2020, 9 burrows were opened after hibernation (28.1% of the remaining 32 hamsters). In contrast, the population in Pulheim was strong. There was less rainfall.

In spring, 135 burrows were found. Considering an estimated number of 170 hamsters in autumn, 80% had survived the winter.

The spring of 2020 challenged the release sites by a long-lasting drought. The ground cover was completely lacking. After large-scale watering, releasing could be resumed with 64 animals between mid-May and early July in Rommerskirchen. Pulheim got another 17 animals on a neighbouring field to reinforce the existing population. In late summer, the Aachen area was supplemented by the joint efforts of the Dutch and the North Rhine-Westphalian colonies with about 50 animals. Additionally, a total of 93 animals were released at 4 Dutch sites, most of them in early May and the last group in early September.

In 2021, an area between Rommerskirchen and Pulheim should be repopulated in order to connect both populations. The long-term goal is to connect the Rommerskirchen and Pulheim areas to an 8-km-long part of a biotope network system in the region and the Aachen area with the Dutch release sites in Sibbe, Heer, Sittard and Doenrade. A steering committee meets up to twice per year to coordinate the activities and needs at the release sites and the breeding colony. Another annual meeting coordinates the Dutch and North Rhine-Westphalian breeding activities. Difficulties are encountered concerning reliable monitoring, especially of reproduction.

The listed authors are representatives of organisations, which are involved. Since many areas are involved, and a lot of work has to be done on the political, administrative and local levels for each of them, many more enthusiastic people and organisations are involved whose work is highly appreciated. Special thanks are also due to the contributing farmers.

Starting a breeding programme for the European hamster in Ukraine

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In Ukraine, the European hamster (*Cricetus cricetus*) has been a protected species since 2009, when it was included in the National Red Book (Mezhzherin, 2009). However, there have been no activities related to the conservation of the species. In 2019, we organised a first captive breeding programme for the European hamster in Ukraine. Ukraine has the largest genetic diversity within European hamsters (Korbut et al., 2019). Keeping this in mind, we decided to start with one of the least known populations. In 2019, we brought 11 adult hamsters (six males and five females) from the Kelmentsy District (the Chernivtsi Oblast of Ukraine) to the Kiev Zoo. At the Zoo, we constructed a breeding hub with controlled climate conditions and adjustable artificial light (mimicking the sunset and sunrise in the Chernivtsi Oblast). In 2020, we obtained seven litters. Eleven of young hamsters were released back to the wild in the National Nature Park "Khotynskyi".

Further plans include: continue breeding and release to the wild; study the reproduction of different genetic lineages; develop methods for successful breeding and reintroduction.

All the activities are done in accordance with the legislation issued by the Ministry of Ecology and Natural Resources of Ukraine.

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Improving the success of restocking programmes: effects of a pre-release training period on the anti-predator behaviour of adult and juvenile common hamsters

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Captive breeding programmes are an important pillar in conservation biology, aiming to prevent the extinction of threatened species. However, the establishment of self-sustaining populations in the wild through the release of captive-bred animals is often hampered by high mortality during the first weeks after release. Post-release mortality of captive-reared common hamsters (*Cricetus cricetus*) is associated with a strong predation pressure in farmlands and could be a result of unsuitable behaviours of hamsters towards unknown predators. A measure to optimise the behavioural response of hamsters and increase their survival would be to subject them to a pre-release period.

In this study, we investigated how a pre-release 'training period' under semi-natural conditions influenced the anti-predator behaviour of captive-reared hamsters. We conducted experimental predation trials on one-year-old adults in 2018 and on three-month-old juveniles in 2019, using a moving taxidermied fox model (*Vulpes vulpes*) in an experimental arena. We video-recorded the behaviours of the hamsters before (5 min), during (4 min) and after (5 min) the exposure to the predator model. After the tests, we released half of the individuals to an outdoor enclosure (0.4 ha) protected from predators (N=15 adults in 2018, 11 juveniles in 2019), whereas the other half (control group) remained in individual cages at our breeding unit. After two weeks, we recaptured the hamsters (10 in 2018 and 7 in 2019) from the enclosure and placed them in individual cages at our breeding unit. All the individuals underwent another round of exposure to the taxidermied fox the next day, 24 h after recapture. We found that the anti-predator behaviour of adult hamsters from the enclosure group was significantly modified by the 'training period'. Specifically, compared to the control group, the adult hamsters of the enclosure group sought shelter 10 times faster during predator confrontation and remained hidden in the shelter two times longer. On the other hand, we did not observe significant behavioural differences between the two groups of juveniles, as they initially spent most of their time in the shelter. Hence, our results suggest that a pre-release 'training period' may be a simple way to optimise the anti-predator behaviour of captive-reared adults, which could improve their post-release survival, while the treatment may not be necessary for captive-reared juveniles.

How agricultural transition can help hamster conservation and bring many other benefits?

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The modification of agricultural landscape and practices explains the decline in common hamster populations throughout Europe. Maize monoculture and increased rainfall have been shown to affect the body condition of hamsters. Their average body mass after hibernation indeed decreased by 21% since 1937. Bare soils linked to maize in winter to spring or wheat in summer to winter lead to increased predation risk for this rodent. Moreover, a decline in reproduction rate has been observed in wild populations. Indeed, agricultural practices can impair the nutrition of the species and thus affect the hamster's fitness, especially reproduction. Experiments in controlled conditions revealed that reproduction failure occurred with maize-based diets as a result of micronutrient deficiency and with various other diets (including wheat-based diets) if protein content was low (e.g. clover instead of earthworm supplementation). Experiments in semi-wild conditions showed that neither maize nor wheat monoculture allowed hamsters to compensate for the nutrient deficiency of the crop by feeding on adventive plants or fauna, whereas with a mix of maize, wheat, alfalfa and sunflower in the same conditions, reproduction was successful. Hamsters have the possibility to feed on a very broad diversity of foods, including weeds and animals, determined by what is available in their environment. When different food items are available, hamsters can select their food to balance their nutrient intake. However, many different foods are necessary to fulfil their needs, and it is likely that they are not available in their current agricultural environment.

The protection or enhancement of wild hamster populations in farmlands would thus require the implementation of diversified crops and sustainable agricultural practices. However, this is often considered to be in competition with agricultural production and farmers' goals. Funding for hamsters and biodiversity, like agro-environmental schemes, can help farmers with the implementation of innovative practices, but this is costly and may not be sustainable. However, hamster's preservation is not necessarily opposed to agricultural production. Indeed, some agricultural practices and models rely on the same aims and are beneficial for both. This is the case for organic farming, for example. Also, reduced tillage and especially no-tillage limit disturbance of the soil and enhance soil biota. It is generally linked to maximisation of cover crops and sometimes to other practices like mixed cropping or semi-natural habitat enhancement. These practices are developed in conservation agriculture, which aims at promoting soil biology and functions, but also biodiversity and functions of the whole ecosystem, to benefit from ecosystem services. For hamsters, this could allow higher abundance and diversity of arthropods, more crop diversity, more suitable field margins, and more adventive plants, leading to better nutrition and better reproduction. Cover crops also offer shelter from predators.

The implementation of such practices in the habitat of the hamster has many other benefits. It can enhance the overall biodiversity since plant diversity is increased, semi-natural habitats are developed, and pesticides and disturbance are reduced. Furthermore, it is beneficial for farmers by preserving soil functions, limiting soil erosion, enhancing biological control, bringing more independence and security, and sometimes resulting in a permanent increase in yields. Finally, human well-being is also improved, with better water and food quality, less extreme events (e.g. muddy floods), improved agricultural landscapes and closer link to nature with more biodiversity.

A transition toward an agricultural model relying on such practices requires many changes and can be complex to develop. This involves a new approach to the agro-ecosystem, specific knowledge and material, and high investment in money in the first years. It also takes several years to be effective. Given that the expected benefits are worth it, we recommend linking the different issues. Hamster conservation alone will not lead farmers to engage in a risky transition. However, if a holistic view is taken and all the advantages are considered, farmers, conservationists, policymakers, and society as a whole can bring the force, knowledge and money to make it happen.

An effectiveness test of different barrier types for the European hamster

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Barriers are among the most common infrastructures used to prevent wildlife roadkill due to collisions. Barriers have a crucial role in preventing animals from entering roads and act as a guide to help wildlife find underpasses. Despite their importance, their effectiveness has rarely been tested. Therefore, barriers may be inappropriate and inefficient because animals can cross them or because they tend to wear over time. The European hamster (*Cricetus cricetus*), one of the most vulnerable species in Europe, is now listed by the International Union for Conservation of Nature (IUCN) as critically endangered. In France, this hamster has disappeared from three-quarters of Alsace, its original habitat. In this area, to protect this target species from accessing roads and highways, hundreds of kilometres of mesh fences have been installed. However, the efficiency of these fences has never been tested, and they do not seem to be the most suitable.

In order to evaluate the effectiveness of this fence and potentially find a new efficient barrier that could be installed alongside the roads, we tested three types of barriers on captive hamsters (N=40) in controlled conditions, over three years. The first fence tested was the one commonly used in Alsace, a 50 cm high mesh fence (0.6 mm) with an 8 cm overhang at the top. The second was an L-shaped, 40 cm high concrete wall. The third one was a 40 cm high galvanised steel sheet (3 mm thick) with a 5 cm overhang at the top.

Our results showed that hamsters were able to cross the mesh fence without any difficulties by hanging on and climbing until reaching the top of it. However, both the concrete wall and the steel sheet seemed to be effective, as none of the hamsters were able to over-pass them.

Knowing additionally that tears in the screen fence are systematically encountered, we recommend that design engineers use concrete or metal fences alongside roads in areas where this endangered hamster is present.

Building on the experience from the European ground squirrel conservation programme to actively protect the common hamster, and vice versa

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The Polish Society for Nature Conservation "Salamandra" has been implementing a programme of reintroduction and protection of the European ground squirrel (*Spermophius citellus*) for 16 years. For five years, we have been cooperating with Jaworzono Municipality, A. Mickiewicz University and Poznań Zoo in the implementation of the common hamster (*Cricetus cricetus*) protection programme. The ground squirrel and the hamster are rodents which in Poland occur mainly in agro-ecosystems. Both are burrow-digging animals, have a similar size and diet, and hibernate during winter. However, there are also significant differences between them. They belong to different families and have different activity (ground squirrels are almost exclusively diurnal, and hamsters are more nocturnal). Ground squirrels do not collect food for the winter (which hamsters do). Above a certain number, common hamsters may cause significant damage to the crop, while the effect of European ground squirrels is usually economically negligible. One important difference also concerns the social relations of these species. Ground squirrels live in colonies. They warn each other of dangers and accept conspecifics in proximity. In contrast, hamsters are solitary. Even when they occur in high densities, they do not have the social relations and mutual acceptance observed among ground squirrels.

When planning the conservation measures for hamsters, we try to take advantage of the experience gained from the conservation of ground squirrels. Some of the solutions are universal, and we can implement them directly. This applies, in particular, to mitigation of risks, some of which are the same for both species. Reducing pressure from wild predators or from domestic animals is similar for many animals – including the two species. For both of them, it is crucial to maintain the places where they occur in appropriate agricultural use. Similarly, in both programmes, actions aimed at fostering a positive attitude of local communities towards these rodents are important. We use similar educational methods for this purpose.

Because in both projects we do resettlements and supply the population with specimens bred in captivity, we also use our previous experience from both projects in these activities. In the case of common hamsters, as in the case of ground squirrels, any release into the wild is done using acclimation cages and pre-drilled burrows. When releasing hamsters, we use techniques developed for ground squirrels that prevent rapid digging from the enclosure. So far, we have been releasing ground squirrels in large cages, 20–30 individuals per each. When we release hamsters, each animal is put in an individual cage. As this allows for more precise placement of animals in selected locations, we have now started to use individual acclimation cages also in releasing ground squirrels, especially in places where the species is already present.

The ground squirrel conservation programme is currently co-funded by the European Commission under the LIFE programme LIFE19 NAT/SK/001069 "Conservation of the European Ground Squirrel (*Spermophilus citellus*) at the northwestern border of its range".

Have you ever heard of the common hamster? Raising public awareness in Poland

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The common hamster (*Cricetus cricetus*) is one of the mammal species whose existence Polish people are least aware of. One of the reasons might be its secretive lifestyle – it is often observed and recognised by farmers only. Another reason might be the high number of its local names – for example, some people claim there is a "recek", and not a hamster, living in their neighbourhood.

That is why one of the aims of the "Common Hamster Conservation Programme in Jaworzno" is the education of children and adults living in the areas where hamsters occur. Additionally, the Adam Mickiewicz University and the Polish Society of Nature Conservation "Salamandra" conduct countrywide educational activities. During the six years of the programme, numerous lectures were given and workshops were conducted. A dedicated website and fan page on Facebook were created. Articles and interviews about the hamster were published in popular science magazines and on the internet. TV programmes and short movies dedicated to the common hamster and its protection were released. The common hamster became the main character in cartoons on the environmental protection in Jaworzno, air pollution, and the hamster itself. Information boards were placed in rural areas where hamsters occur, and in a zoo where hamsters are bred. Several exhibitions of hamster photos were organised. Souvenirs such as calendars, posters, t-shirts, and bags depicting the hamster were prepared. Leaflets, bookmarks and document folders with information about hamsters were printed. A free educational board game will be available for download to teachers and pupils soon. Finally, a statue of the common hamster was unveiled in Jaworzno. In the future, a few more statues located in different places will establish a "hamster trail", which may become one of the town's attractions.

Diverse educational means facilitate reaching a wider audience. Locally, this may raise awareness of the risk posed by walking dogs without a leash and letting cats outdoors. It may also encourage farmers to implement hamster-friendly management. On a countrywide scale, education is crucial in gaining people's support for protective measures and increasing their awareness of the threats to this species posed by various types of construction projects.

Three methods to estimate the abundance and distribution of the common hamster (*Cricetus cricetus*)

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It is well known that on July 9, 2020, the conservation status (IUCN) of the common hamster underwent significant changes – it shifted sharply by four steps (from LC to CR). Hence, the assessment of the common hamster's population in different parts of the range has become more relevant. Earlier (Surov et al., 2016), we made several maps of changes in common hamster abundance separately for the European part and the former USSR (excluding the Kazakhstan part). Now, our goal is to create a generalised map of the entire contemporary range, using methods that allow to assess the current status of the species more objectively and give a prognosis for the future. Previously, to estimate the abundance of the common hamster, data on the number of harvested skins were often used. However, because of the termination of the hunting business, this method cannot be used anymore. Instead, we suggest a new approach that might be productive, at least for the Russian Federation.

Commensalism is at the core of the common hamster's current ecology. Commensal species are often perceived as pests in allotment or house gardens. Gardeners search for information about this new commensal species. Nowadays, everything is discussed in social networks, including the presence of species important for humans. We suggest using browser query statistics as a pest harmfulness criterion for creating the distribution map. Relevant reports must be supported with photo and/or video evidence of species presence or the person submitting an observation must correctly describe the animal and its behaviour. We have created a database and used it for a Maxent analysis. For the former USSR Russian-speaking area, the Yandex browser is the most popular and we used it to collect the regional statistics for the query "how to eliminate hamsters from the garden". As Internet traffic has regional differences, absolute query numbers are not comparable, and therefore the relative "affinity index" values were used. To make the statistics more robust, we summarised all the monthly values for JAN-2017 to SEP-2020. This way, "a map of harmfulness" was created. Another ("traditional") map was made by new literature sources, own trapping data and interviewing local inhabitants during our field trips. We have carried out six trips across Russia and Kazakhstan for the last five years. We conclude that the common hamster population has declined in most of the 95 provinces (USSR) and 15 European countries of the range. Before 1970, this species was abundant in 38, common in 48, and rare in 24 Russian Federation provinces and European countries, while nowadays, we consider it as abundant only in 3, common in 37, rare in 56, and extinct in 13 Russian Federation provinces and European countries. In some parts of the range, we have observed dramatic changes and even complete extinction (mainly in Europe). In others (the Caucasus and Siberia), the species is still relatively abundant.

Based on the new maps, we suggest that the common hamster has the best chances to survive in eight areas of its range. Two – in Ukraine (in its western and northern part), one – in the Northern Caucasus, one – in the Upper Volga region, a large area located to the east of the Middle Volga and two – in Siberia. In Eastern Europe, there is an area with relatively high abundance in Romania and Hungary. We can assume that all the above places are contemporary refugia for the species.

The study was supported by RFBR #20-04-00102.

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The monitoring of the common hamster (*Cricetus cricetus*) in Poland – objectives and results

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The aim of the Polish monitoring scheme for the common hamster is to collect data that will allow to pinpoint changes that are taking place within the area of occurrence of the species, and to indicate factors that cause these changes. The survey takes place every four years, with the next survey planned for 2021.

The common hamster monitoring survey was carried out in 2013 (40 sites) and 2017–2018 (50 sites). It was repeated at 39 sites. The results show that the range of the population has been contracting towards the central part of the area of occurrence. The common hamster is now absent from three marginal sites at the (Kamieńszczyzna, Rząsawy and Lubcza), in two other locations (Nehrybka and Siedliki-Michałówka) it was not observed in 2017–2018, and in the remaining marginal sites the numbers are low. The easternmost and north-easternmost areas are seriously threatened. The sites located in the south-western and western parts of the range are highly isolated.

A relatively large number of sites with high burrow density (6–20 burrows/ha) was found in the Świętokrzyskie Voivodeship and some locations of the Lublin and Podkarpackie Voivodeships. An increase in numbers was mainly observed at the sites occupied by the hamsters of the *E1* phylogeographic lineage, and in the vicinity of the towns Radymno, Leżachów Osada and Kuryłówka, which are important to preserve the continuity of the *Pannonia* phylogeographic lineage.

The reports from the Polish monitoring scheme of the common hamster are available at the website of the Chief Inspectorate of Environmental Protection. They can aid local government administration authorities with environmental decision making. The data on the range is published as a map in the digital Mammal Atlas of the Institute of Nature Conservation PAS. These data allow to preliminary identify areas of the common hamster's occurrence during construction projects that interfere with the habitat of the species. The database is supplemented with regional schemes, such as the common hamster census in the south Mazovia and in the Zamość region.

The use of unmanned aerial vehicles in finding burrows of the European hamster (*Cricetus cticetus*)

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The aim of the project was to assess the practical use and possibilities of UAVs in inventory and monitoring of European hamsters (*Cricetus cricetus*) on agricultural areas. The Yuneec Typhoon H520 drone with an E90 camera was used for the study, and the air surveys were planned using the Yuneec DataPilot software. The data were analysed using the DroneDeploy and Pix4D software. Seventeen surveys were carried out at different times during 2018–2020 and in different locations. The analysed orthophoto maps were compared with the results received in a traditional field inventory. The plant health index was also analysed.

It was observed that the burrows were visible in photos taken at the height of 50 m, especially in areas with rapeseed crop, right after the harvest. There were also visible differences in the plant health index. There was a difference between orthophotos from the UAVs and the traditional inventory in favour of the first. The differences are mainly due to photointerpretation errors, i.e., shadows in the pictures resembling burrows, no visible burrow in the photo (e.g., a burrow among cut crop), burrows invisible in the photo because of tree shadows, burrows in balk, which were very hard to notice in UAV photos.

UAVs have been shown to be a good supplement to the current inventory methods for the European hamster. UAVs can work in areas where limited resources make it impossible to check the whole area and where the presence of the hamster is questionable.

The influence of soil properties on the distribution and winter survival of the European hamster (*Cricetus cricetus*)

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Within the last decades, the population numbers and geographical range of the European hamster (*Cricetus cricetus*) have declined in many countries of our continent. In Poland, this species has disappeared from the majority of previously known locations. The causes of these negative changes are probably diverse. However, most of the research to date indicates that they are associated with broadly defined intensification of agriculture and climate change. The European hamster is a fossorial species that spends the majority of its lifetime underground. Despite that, research focused on the impact of soil conditions on the biology of this species, especially in the context of other current extinction drivers, has been thus far limited. This research project aims to investigate the influence of soil properties on the distribution and winter survival of European hamsters.

In the summer of 2018, a burrow survey was conducted in the Miechów municipality (Małopolskie Voivodeship). Occurrence data was later used in a habitat suitability model for European hamsters in the monitored area. Results indicated the proximity of the preferred soil types as the geographical variable with the strongest effect on the distribution of hamsters. In the second part of the project, the winter survival and post-hibernation fitness of hamsters were investigated on plots located on four soil types. Moreover, the depth of the burrows and microclimate in the chosen soil types during hibernation time were compared. Thus far, microclimate was examined in the soils on the depth of 50 cm. In the coming year, temperature and humidity will be measured inside the burrows.

The initial results show higher winter temperatures in two soil types preferred by hamsters: Chernozems and Calcaric Cambisols. This is an ongoing project, and the presented results are preliminary.

This work was financially supported by the National Science Centre of Poland (https://www.ncn.gov.pl), grant number: 2018/31/N/NZ9/03846.

Landslides and a decline of the common hamster (*Cricetus cricetus*) population – a case study from Przytkowice (Wieliczka Foothills)

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Common hamsters (*Cricetus cricetus*), locally called "zimne pieski", which is similar in meaning to "cold doggies", were observed in Przytkowice (UTM DA-02) on the Wieliczka Foothills from the late 1940s to the 1950s (Michalina Janicka, personal communication). The site was located on a northwest-facing hill slope covered with postglacial deposits, among cultivated fields. Soils were loamy, light and loose, with rock crumbs, and not very shallow. In the late 1940s and 1950s that place was under constant agricultural use: it was ploughed (horizontal field pattern), cereal and potato were grown (simplified crop rotation), and field margins were mown.

During a several-year wet period characterised by rainy summers, landslides were activated. Due to repeated mass movements, which still occurred in the late 1970s, agricultural use was limited to haymaking (using fresh meadows from the *Arrhenatherion* alliance) and cow grazing. After these events, hamsters were not observed there. The area was named "Ugory", which means "Fallows". This name is still in use.

It seems that one of the main causes of this collapse of the local common hamster population was a series of landslides connected with wet years, which led to a decrease in the availability of safe and suitable habitats. Another problem was cessation of crop cultivation, as it caused a lack of grain food in that place. We do not have information about the situation on the opposite, southeast-facing hill slope, which also was agriculturally managed. However, because of favourable conditions, hamster presence and/or migration from the endangered parts of the hill were possible.

The genetic heritage of the common hamster in Europe – putting the puzzle back together

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The decline of the common hamster (*Cricetus cricetus*) throughout its range is not going to be stopped in the next decade. This will not only result in further loss of a huge number of populations. This will also result in another huge loss of genetic diversity within the species, which will be gone forever. Genetic diversity can be considered an increasingly important and precious resource for the long-term future of the species. This not only includes regional adaptations but also regional adaptability and flexibility. All the species' abilities to cope with future environmental conditions will depend on its genetic makeup.

Unfortunately, it must be stated that currently insufficient effort is being taken to safeguard the genetic heritage of the species. Before populations get extinct, we need to set up better managed ex-situ populations and integrate wild and captive populations in regional metapopulations.

In my presentation, I will demonstrate examples from the western part of the hamster's range, showing how regional metapopulations could be managed in the long term.

Conference Resolution

In 2020, the European hamster (*Cricetus cricetus*) was identified as Critically Endangered (CR) in the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN)[1]. This is a dramatic change from the previous assessment, in which the species was listed as of Least Concern (LC), i.e. the lowest risk category. A detailed assessment carried out by the IUCN highlighted that both the areas of occupancy and population sizes of European hamsters shrunk dramatically in the vast majority of countries within its distribution range. If decisive action is not taken, we will see the species go extinct in the next few years in successive regions and countries, until it disappears completely from the wild. According to estimates, this would likely happen before 2038 on a global scale, whereas populations in Western countries may go extinct much earlier[2].

The sixth mass extinction of wildlife is accelerated by climate change, the degradation and fragmentation of wild habitats and changes in agricultural practices that lead to standardisation of landscapes, which are the main threats to ecosystems resilience and thus to human health, food security and human well-being in Europe and around the world[3]. To overcome these challenges, both individual countries and the global community must implement all the possible actions to prevent the irreversible loss of biodiversity[4]. Conservation measures for the European hamster, an umbrella and keystone species for many natural habitats and other species associated with farmland and urban areas, should be among the priorities.

For this reason, we, the participants of the 27th Meeting of the International Hamster Workgroup[5] express great concern about the future of the European hamster in Eurasia. We urge the Council of Europe, the European Commission and all the states where the species is present[6], and their respective nature conservation bodies, to fulfil the obligation to safeguard this unique species for current and future generations. Taking into account the current most important threats to the European hamster and its habitats, as well as the best current knowledge of its effective conservation methods, we point out that it is particularly urgent to adopt and consistently implement the following measures:

1. Preparing and implementing **regional, national and international[7] strategies or programmes for the conservation of the species**, in accordance with the national and international legal requirements. These documents should be based on the latest scientific knowledge and include both active conservation tasks and measures to reduce conflicts and promote the coexistence of the European hamster with local communities. Protection should cover not only residual, endangered populations but also those that are still relatively stable, to preserve the natural genetic variability of the species in its natural environment and the resilience of those populations. The conservation needs of the European hamster should also be taken into account in **spatial planning, to prevent the fragmentation and loss of its habitat**. It is important to preserve representative populations of all the phylogeographic lineages.
2. Establishing **breeding programmes for different European hamster phylogeographic lineages**, as well as supplying the genetically impoverished populations with new individuals and restoring extinct populations, in order to prevent the irreversible loss of their unique local characteristics and adaptability.

3. The protection requirements of the European hamster in all the projects and activities which could have an adverse impact on the maintenance or restoration of the proper conservation status of this species must be respected and enforced by national and regional nature conservation authorities. In particular, **a reliable wildlife survey, a proper environmental impact assessment and implementation of necessary preventive, mitigation and compensatory measures**, appropriate to the magnitude of the threat, must be guaranteed for all such projects.
4. **Taking into account the arable land biodiversity** (which includes the European hamster) **in the European sector policies,** e.g. by promoting and implementing specific conservation tools such as hamster-friendly farming or Common Agricultural Policy greening measures to diversify crop rotation. This should also create a link between the conservation needs of mammalian species associated with agricultural habitats and agri-environmental payments.
5. **Monitoring** the status of European hamster populations; rapid, timely **and effective incorporation of monitoring results into protective measures** at a national and global scale.
6. The European Commission, the Council of Europe as well as the Secretariat, the Bureau and the Standing Committee of the Bern Convention must **ensure that the conservation requirements of the European hamster are met in individual member states** and contracting parties, and promote European hamster conservation in the states which do not comply with these requirements.
7. **Supporting scientific research on the European hamster**, with priority given to issues such as identifying all the causes of extinction, testing hamster-friendly agriculture practices at both field and landscape scales to restore hamster habitat to a favourable conservation status, developing effective methods of releasing individuals from breeding programmes and monitoring the effectiveness of various protective measures.

25.10.2020, Jaworzno, Poland

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[5] The 27MIHW took place between 23-25.10.2020 in Jaworzno, Poland, and online. It was attended by about 90 hamster researchers and conservationists from 11 countries http://www.salamandra.org.pl/27MIHW.

[6] This also applies to the countries that are not part of the European Union and that are non-signatories of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).

[7] This point also includes the updating and adoption of the European Action Plan for the conservation of the European Hamster: https://www.researchgate.net/publication/275340185.

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DEUTSCHE WILDTIER STIFTUNG

ISBN: 978-83-954508-0-8

THE CONFERENCE WAS SUPPORTED BY:

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