



1st European Hedgehog Meeting in Berlin

3rd of November
&
4th of November

2016, Berlin

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**Leibniz Institute for Zoo
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IN THE FORSCHUNGSVERBUND BERLIN E.V.

On behalf of the Leibniz Institute for Zoo and Wildlife Research (IZW), we heartily welcome you to the **1st European Hedgehog Meeting in Berlin**. Hedgehogs are loved by the public, yet curiously underrated by science. Students of hedgehogs know that there is more to this ancient mammal than appears on first sight and that there are still many questions to ask, not the least about the viability of hedgehogs in the context of global change. We hope that by convening this meeting we can assist each other in resolving the methodical and conceptual issues surrounding this and other topics of interest.

We are looking forward to your contributions and are confident that your participation in this meeting will contribute to a stimulating exchange of ideas. Germany's capital, Berlin, offers a vibrant cultural life, including famous sites of contemporary architecture, museums, art galleries, two zoos and much more. We hope you will have time to enjoy both the conference and the hosting city. Our aim is to make your stay productive and pleasurable. Please do not hesitate to contact us whenever you need any help and or advice.

Leon Barthel, Anne Berger and Heribert Hofer

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TIME SCHEDULE

3rd of November

10:30 – 11:00	Welcome Coffee	
11:00 – 11:30	Introductory Talk	Leon Barthel
11:30 – 13:00	Session 1 – Citizen Science	
	Tracking punks in your backyard - results of a citizen science project on hedgehogs in gardens	Silvia Winter & Kristina Plenk
	Volunteer-powered research: monitoring hedgehogs in central London, UK	Clare Bowen & Nigel Reeve
	Hedgehog highways: a UK perspective on practical solutions for improving landscape connectivity for hedgehogs in existing properties and new developments	Henry Johnson
13:00 – 14:00	Lunch	
14:00 – 15:00	Hedgehog Improvement Areas: Understanding the impact of community led hedgehog conservation	Simon Thompson & Deborah Wright
	Public engagement and media excitement about hedgehogs in Britain	Hugh Warwick
15:00 – 16:00	Group Discussion – Citizen Science	

At the close of the first day we will do a joint tour to the Tierpark Berlin followed by a dinner.

09:30 – 10:00	Coffee	
10:00 – 11:30	<p>Session 2 – Urban Hedgehogs</p> <p>The Survival and Behaviour of Juvenile Hedgehogs in the Suburbs of Copenhagen, Denmark</p> <p>Can they survive? A study of hedgehogs in The Regent’s Park, London, UK</p> <p>Urban planning for hedgehogs with Animal-Aided Design</p>	<p>Sophie Lund Rasmussen</p> <p>Nigel Reeve & Clare Bowen</p> <p>Maximilian Mühlbauer, Robert Bischer & Laura Maniak</p>
11:30 – 12:30	Group Discussion –Urban Hedgehogs	
12:30 – 13:30	Lunch	
13:30 – 14:30	<p>Session 3 – Influences on behaviour and distribution</p> <p>Factors Affecting Hedgehog Distribution and Habitat Selection in Rural Landscapes</p> <p>Using accelerometers to assess living conditions of European hedgehogs</p>	<p>Carly Pettett</p> <p>Anne Berger & Leon Barthel</p>
14:30 – 16:00	Group Discussion – Detection Methods	
16:00 – 16:30	Coffee & Snacks	
16:30 – 18:00	Group Discussion – Collective Review	

ABSTRACTS

Tracking punks in your backyard - results of a citizen science project on hedgehogs in gardens

K. Plenck¹ & S. Winter¹, S. Stadler¹, J. Kelemen-Finan²

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As a synanthropic species hedgehogs often stay in the close vicinity of human settlements. Since various changes in land use degraded habitat quality in cultural landscapes, gardens and public green sites in rural and urban areas may represent important refugia for hedgehogs. Despite hedgehogs' popularity, only little is known about their general abundance and occurrence within the distribution range. As private gardens are usually not accessible to researchers, we developed a citizen science project called 'Hedgehogs in gardens' to obtain information on hedgehogs in people's backyards. Citizens observe the nocturnal animals with so-called hedgehog tracking tunnels (developed by Dr. Richard Yarnell) in private and school gardens all over Austria. The triangular shaped tunnel, equipped with bait, non-toxic colour and white paper, is positioned in the garden for five consecutive nights. Attracted by the bait, the hedgehogs pass through the tunnel and leave their footprints on the paper. Direct observations of hedgehogs can also be reported. For data entry, citizens complete an online form on garden structures and management and upload results of hedgehog observations together with scans or photographs of the animals' footprints. Hedgehog presence or absence will be related to garden parameters and the surrounding land use.

Up to now, citizens explored hedgehog occurrence in more than 270 gardens all over Austria. In 188 gardens the tunnel experiment was carried out, revealing an overall hedgehog presence of 49 %. Additionally, 97 direct hedgehog observations were reported during the last two years. In a preliminary generalized linear model, both garden structures and the provision of additional food proved to influence hedgehog presence.

Volunteer-powered research: monitoring hedgehogs in central London, UK

C. Bowen, N. Reeve, J. Gurnell

The Royal Parks

The Hedgehog Study in London's Regent's Park is a good example of a science-led, community-based research programme set up to examine an isolated and vulnerable population of hedgehogs in need of urgent conservation action. In this paper we describe how we have managed this three-year citizen science programme (2014 – 2016), establishing strong links with excellent partners and involving hundreds of dedicated volunteers. We describe how volunteers from a wide range of backgrounds were recruited, trained and supervised to carry out systematic night-time surveys of hedgehogs in 166 ha of parkland in the heart of London. Under the guidance of scientists, the volunteers successfully collected large amounts of data on numbers, distribution, habitat preferences and movement patterns of hedgehogs in the spring and autumn of each year. The efficient recording and storage of data were key components of the programme. There is no doubt that the nocturnal fieldwork experience captured the volunteers' hearts and minds. These interested amateurs have now become strong advocates of hedgehog conservation, an important and valuable legacy of the programme.

ABSTRACTS

Hedgehog highways: a UK perspective on practical solutions for improving landscape connectivity for hedgehogs in existing properties and new developments

H. Johnson

People's Trust for Endangered Species (PTES)

From population models we estimate that sustainable hedgehog populations need a minimum of 90 hectares of connected land to survive long-term in the best habitat. In suburban landscapes, fragmentation of habitat primarily comes about through the fences and walls used in domestic gardens. Improving connectivity can be achieved in various ways: through installing permeable garden boundaries when developments are first built; through improving awareness of homeowners; by increasing the availability of hedgehog-friendly fences for purchase; and by increasing awareness among architects, landscape designers and fencing contractors. In this talk we will examine the progress made and pitfalls encountered at each of these levels through the national hedgehog conservation programme coordinated by People's Trust for Endangered Species (PTES) and the British Hedgehog Preservation Society (BHPS).

Hedgehog Improvement Areas: Understanding the impact of community led hedgehog conservation

S. Thompson and D. Wright

Warwickshire Wildlife Trust

The hedgehog, more than any other mammal, has the capacity to capture the imagination of the general public. Known to be in serious decline across its range in the UK, converting public passion for the species into positive conservation action could be a powerful vehicle for change.

Warwickshire Wildlife Trust, with funding from The British Hedgehog Preservation Society, has established two Hedgehog Improvement Area (HIA) projects. The HIAs aim to empower people to take responsibility for their local hedgehog population and ultimately improve the landscape through which they wander.

The HIAs each have a dedicated Hedgehog Officer delivering talks and training to community groups and schools; undertaking presence/absence and habitat surveys and liaising with local authorities, residents and potential developers to make lasting changes for hedgehogs. In suburban areas change is principally achieved by encouraging an increased network of connectivity through gardens and improving the quality of habitat features therein. Although levels of engagement are straightforward to quantify and perceptions measurable using social surveys; measuring the direct outcome that such work has upon hedgehog abundance is extremely problematic in a highly fragmented and complex suburban environment.

Given the status of hedgehogs in the UK, uncovering methods to establish the effectiveness of community outreach work and the long term impact of increased garden connectivity should be considered a conservation priority.

ABSTRACTS

Public engagement and media excitement about hedgehogs in Britain

H. Warwick

British Hedgehog Preservation Society

Hedgehogs continue to attract a vast amount of media attention in Britain. They have twice been voted the most popular animal in the country and as such offer a great opportunity to engage the public with wider conservation messages. The British Hedgehog Preservation Society uses this to spread information about helping hedgehogs and in conjunction with the People's Trust for Endangered species and our jointly run Hedgehog Street campaign we have been able to use this to send a simple conservation message to a very wide audience, recruiting, so far, over 40,000 'hedgehog champions'. National television, newspapers, radio along with a host of magazine, local media and social media have all proved successful avenues. However, with such an appetite for hedgehog stories it can be a challenge keeping the message accurate, especially when dealing with television. This talk will review the successes we have had, look at the lessons learned for better public engagement and consider how we can take hedgehog conservation to a different level with community wide involvement.

The Survival and Behaviour of Juvenile Hedgehogs in the Suburbs of Copenhagen, Denmark

S. Lund Rasmussen

University of Southern Denmark, Institute of Biology, Denmark

A field study of 35 juvenile hedgehogs in residential areas in the western suburbs of Copenhagen was performed from September 2014-July 2015. The purpose was to obtain an understanding of the spatial behaviour, hibernation behaviour and survival and weight development of juvenile hedgehogs in this habitat type.

The 35 juvenile hedgehogs were radio tagged. The fieldwork was distributed between 70 nights in the autumn of 2014 and 84 nights of fieldwork during the spring/summer of 2015. One location point was recorded/hour/hedgehog. Radio tracking took place approximately once a week during hibernation.

A total of 14 individuals lost their tags (shedding of spines) and 6 signals were lost during the course of the study! 9 individuals died. Out of the individuals we were able to follow, 74% survived until the onset of hibernation, 89% survived hibernation and 88% survived during the spring and summer.

The extremely mild weather in Denmark during the autumn and winter of 2014/15, caused the juvenile hedgehogs to gain weight efficiently during the fall. They were all in good condition post hibernation with a limited weight loss during hibernation. The males lost weight during the mating season.

The onset of hibernation was between the 16th of November 2014 and 2nd of January 2015. The individuals became active between the 14th of April and 14th of May 2015. Number of recorded nest changes during hibernation ranged from 0-8.

The average home range areas for both sexes in the autumn was 2.05 ha and 6.87 ha in the spring/summer (MCP, ≥ 30 GPS points). Home range were larger in the summer compared to the autumn.

ABSTRACTS

Can they survive? A study of hedgehogs in The Regent's Park, London, UK

N. Reeve, J. Gurnell, C. Bowen

The Royal Parks

Our paper summarises the results of a study (2014-2016) to investigate a small, vulnerable and isolated population of hedgehogs in The Regent's Park (166ha); the only remaining breeding population of hedgehogs in central London, UK. Our project is a partnership lead by the Royal Parks Foundation, involving up to 168 volunteers each year. During two intensive week-long periods of field-work each May and September, we used a range of field techniques including footprint tunnels, spotlighting, mark-recapture, VHF radio-tracking and GPS tracking, and the use of thermal imaging cameras for detecting hedgehogs and observing their behaviour.

Nightly movement and behaviour patterns of 33 GPS/radio-tracked hedgehogs during 2014 and 2015 were broadly typical of hedgehogs elsewhere. Mean distances travelled per night were 892m (males) and 821m (females) with mean nightly range areas (95% kernel) of 1.5 ha (males) and 2.0ha (females) per night. These figures exclude two males that averaged about 1900m per night.

Analysis of GPS locations and focal animal behavioural observations showed that grassland (except sports pitches) was found to be particularly important as foraging habitat. Scrub, planted shrubberies and hedgerows were important as nesting sites.

The data show a very patchy use of available habitat with two or three key 'hotspots' and other apparently suitable areas rarely used. Further data are required properly to understand both this patchy distribution and the factors limiting population size. However, the park's management team are implementing a range of evidence-based recommendations to reduce hazards, enhance habitat quality and improve connectivity within the park. Twice-yearly counts with mark-recapture will continue to monitor population change.

AAD – Animal-Aided Design

Urban planning for hedgehogs with Animal-Aided Design

W. W. Weisser¹, T. E. Hauck², M. Mühlbauer¹, R. Bischer^{1,2}, L. Maniak^{1,2}

¹ Technical University of Munich, Germany

² University of Kassel, Germany

The Animal-Aided Design concept (AAD) was developed as a new method to make animals an integral part of the design of urban free spaces and buildings. A key element of AAD is the provision of planning tools, to transform the critical needs of animals into designing opportunities for architects and planners, and to promote positive contact of citizens with the planned species.

Within a current AAD research project of the Technical University of Munich (TUM) and the University of Kassel (Uni Kassel), the European Hedgehog (*Erinaceus europaeus*) has been selected as a target species for a building project in Munich.

Following the strategy of AAD, the research team created a ‘species portrait’ summarizing all relevant biological data to be considered by architects and planners, including a short description of the hedgehog, an illustrated life cycle and most importantly a list of tasks any planner would have to follow to successfully establish the selected species in the planned area. The species portraits thus serve as an inspiration for the planning process rather than a limitation of the design.

Currently the team is following the common steps of a planning process in close cooperation with the developer, architects and landscape architects, including drafting ideas and sketches, designing details as well as drawing final plans to be implemented at the construction site. Among other things, the design not only includes avoiding barriers for hedgehogs, but also provides possibilities for drinking water, feeding, hibernation and breeding.

In our talk we will illustrate and discuss the AAD concept as well as our measures and plans for the European hedgehog.

ABSTRACTS

Factors Affecting Hedgehog Distribution and Habitat Selection in Rural Landscapes

C. Pettett

University of Oxford, Department of Zoology, The Wildlife Conservation Research Unit (WildCRU), Tubney, UK

The UK population of hedgehogs (*Erinaceus europaeus*) has halved in rural areas between 2005 and 2015, and hedgehogs select gardens over arable land. Explanations for the unsuitability of arable land for hedgehogs in the UK include predation risk from badgers (*Meles meles*), low prey densities and cold microclimates. We investigated the reasons for hedgehog avoidance of arable land by measuring hedgehog ranging behaviour, daily energy expenditure (DEE) and diet along a gradient of habitats from rural villages to arable farmland, under varying predation threat and temperatures. We also examined which factors affected hedgehog abundance nationally. A hedgehog's mean distance to buildings over a season was positively correlated with its home range size and DEE, conceivably due to increased movement on arable land to achieve sufficient food intake. We found little evidence that the prey taxa hedgehogs consumed changed along the gradient from buildings to arable land, although all hedgehogs consumed pet food, suggesting that supplementary feeding is one reason hedgehogs are attracted to gardens. On sites where badgers were present hedgehogs stayed closer to edge habitats, had smaller home ranges, were found less on arable land, and had a lower DEE. Badger presence is one likely cause of hedgehogs' selection of rural villages, where badgers are found at lower densities than on arable land. Nationally, badger abundance and fox (*Vulpes vulpes*) abundance was negatively associated with hedgehog abundance. In conclusion, rural villages are a key habitat for sustaining hedgehog numbers in the UK countryside and conservation efforts should focus on the connectivity between these island populations, for example by increasing hedgerow cover, which could also potentially reduce predation pressure on arable land.

Using accelerometers to assess living conditions of European hedgehogs

A. Berger, L. Barthel, K. Eichhorn

Leibniz-Institute for Zoo and Wildlife Research, Berlin, Germany

Sensor-based technologies are becoming increasingly available and can be used to gather detailed information about animal behaviour. Modern wildlife collars are commonly used to obtain regular GPS location of animals to give information on home range size and migration paths. In most studies, only few GPS fixes per day are obtained due to the considerable amount of energy GPS fixes need. In contrast, measurements of acceleration need little energy, allowing a virtually continuous monitoring of animals. We present possibilities of analysing continuously measured acceleration data to draw conclusions to the animal's behaviour.

First part is a procedure for biorhythmic status diagnosis to identify systemic disorders and „stress loads“ in wild animals by changes in total daily activity and in day- night relationships as well as a reduced coupling between the behavioural rhythm and the diurnal environmental periodicity.

Secondly, we focus on the development of analysis methods to distinguish among several behaviours (like resting, feeding, locomotion) and, finally, combine them to the position information to understand the functional site of habitat use of animal.

Such knowledge about what an animal is doing where and when is crucial for understanding habitat use as well as for detecting deviations from the norm, e.g. responses to disturbances or habitat changes.

Activity of hedgehogs living in a Berlin park was continuously measured by accelerometers. Activity patterns of the hedgehogs before, during and after the major event Loolapalooza in the park are presented.

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