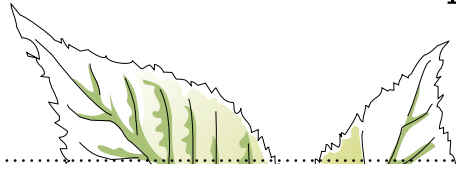


The **Dormouse** Monitor

WINTER 2014

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species



Planning with dormice in mind

Taking a closer look
at what happens when
developers build on or
near to dormouse sites



Dormice in tree crevices

Henry Andrews shares his photos and experiences of finding dormice nesting in tree crevices during his bat surveys in Somerset.



Dormice in literature

Detlev Seibert began collecting books about dormice before the internet made searching easier - now he has a vast collection.

Taking a look at genes

A few years ago a hazel dormouse turned up in Ireland. Where was it from? Debbie Glass investigates and reports.



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In this issue



Welcome



This year has been an exciting one at PTES. We've moved offices, have a new look and a new website. I really hope you like the new style of *The Dormouse Monitor*. Thank you to everyone who's kindly contributed to this edition - we have lots of fascinating articles to keep you entertained over the winter months. Alice Mouton and Debbie Glass have both

been studying the genetics of hazel dormice and asking how you define a species. There's a review of this year's dormouse release in Nottinghamshire. And we have a report of the Danish dormouse conference. Thank you also to those of you who've been busy entering your data online. We're sorry the site was down for some time - but are pleased that it's working smoothly again now. Please get in touch if you have an article that you'd like printed in a future edition. Merry Christmas and a Happy New Year.

Nida Al-Fulaij & Susan Sharafi

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MAULDEN WOOD, BEDFORDSHIRE



Maulden Woods, in Bedfordshire, was the 2001 release site. We have had exciting news from Sue Raven who co-ordinates the monitoring at the site - there is evidence that the dormouse population has spread to an adjacent woodland. 30 animals were released into this mixed woodland site well over a decade ago. Sue will give a more detailed update in the next issue.

WINDMILL NAPS WOOD, WARWICKSHIRE



Windmill Naps was the site chosen for a double release carried out over two consecutive years in 2009 and 2010. A total of 46 animals were put into the wood. The box checks carried out in the subsequent years revealed only a handful of animals - mostly male. But then in autumn 2013 the team were delighted to find over 20 animals, including three litters. Great news.

BRADFIELD WOOD, SUFFOLK

However the prize - if there's a prize for the number of dormice at any release site - goes to Bradfield Wood in Suffolk. In 2006 we released 38 animals into the wood. In the first autumn exactly 38 animals were found in the box check. The numbers dropped a little over the course of two years and then in 2010 64 animals were found. However they trumped their own record and in 2011 the team must have taken hours to sex and weigh the 164 dormice that they found. What wonderful results!



Images kindly provided by Nick Upton

Dormouse release 2014

This summer Ian White and Nida Al-Fulaij escorted 44 dormice to Nottinghamshire to be released into a woodland just a stone's throw from the 2013 site, Treswell Wood.

It has been known for the past 30 years that hazel dormice became extinct from at least seven counties in England. For the past 20 years PTES have been trying to put them back.

There have been a total of 19 dormouse reintroductions to 12 counties in England.

The first of these took place in a 132 hectare wood in Cambridgeshire in 1993. The dormice are still there and

appear to be doing well but there is no evidence yet that they have started to disperse from the woodland.

The 2013 and 2014 reintroductions both took place in well-managed woods in Nottinghamshire that are owned by the local Wildlife Trust. The aim is to allow the dormouse populations to establish in the woods and then a further joint project between PTES and the Wildlife Trust will engage with the local landowners to improve hedgerow linkage between the woodlands. At the 2014 site, dormice have already bred and dispersed across it to areas of suitable habitat.

As a result of a Natural England report in 2013, the aim of the dormouse reintroduction programme has shifted away

from just trying to put a single population back into an area, to putting at least two populations back in close proximity. Improvements in the local habitat linkage between the two sites are then encouraged and supported and it is hoped that this will facilitate the two populations meeting at some point in the future to create a more robust metapopulation.

The 2015 dormouse

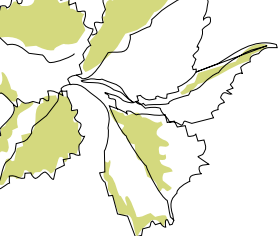
reintroduction is planned to take place in a wood in Rutland in June.

There have been a total of 19 reintroduction across 12 counties



PTES

Paul Manchester



Dormice and donkeys

James Chubb hosted a woodland management training day on behalf of PTES.

In October, here at The Donkey Sanctuary in south Devon, the charity hosted a workshop run by PTES to help woodland owners and managers to look after woodlands for dormice; and they used our dormouse woodland here at the sanctuary as the afternoon field visit!

It was a thrilling day for me. The workshop was led by national dormouse expert, Dr Pat Morris, who happened to be my tutor at Royal Holloway and whom I had not seen in almost 15 years!

As ever, with people who have yet to visit our fabulous farms here around Sidmouth, there were quizzical eyebrows raised from some of the participants. However, after a brilliant lecture and thoroughly enjoyable site visit in which we met one of the sanctuary's dormice in the flesh – everybody left very happy and with a new-found appreciation for the fabulous environment in which we farm. I learnt an awful lot as well.

The star of the show, aside from Dr Morris, was undoubtedly the dormouse we found. In the 20

months in which the scheme has been running, this is still only the fifth dormouse we have discovered in one of our boxes, and only the second this year. It was found in box 49 of 50 on the morning of the workshop by Adrian Bayley and I. This massive stroke of luck possibly explains my sleeplessness the night before! The dormouse was a youngster from this year, male and weighing-in at a mere 8g. The 10 days of very warm weather after finding him

In the 20 months the scheme has been running this is only the fifth dormouse we've found

would have helped him reach the minimum bodyweight for successful hibernation. If it had been a normal autumn he might not have been so lucky.

Looking at our dormouse woodland with fresh eyes after the workshop, I noticed that there is very little understory and the majority of the trees are of a similar age – about 10-20 years old. My next task is to write a simple 10-year management plan for this area, with further input from PTES, specifically to improve certain aspects of the woodland for dormice. After all, "what is good for dormice is good for many other plants and animals." This was something of a mantra for the day.

So this winter has instantly been filled with many hours of practical woodland work for me and a team of volunteers. We will



James Chubb shows off The Donkey Sanctuary woodland

be selectively thinning trees to allow more light through to the woodland floor. If you would be interested in helping with this practical conservation initiative, or any of our other wildlife projects being undertaken on the Sanctuary, please get in touch.



Adrian Bayley shows the group how to accurately sex a dormouse

Images Suzi Crewey & Nicola Al-Fulaij



The dormouser in winter

Detlev Seibert, from Germany, tells us the story of his search for books and tales about the hazel dormouse.

Here comes the wintertime. Every sensible dormouse is in a deep torpor within its den. And what about those of us – like myself - who care for these animals during the year? They certainly will catch up on their sleep too but there may be enough time and strength for other pleasures concerning these most beloved animals.

I decided to spend my time looking for books that featured dormice, especially children's books, hopefully with a lot of nice pictures. Preferably books about hazel dormice but I decided not to be too picky - fat dormice or other relatives will do too.

So I think that everyone in the English speaking world has heard of the mad hatter's tea party from "Alice in Wonderland" for sure. And many a German knows it too. But are there other books?

When I began my search the world-wide-web did not exist in its present form. So I went to my favourite book-dealer in my hometown and asked for the many volumes of German-Books-In-Print to search for titles relating to dormice. After spending some time on it, I found this and that, but in general the results were a little bit disappointing. Either nobody was writing about dormice or they were being listed as books about ordinary mice. This may be the case, because there are a huge amount of books about mice in print, which seem to be

very popular with children.

After my initial experience I started to browse in antiquarian bookshops in order to find out-of-print books. My search was time-consuming, but also a great and pleasurable adventure because I found lots and lots of books about other things I was interested in. But only on seldom occasions did I find a dormouse book.



Detlev Seibert

I started to browse antiquarian bookshops to find out-of-print books

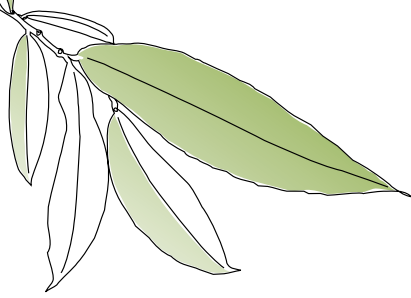
So onto new places! As my wife and I are fans of English speaking countries the natural places to take our holidays are Great Britain and the USA. And so we took our search abroad. The fun we had in these new and second hand book shops was even greater and so was our harvest. In fear of

losing my books down to the negligence of the airline transportation services I took them with me as cabin baggage. One day my wife and I queued up at customs at Heathrow airport and an inspector lifted up my extremely heavy bag and said "Ugh! What's inside this?" With an innocent shrug I replied "Books." The customs inspector looked at his partner as if to ask for advice but his colleague shrugged his shoulders and said in a very friendly manner "Books? Let him pass!" So I thanked them both very much, bade them farewell and off we went. That was a long time ago.

Slowly, very slowly my collection started to grow. Then came the era of the internet and now every book is 'just a click away'. In a way, some of the fun has gone forever. On the other hand I have found new booksellers I would never have found otherwise. And excitingly, I have discovered books in other languages that I am not familiar with, for example Russian and Japanese.

Now I'd like to request a little help from you, the readers. Please can you help me to build up a complete collection of all children's books about hazel dormice? Any help will be greatly appreciated. For a detailed list of the books I have collected up till now, please contact me at DetlevSeibert@web.de.





Dormice in tree crevices

Henry Andrews tells the story behind these charming photos.

My work involves cataloguing and describing various features on trees that are used by bats – such as crevices. I also monitor some of these features to see how the environment inside changes over the year. For example the humidity might change in response to the level of sap rising. Whilst I am out and about, I have come across dormouse nests a few times. Excitingly on a recent check I found the animals themselves.

The woodland that is my study site is part of the Quantocks SSSI and is known as Dowsborough by the locals. The site has a chequered history – there was once a gibbet at the end of the wood. In case you haven't

come across a gibbet before, it's a device used for public execution, like a gallows. This particular wood has some notorious and sad tales associated with it!

So each month I check about sixteen trees and photograph some of the conditions. On this particular check, whilst I was recording the features, I suddenly noticed that a couple of hazel dormice were present. On reflection it would appear that the dormice were selecting features for their nest site that are relatively unused by hole nesting birds, but that are favoured by several species of bat, such as barbastelle, Bechstein's, Natterers and brown long-eared bats.

This woodland is mostly upland sessile oak and birch woodland, in what had been an extensive area of intensively managed tan-bark coppice. Historically the wood was also used for the production of charcoal. I believe the last time it was worked was in the 1950's.



Henry Andrews



Daily dormouse sightings in Dorset

Dormice have been seen on bird feeders in the south west of England on quite a few occasions. Caroline Dilke sees them almost daily at the end of her garden in Dorset.

I am able to observe dormice daily as they go about their lives in the small wooded area in my garden.

In the summer of 2013 I happened to come across one, so I put a bird feeder up, and happily watched dormice, wood mice and field voles come and feed.

Then I noticed that the dormice were getting to the feeder by crossing a small cherry branch over a path. So I abandoned the bird feeder and instead put out hazelnuts (cut into four), a few scraps of apple and some smears of peanut butter directly onto the branches of the bush from which they'd come. The dormice would come out immediately, sometimes I

Sometimes I even found them waiting for me in the bushes



even found them waiting for me in the bushes at about 8pm. Once or twice one has even climbed over me and taken a nut from the basket on my knee!

I've been able to observe their behaviour and even identify individuals. This summer at least two females had litters. Interestingly the animals come to feed individually, one after another, though sometimes they interact with each other as one leaves and another appears. Could there be some kind of hierarchy in their feeding patterns? Is it the same animals getting to feed each night and access the best food resources? I look forward to seeing the again next year.

Image kindly provided by Colin Varradell

Monitoring dormice at Briddlesford Woods

Rachel Bates shares her experiences of visiting the PTES-owned nature reserve, Briddlesford Woods, on the Isle of Wight, to carry out a dormouse box check.

In the world of ecology and conservation, the saying "it's not what you know but who you know" certainly applies. It wasn't my intention to become a dormouse monitor but when I moved to Kent I was intrigued by the adorable little ginger mammal whose photo graced numerous publications, websites and magazines. So I enrolled on a course at the Wildwood Trust in Kent to learn more. I fell in love that day.

Fast forward two years and I am now a licenced dormouse surveyor who carries out dormouse surveys as part of ecology work and who helps monitor a number of sites voluntarily. Through one of my trainers at Scotney Castle in Kent last year, I received an invitation to join a group of volunteers with the PTES to help check the 560-odd dormouse boxes at their Briddlesford Reserve on the Isle of Wight.

I have now been to the island four times to monitor dormice and love every minute of my time there. The weekend usually pans out the same way – travel to the woods early Saturday morning to meet up in time for lunch, and then spend Saturday afternoon and Sunday morning checking the dormouse boxes before heading back to the ferry port mid-afternoon to begin our various journeys home.

As well as monitoring populations of the resident dormice, the weekend is a good training session for those working towards their dormouse licences or those who are similarly intrigued to see one for the first time.

Splitting into four or five groups of three to four people, we head out into our allotted sections of the wood to begin the checks. As a team leader I sometimes feel a bit lazy making the trainees do the work, but how else are they going to learn!

Trainees check a few boxes each before switching and when we get a box with potential nest material or signs of movement we bag it to check inside the box properly. During the October check this year we caught a high number of wood mice

(there are no yellow-necks on the island), and while they were sadly not dormice, the wood mice provided a good opportunity to practice bagging the boxes and checking them, and handling and sexing small mammals.

For those groups who aren't lucky enough to see dormice on the Saturday afternoon, groups are distributed fairly on the Sunday to give everyone a chance to handle or at least see one. Each dormouse found is weighed and sexed, and their life stage recorded – although on occasion dormice escape in the blink of an eye!

I was intrigued by the adorable little mammal

I have seen and handled a lot of dormice this year but I never fail to be amazed by them and grateful that I get to be involved with their conservation. Add in the lunch and end-of-check breaks with copious amounts of tea and cake, good company with interesting and friendly people, and simply being out in the fresh air in wonderful woodlands, and you can't ask for a better weekend.



Rachel Bates & Nicola At-Palan



Dormousers in Denmark

Nida Al-Fulaij reports on the gathering of dormouse enthusiasts at the ninth international conference.





It has been three years since over 100 people gathered in Saxony, Germany for the eighth international dormouse conference. I remember Pat Morris standing up on the first day to tell us what would happen throughout the conference, but also asking us to think about whether this would be the last one or if someone sitting in the room that day would be prepared to plan and host the next one.

Pat suggested that if no one volunteered by the time this conference was over, then there was unlikely to be another one. And so we were all hugely relieved and grateful when Helle Vilhelmsen and Mogens Krog, from Denmark, stood up and said that they would muster the support back home in order for them to host the next one.

Thomas Berg, the Senior Scientist Curator at Naturama Museum, took on the challenge of organising the conference. Naturama is an amazing, modern, sophisticated natural history museum located on the central island of Funen - or Fyn - in Denmark, in the coastal town of Svendborg. It was an ideal place for the conference - in between talks we could wander around the exhibits that dramatically display wildlife, complete with sound effects and atmospheric lighting.

There were scientists, conservationists, monitors and general enthusiasts who gathered for the four day event filled with talks, posters, films and field trips. It was a great chance to learn about recent research results, catch up with old friends and - of course - make new ones. The talks spanned studies about the feeding ecology, marking protocols and genetics of at least six dormouse species. Several people gave talks about monitoring dormice, the different methodologies and modelling where they may disperse if habitat improvements are undertaken. There were interesting reports on captive breeding hazel dormice and the very first release in the UK.

On the Sunday we were taken on a field trip was to visit a vast green bridge that had been built to ensure connectivity for a dormice population in the nearby landscape. The bridge spans a dual carriageway, and the vegetation on the top is growing nicely. To date no dormice have been found on the bridge but the habitat is already suitably scrubby. Unfortunately there was some local opposition to the construction of the bridge and some negative publicity. Consequently, Thomas and his team used our visit as an opportunity to invite the press back to see how much interest the bridge had generated



internationally and give some of the visitors a chance to comment on how impressed they were. We featured on the local evening news that weekend!

The conference was a success, not just because it was a perfect opportunity for those working on the same species to present findings, learn what's happening in other countries and generate new ideas. It felt like a real chance to bring together

It was a chance to bring together conservationists to work in partnership

conservationists to work in partnership and make a much bigger impact that you can have in just one country. These meetings have spawned smaller get-togethers across the world. We had visitors from Germany and Denmark who work in the forestry sector visit us after the last conference to see how we manage our woods in the UK. Next year we are looking forward to hosting colleagues from Austria, Switzerland and Germany who are planning to come and spend a few days with us, during which time



Sina Ehlers, Romydas Juskaite, Thomas Berg

we'll run special training courses tailored just for them.

And, on the final day, we agreed that we would all work towards a unified monitoring protocol for hazel dormice in Europe. Thank you Thomas, Helle and the rest of your team for such an enlightening conference, a chance to visit your wonderful county, see fascinating places, make new acquaintances and also to sample your delicious food. We now look forward to the next conference in Belgium, in three year's time.

Branching out

Debbie Glass investigates the distribution of dormice by taking a closer look at their DNA.

The hazel dormouse is a treasured native species here in the UK. Their strong association with our well-loved literary past stems from the sleepy dormouse's starring role in Lewis Carroll's *Alice in Wonderland*. It also has a reputation as a peculiar Roman delicacy (wrongly, I may add), which may explain why it is that they routinely find themselves top of the nation's favourite animal list. Being experts at scurrying fearlessly from branch to branch, their ability to roam freely within our woodland canopy is a well-known fact.

Until recently, it was also considered to be a well-known fact that their westward range across northern Europe extended only as far as Wales. That was until 2010, when a hazel dormouse was first discovered nesting in a garden in County Kildare, in Ireland. As the species had never been recorded in Ireland, its sudden presence drew much attention. Although the ranges of many species change naturally due to environmental changes, more species are likely to end up in new locations through human mediated transport, intentionally and unintentionally. A well-known example is that of the grey squirrel that is native to north America, not Britain. Species that accidentally get introduced into a new area often do not survive, or make very little impact on the recipient community. Some, however, can be harmful for the recipient habitat and the native species living within them, as is the case with the grey squirrel, which has displaced our native red squirrel throughout much of its British range. Continuously monitoring the behaviour and range of species is therefore important for the effective management of communities.

Because the hazel dormouse is new to Ireland, it is clearly necessary to ask how the dormouse came to be there in the first place and where it travelled from. I was also curious to know whether this individual was a member of a much larger, yet to be identified, population. In cases such as this it is natural to look to one's nearest neighbour and so it seemed

reasonable to assume that it had somehow travelled across the Irish Sea from a population in Britain. This scenario seemed likely, especially as hay has been imported for equestrian purposes from England to County Kildare, where some poor unsuspecting dormouse may be sleeping. But how was I to go about testing whether this theory had any legs?

At the time of this discovery I was conducting research for a PhD at the University of Brighton on the genetic structure of the hazel dormouse in the UK. This had already given me some understanding of how genetic information can be used to make inferences about the population's demographic history; in particular the population's historical breeding and migratory behaviour. Just how far back in time one wishes to consider for a study such as this dictates which type of genetic marker is required. I knew, therefore, that the best approach to identifying the country of origin of the Kildare dormouse would be to study the

In 2010 a dormouse was discovered nesting in a garden in County Kildare in Ireland

genetic variation that lay within the mitochondrial DNA of the Kildare dormouse. Mitochondria are tiny organelles found within animal and plant cells that are responsible for making the energy the cell needs for its everyday functions. Interestingly, the mitochondria have their own genome that, unlike the majority of genes that are found in the cell's nucleus - where one half is inherited from each parent, the mitochondrial DNA is inherited only from the mother. This means that the mitochondrial genome is inherited intact and not subjected to the usual mixing

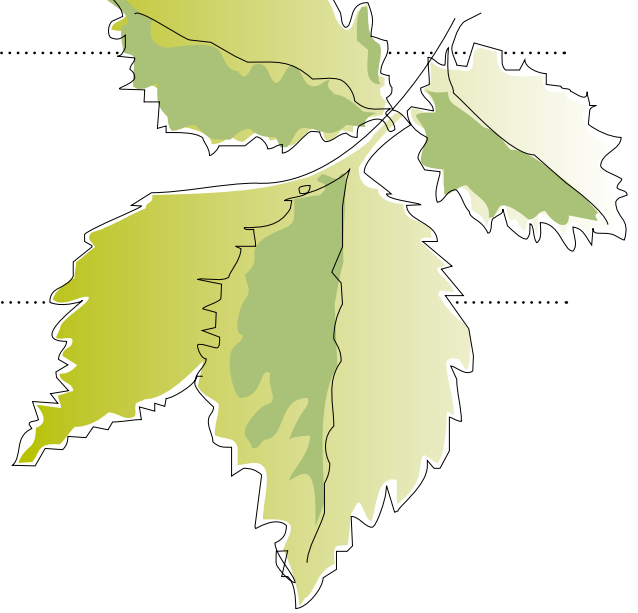


that is experienced by nuclear genes (known as recombination). As a consequence, the differences seen between different individual's mitochondrial DNA can be attributed to historical genetic mutations, whereby individuals that share the same mutations are deduced to have a more recent common ancestor than individuals with dissimilar mutations. Basically, close relatives are more likely to share the same genetic variants than distant relatives. Another consequence of this clonal inheritance is that all the mitochondrial genes share the same history and it is this, together with the known rate of mutation, which allows geneticists to reconstruct patterns of past migration. For the purposes of my investigation, a stretch of mitochondrial DNA found within a gene called cytochrome b was chosen. This gene happens to be a popular choice amongst geneticists asking questions about species phylogeography (the historical causes of current geographic distribution). It has already been used by a group of international researchers studying the distribution of hazel dormice on mainland Europe, headed up by Alice Mouton in Belgium. These authors had published their results, making it possible for a direct comparison to be made between the Irish dormouse sequence and those of mainland Europe, in addition to other sequences I was obtaining from English and Welsh populations.

PTES was kind enough to point me in



© David Popen



between all the DNA sequences I was able to generate a family tree, known as a phylogeny. This tree groups sequences by inferring common ancestry, such that I was able to identify that the Irish dormouse shares a more recent common ancestry with the western Europe populations (including France, Belgium and Switzerland) than with those of the British dormouse populations (which is grouped with the

The Irish sequence did not match any other published ones

the direction of people able to provide hair samples from south west England and Wales. These samples, together with many I collected from different locations around Sussex and the Isle of Wight, allowed me to test the theory that the dormouse originated from Britain.

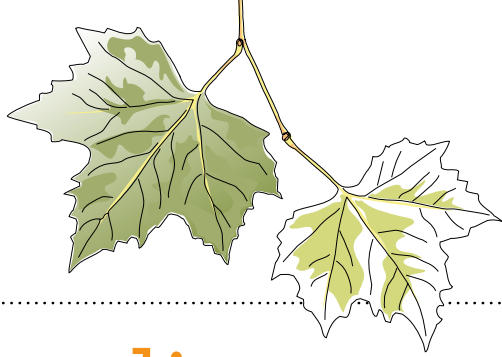
After sequencing all my samples the first notable finding was that the Irish sequence did not match any of the other published sequences. However, by measuring the degree of similarity

Central - North Europe populations, including Lithuania, Germany and Poland). This was extremely exciting as it means the County Kildare dormouse is highly unlikely to have originated from Britain, but much more likely to have arrived from France, where the difference between the genes was minimal. It is always possible that dormice have been established in Ireland for a long time - long enough to have genetically diverged from the French population. The shy, arboreal and nocturnal nature of the

hazel dormouse, in addition to their typically low population density, makes them notoriously difficult to observe in their native range. Maybe they have simply gone undetected in Ireland for all this time? The most reasonable hypothesis, however, is that the population of Irish dormice originated from a region close to where the French dormice were sampled from that remains, as of yet, unsampled.

So, although the precise location for the origin of the Irish dormouse remains a mystery, the moral of this story seems to be that in this world of modern transportation, the nearest geographic neighbour is not always going to be responsible for species introductions. It would seem that even the otherwise unassuming hazel dormouse, considered to be sensitive to environmental fluctuation, can find its way to distant and new environments and survive.





Feeding on the edge

Rimvydas Juškaitis and Laima Baltrūnaitė investigated the feeding habits of a hazel dormouse population in Lithuania, on the northern edge of their range.

Although the hazel dormouse is considered both a highly specialized and a threatened mammal across its range in Europe, it is relatively widespread and common in Lithuania. We wanted to investigate what our hazel dormice are eating throughout the year, and whether their diet varies to that of the population found in the UK.

The reason for comparing these two populations is that in England and Wales, dormice are also on the very edge of their range and are also considered rare and endangered. However in the UK the average population density is 2.2-3.5 dormice per hectare. This is much higher than the density found here in Lithuania, which is only one animal per hectare. So are our forests not providing the same food resources as those in the UK? Are our dormice eating food that doesn't provide as much energy? With the exception of pure pine forests, hazel dormice are found throughout Lithuania. But are they living in what we might call sub-optimal habitats that are unable to support high populations?

Our study site is a 60ha mixed deciduous-coniferous woodland, dominated by birches and Norway spruce. It is in the Šakiai district of south west Lithuania. There are a variety of other tree species including ash, black alder, aspen, pedunculate oak, hazel, glossy buckthorn, rowan and bird

cherry. We collected more than 230 faecal samples over the entire active season from April to October, visiting the 272 nest boxes every two weeks. We grouped all the food remains in the droppings into five types: animal origin, inflorescences (groups or clusters of flowers), vegetative parts of plants, soft mast (berries), and hard mast (nuts, acorns). Not all soft mast and flower remains could be identified to species level and so were attributed to other berries and inflorescence of other deciduous trees. Normally an entire single dropping contained the same type of food remains. But all droppings from one nest box were

made up more than 60% of their intake, whilst they were also feeding on Norway spruce strobili, the vegetative parts of plants and insects.

During June our results showed that this was the month that dormice had the highest proportion of insects in their diet. They also continued to feed on oak flowers, honeysuckle berries and we have evidence that they also feed on birds' eggs whilst occupying their nests.

From July, and throughout the summer, soft mast dominated their diet, accounting for 100% of their food resources. Firstly they fed on honeysuckle berries and raspberries and when these were no longer available they moved onto glossy buckthorn berries. As autumn began glossy buckthorn berries remained an important part of their diet – forming two-thirds – and the rest was made up of hard mast. As there was almost no hazel crop in this area during this study (2010), the dormice were feeding on oak acorns. And finally, just before hibernation, the dormice fattened up on glossy buckthorn berries and acorns.

There are acknowledged disadvantages to using faeces to study what animals have been eating. Not all food are digested to the same extent and therefore the remains left in the faeces aren't always a good indicator of the proportion eaten. However, this non-invasive method still gives us a good

The first droppings to be found in April contained black alder pollen

summed and the proportions of food items identified were expressed as the percentage of dry faeces weight.

The first droppings to be found in early April contained black alder pollen. Later in the same month we found that willow catkins were the preferred food of our dormice. During the month of May, dormice had the most varied diet of any time throughout the year. Willow and oak flowers



Willow inflorescence is an important part of the diet of dormice in Lithuania

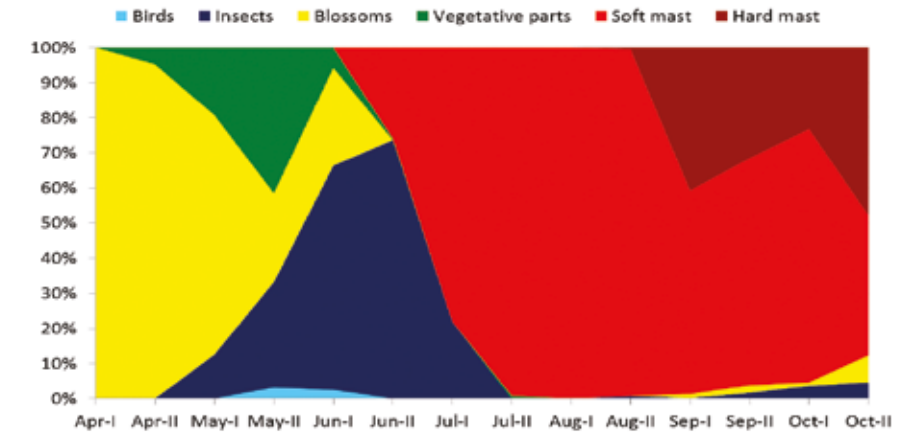


Norway spruce inflorescence also provides food in the springtime

qualitative evaluation of the dormouse diet. Comparing our results to the studies carried out in the UK, we found some similar results. Our dormice had about 30 potential food plant species to choose from but, of those, only seven were dominant in their diet. A similar number were also commonly fed on by the dormouse populations in England. However, only hazel and pedunculate oak featured in the diets of both dormice. Bramble and hawthorn, which feature prominently in the woodlands of the UK, (and therefore in the diets of those dormice) are species that are rare in Lithuania. Honeysuckle is important in both countries but the fly honeysuckle which we have here in Lithuania, is not very common in the UK. Norway spruce, glossy buckthorn and wild raspberries are important sources of food for the dormice populations in Lithuania, whereas these foods did not appear to feature in the diets of the UK dormice. These differences suggest that hazel dormice are highly adaptable to local feeding conditions.

Insect remains were dominant in the diets of our dormice throughout June, but overall they did not feature any higher in Lithuania than in any other part of their range. This indicates that dormice are able to find sufficient quantities of suitable vegetable food on the edge of their range.

Dormice have been seen to consume birds' eggs in captivity and our study showed that the dormice in Lithuania also fed on birds' eggs. They made up a small percentage of their diet (2.5-3.2%) in the springtime. As in the UK, hazelnuts are important for our dormice as they have the highest calorific value of any European tree



seeds that constitute potential food for small mammals. Unfortunately they are also the least reliable food resource in our study area. During a 14 year period, hazel crop was absent for four years, was small in six of those years and only abundant for four

range, studies have indicated that acorns are an important part of their diet.

So it would appear that food resources in Lithuania are good in terms of variety and quality. So what is the limiting factor that is keeping our dormouse population density so low? When we increased the density of our nest boxes at our study site, the population increased fourfold, which strongly suggests that maybe our woods are lacking secure nesting sites. This could be true of the UK too – where old trees with natural cavities are lacking, nest boxes end up providing a safe alternative. This is a useful finding in terms of conservation advice and how best to improve future management of our woodland.

Norway spruce, glossy buckthorn and wild raspberries are important food sources

years. Glossy buckthorn, on the other hand, fruits almost every year, is very abundant, and is available from late July through to November.

Some studies in the UK suggest that hazel dormice do not feed on acorns, however across the majority of the rest of its

The full report is available in *Mammalia* 2013; 77(2): 149–155.



Honeysuckle berries appear in the summer months



Dormice will eat birds' eggs if they come across them in nest boxes



Oak inflorescence provides another springtime source of food



glossy buckthorn fruits almost every year providing a reliable food source



Who are you dormouse and where do you come from?

Alice Mouton studied the genetics of dormice at the University of Liege in Belgium to see whether the European population is in fact just one species.

Many ecological studies have been carried out on the hazel dormouse in Europe. Red-listed in many European countries, this species is the focus of several recent conservation plans including the restoration of habitat corridors, breeding programmes and reintroductions. However, we are still far from knowing the overall genetic structure of the species in Europe and its evolutionary history. This information is also essential to know before developing a framework to conserve the hazel dormouse.

The overall aim of my PhD thesis, now completed, was therefore to fill in the gaps about the phylogeographic and evolutionary history of the hazel dormouse in Europe. I undertook my PhD at the University of Liege in Belgium, under the supervision of Johan Michaux, who helped me to determine the origin and the evolution of this species, whose ancestor appeared 17 million years ago.

To this end, it is fundamental to analyse the evolutionary history of the species in both a geographic dimension (spatial) and a temporal scale. When investigating the history of a species, two approaches are commonly used: the first one is based on fossils and involves paleontological studies. The other method uses molecular biology to look directly in the DNA of species and trace their past, considering the geographic distribution of individuals in light of the patterns associated with a gene genealogy. This discipline is called phylogeography. We compare small regions of DNA of several individuals from different parts of its range. Then we can highlight their differentiation and trace the genealogical relationships among populations. I used the DNA extracted from samples I received from many "dormousers" throughout Europe (tissue, hairs, cotton swabs, needles...) and was able to cover the entire distribution of

the hazel dormouse in Europe. To have a robust phylogeographic study, it is essential to combine several molecular markers to confirm the results because the use of a single gene might reflect the history of the gene and not the history of the species!

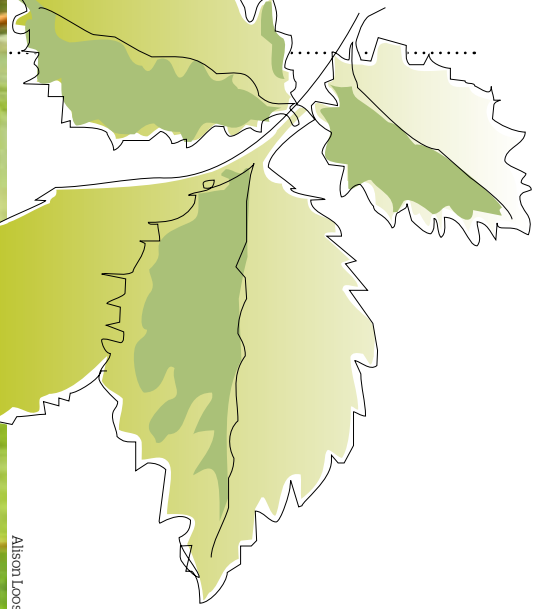
In this study, we combined several markers and our results highlight the presence of two highly divergent lineages.

Our results highlight the presence of two highly divergent lineages across Europe

The first one encompasses individuals from Belgium, The Netherlands, France, Switzerland, Italy, western Germany and the second one corresponds to individuals from Turkey, Serbia, Slovenia, Austria, Macedonia, eastern-central and northern Germany, Lithuania, Latvia, Poland, Romania, Hungary, England, Sweden, Denmark, Slovakia and Czech Republic. The separation between the two lineages is estimated to have occurred around 6.5 million years ago (my), during the late Miocene. This period (around 23 - 6 my) was a time of major climatic changes, characterized by important climatic oscillations in Europe but also a period of important geological changes. We could hypothesize that the climatic changes, combined with the presence of new environmental conditions, favoured the separation of the ancestor of the hazel dormouse in two different populations. The Middle and Late Miocene were also important periods of speciation for other members of the Gliiridae family. The differentiation of *Eliomys melanurus* (Asian garden dormouse) and *Eliomys quercinus* (garden dormouse) and the colonization of Africa by the ancestor of the genus *Graphiurus* (African dormouse) took place during this period. In addition, the divergence time analyses show that the main lineages of the edible dormouse (*Glis*



Andrew Shaw



Alison Loozer

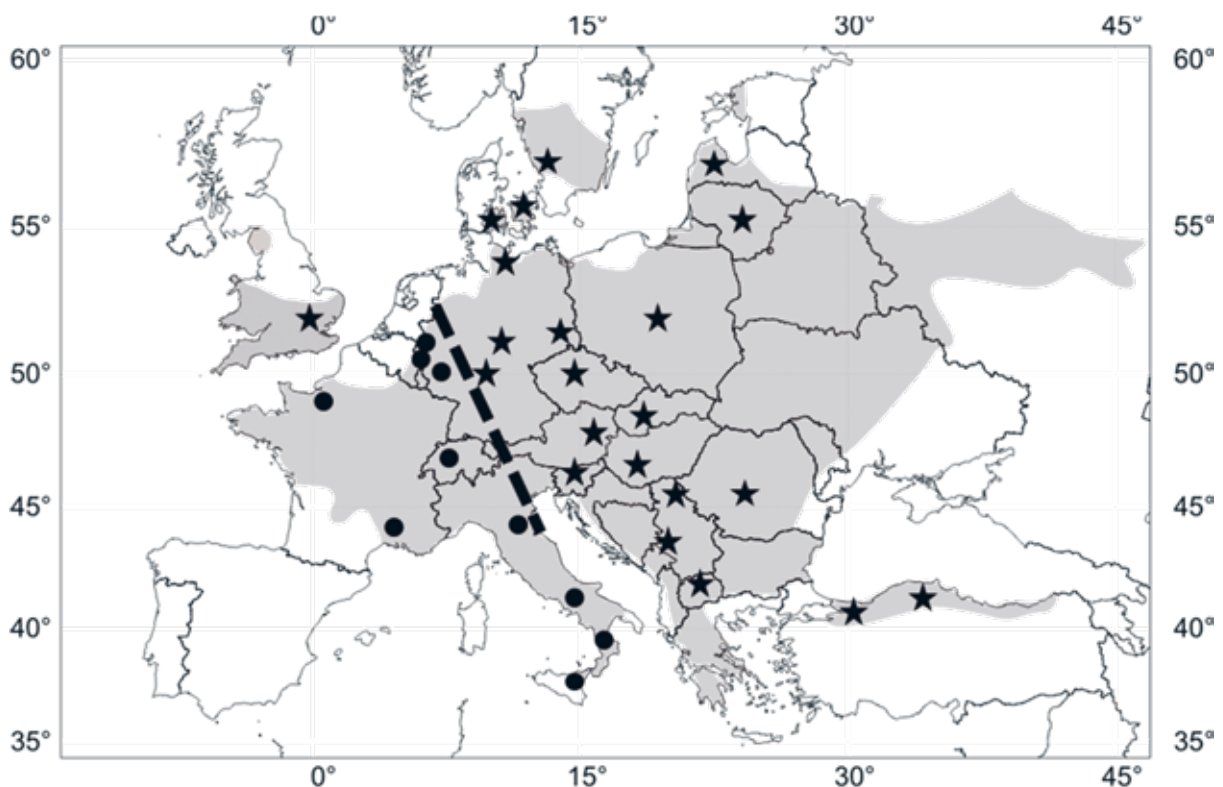
glis) and the garden dormouse (*Eliomys quercinus*) diverged respectively at the end of the Miocene and Early Pliocene (6-5 my). The presence of deeply divergent lineages could correspond to distinct species, but could also be due to strong intraspecific divergence. We attempted therefore to delineate evolutionary entities within this highly genetically fragmented species, but the results revealed the complexity of choosing and applying an appropriate criterion to distinguish species or units of conservation. The definition of taxonomic and population units are seriously compromised by the lack of a consensus of a definition of species and evolutionary units. Should we consider only genetic tests to determine whether one is dealing with a

new species? Or should it be based on morphological and ecological data? If so, how? We think that taxonomic uncertainties are certainly best resolved using an

As this is a protected animal in Europe, the announcement of a new species could jeopardize conservation policy

integrative approach such as combining data from phylogeography, morphology, population genetics, ecology and behaviour.

We could then work together to share this precious information. As this is a protected animal in Europe, the announcement of a new species could jeopardize the whole conservation policy. Conversely, as the mammal is protected, the need to know in depth the status of the species is urgent, particularly to take adequate measures to ensure its conservation. We argue that these two genetic populations in Europe should be at least considered as separate entities in future conservation plans.



Alice Mouton

Planning with dormice in mind

Across the UK, developments are happening at an ever-increasing pace. Inevitably there are impacts on our local wildlife. Li Li Williams explains how she advises builders to plan with dormice in mind.

I am a Senior Ecologist for Devon Wildlife Consultants (www.devonwildlifeconsultants.co.uk), a Wildlife Trust consultancy. We undertake ecological services for projects ranging from private individuals who would like advice on managing their woodland or converting their loft space, to large residential and commercial developments. All of our profits are gift-aided to Devon Wildlife Trust to support their work.

After gaining a degree in Environmental Sciences I worked for an international engineering consultancy based in Exeter. Here I gathered experience of projects and protected species all over the country. However, in my current job, I am lucky

enough to be based solely in Devon, with its wonderful landscapes, habitats and species. We have a wealth of wildlife, with rare species such as dormice and greater horseshoe bats.

Our job is to identify which wildlife species are using a development site and work out how best to protect them and mitigate any impacts. Population growth and government housing targets mean that development is inevitable. However we have strict legislation protecting many of our rare species, in addition to national planning policy which states that developments should minimise impact on biodiversity and promote the protection and recovery of

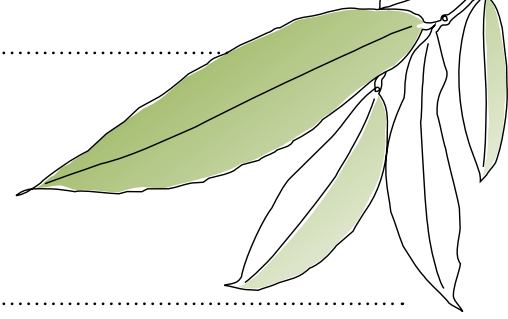
priority species. We undertake detailed surveys to find out whether protected species are present and how they are using the site. We then use this information to feed into the layout and design of the development so that key habitats are protected, and that mitigation and enhancement of habitats are incorporated into plans.

The standard method we use to survey for dormice is nest tubes. The tubes are attached to horizontal branches in hedgerows and woodlands, at 15-20m intervals. Usually dormice will enter the tubes and construct their distinctive nests (although I've also found a torpid dormouse in a tube with no nest present). We tend to install the tubes at the beginning of April and leave them up until the end of October, checking them regularly throughout the summer.

In Devon, we have found it is almost inevitable that there will be dormice present on sites with any hedgerow, scrub or woodland habitat. This can include sites with poor quality hedgerows, isolated fragments of woodland, and non-native scrub such as buddleia. The exceptions are areas such as Plymouth and Torbay, where dormice generally seem to be absent or only present in very low numbers. However,



Li Li Williams



PTES

sometimes the location or habitat connectivity of the site means that it takes a while for their presence to be detected – often there's no evidence of dormice in the tubes until the checks in October/ November, which we suspect may be juveniles dispersing in the autumn, and illustrates that it can be beneficial to leave the tubes out for the entire survey season where possible.

Once dormice have been confirmed as present, specific mitigation can be designed and implemented, with the aim of maintaining the local dormouse population. The priorities are to avoid isolating small areas of habitat, and to ensure that there is an overall net gain in suitable habitat, although mitigation planting will take several years to mature. The best and simplest form of mitigation is avoidance; locate the built areas on intensively-farmed monoculture crops, but retain and protect the woodland and species-rich Devon hedgebanks. This will retain habitats and green corridors through the site, particularly for dormice, but also for other wildlife. This species-specific legal protection often helps other species too, for example the creation and enhancement of hedgerows for dormice will provide habitat for hundreds of other species once established.

Once the development has planning permission, a European Protected Species Licence from Natural England will need to

be obtained in order to legally carry out site clearance, which equates to damage and destruction of habitat and carries the risk of affecting individual dormice. Therefore, vegetation on site is cleared outside the main dormouse breeding and hibernation periods, with a licensed dormouse ecologist supervising and checking for nests throughout the process. Any dormouse nests present are usually found during this process, often well-concealed; I have found numerous summer nests (which can be challenging in dense bramble scrub!), but also several hibernation nests during site clearance including in bramble, buddleia

If dormice are present, mitigation is implemented

scrub and on road verges.

Mitigation is required to be robust and achievable in order to obtain a Natural England licence. This often involves planting replacement habitat as soon as possible, aiming to create and strengthen habitat corridors throughout and outside the site. We also put up dormouse boxes to provide shelter whilst the new habitat is maturing, and to help with post-

development monitoring. Ideally, new and retained hedgerows should be protected by additional planting and a buffer of meadow grassland, and not incorporated as residential garden boundaries. This can be challenging to achieve as housing developers are keen to maximise the use of space on site, and unlit corridors between gardens and hedgerows are not acceptable from a human safety perspective. There are also practicalities in accessing the hedgerow to manage it properly. Often we target the most important hedgerow links to be included in public open space where they can be managed appropriately. Hedgebanks, particularly along lanes, may be heavily and regularly flailed and so there is often an opportunity to improve hedge management measures and incorporate these measures in the landscaping plans for the site. Where required, the hedgerows are given additional protection from human disturbance and cat predation through buffer planting of thorny species such as blackthorn and rose. We have also had sensitive sites where a covenant restricting ownership of cats has been successfully put in place! Although there is usually economic pressure to fully utilise the space on site, particularly for housing, we find that many of our clients have chosen us as consultants because they are willing to achieve a good outcome for wildlife.

If the development is part of a larger area to be developed by several different housing developers and commercial companies, a wider masterplan needs to be produced for the Natural England licence, showing all of the development sites in the area, and how the new and retained habitats will link up through the wider landscape.

When we check the boxes we often find dormice in them whilst construction is still ongoing, sometimes surprisingly close to the areas with the most disturbance! We will return to the site twice a year, usually for five years, to monitor dormouse presence in the boxes to get an indication of how successful the mitigation was. This information then needs to be returned to Natural England as a condition of the licence. We have found dormice using sites during construction and post-development, particularly where efforts have been made to retain a coherent hedgerow network. However, it would be valuable to be able to access and compare monitoring from other development licences, to find out what mitigation measures are most likely to be successful.



Houses versus mice

Stephen Carroll guides us through the complex issues of dealing with protected species in planning.

Hazel dormice receive the highest levels of legal protection in the UK planning system. Uncommon and elusive as dormice are, one might have thought the two rarely overlap. But that was before nest tubes provided a ready survey method, and dormice started to be found in areas which had previously been considered unlikely to be suitable for them.

In Devon, nest tube surveys have revealed populations on the outskirts of towns, along road verges and edges of heathland, in commercial conifer crops, isolated scrub remnants on brown field and quarry sites, golf courses, and in many rural and semi-rural hedges - and not just the high quality ones. It seems dormice could be present in just about any decent hedge, and there are many miles of those in Devon. One view is that dormice were always so widely spread; we just didn't know how to find them before. But this has a number of implications for the planning system, not least many more potential impacts in many more places.



For European Protected Species, such as dormice, current planning obligations are set out in a key document ODPM Circular 06 (2005) and Natural England (NE)'s standing advice (which refers back to Paul Chanin and Michael Woods' 2003 nest tube study report, and the trusty 2006 Dormouse Conservation Handbook). Consultant ecologists, planning inspectors, and, one hopes, local planning authorities, will be very familiar with these documents. ODPM 06 is clear: presence of a European Protected Species (EPS) is a material consideration for the granting or refusal of planning permission, and surveys and mitigation plans are mandatory where there is a 'reasonable likelihood' that dormice will be present and affected by a development.

What happens in practice? To find out more, I looked at over 100 randomly selected planning cases in Devon since 2005, the year ODPM 06 was issued, where the presence of dormice was raised at the

Interestingly, the dormouse habitat most affected by planning was hedges

preliminary survey stage. The background to individual cases are too lengthy to describe here, so what follows are some general observations only, from a part of the country where dormice seem to be relatively widespread.

Interestingly, or unsurprisingly, dormouse habitat most affected by planning applications was hedges (75%). Relatively few applications entailed removal of woodland (n=4), though several were considered to have indirect impacts by being in close proximity or adjacent to woodland (17%). The remainder (8%) involved mixed scrub habitats. Applications ranged from large-scale housing developments, commercial buildings or infrastructure developments, to small-scale

(under 10) housing developments, to as small as new field access through hedges.

Planning cases may contribute 20-25 new records to the county database annually, though paradoxically this coincides with the imminent loss of those sites to development. Even so, these add to knowledge and awareness for subsequent cases. For example, dormice have been found in some unpromising places: aggressively flailed hedges, mono-species rank scrub, fragmented road verges, tiny copses and stubs of hedge, dense laurel, rhododendron, Japanese knotweed...these have been some distance from large semi-natural woodland, although often interconnected via networks of hedges and scrub. We now know not to discount the presence of dormice in such habitats. However a quick search suggested much of this data is not being forwarded to the relevant data holder, such as the county records centre, PTES or the NBN.

While best practice protocols evolve as a consequence of this work, planning decisions still have to be made. Many, possibly most, planning departments do not have in-house ecological staff, leaving planning officers the task of interpreting NE advice. Much now depends on this: NE will not generally comment on individual planning cases, except to refer to their standing advice, which was revised in October 2013, to account for more recent findings, then diluted again in October 2014, when subsumed under the new Gov.uk website.

With eight different districts, two urban unitaries, overarching County Council, and two National Parks in Devon, planning authorities and consultants sometimes differ in their approach to the need for a survey, assessment of impacts, and mitigation requirements. Where 'reasonable likelihood' was inferred (n=71) and further targeted dormouse surveys carried out (41), 24 surveys found dormice to be present, and 17 were negative. This left 30 cases where surveys were not carried out, despite ecologists' recommendation. Some of these applications were refused, withdrawn, or

not otherwise progressed further, but others were consented, including at appeal, with surveys deferred to post-consent planning condition, contrary to ODPM06. Usually these dated from 2005-6 in the early period of ODPM06; latterly this rarely, though occasionally, still happened. There was also one refusal of detailed plans at appeal due to inadequate protection for dormice (though the principle of development had been accepted at earlier outline stage).

In situations without a 'reasonable likelihood' for habitat to support dormice, but still some potential, the approach widely adopted was to put in place pre-emptive safeguards and mitigation (35 cases). Commonly, similar measures were recommended in situations with reasonable likelihood but negative targeted follow-up surveys, in recognition of the difficulties of proving dormouse absence.

On no occasion did the presence of dormice prevent development altogether. Instead, identified impacts and threats of harm were subject to Natural England licensing, a legal requirement under which safeguarding and mitigation measures must be put in place. The recognised impacts included risks to individual animals during site clearance, permanent loss of hedge, scrub, or in rarer cases, woodland, and isolation and fragmentation of any remaining habitat. (See Li-li's article on the preceding pages). Common mitigation methods included phased site vegetation clearance under ecologist's supervision; retention and enhancement of hedges; stand-off buffer distances between the development and retained hedges / woodland, and the minimising of gaps and breaches in connecting habitat. Additional measures might include the regulation of external lighting, installation of nest boxes post-development, or off-site woodland planting and restoration. In one case, houses built within a woodland were located on non-native plantation areas, whilst the native woodland components were to be restored and expanded. Less common measures featured the production of an information leaflet for new householders, a covenant banning new residents from owning cats (!), and commuted sums for creation or improvement of off-site habitat, a kind of proto-biodiversity off-setting.

What seems less well acknowledged or understood are the indirect impacts. When former open countryside, green field sites with old hedges and mature trees, are brought within a built settlement there is

going to be increased disturbance and public pressure on any retained or adjacent habitats; calls to fell mature trees; unsuitable formal hedge maintenance; accesses through and replacement of hedge sections by fencing; increased lighting and the threat of cat predation (for one site I was told that a new house's cat found and killed 5 dormice within 2 months of moving in). Another problem appears to be the practical difficulties of enforcing some planning obligations: there were a number of instances where planning conditions for mitigation measures were ignored or only partly followed. What are the chances that a dormouse population will survive, when tens of houses are brought within 5-10m of a hedge, enclosing within the new development habitats which were previously separated by the width of a field or more? The answer remains unknown – and so does the knowledge of how to address this.

Some mitigation techniques, such as dormouse bridges, ropeways, and underpasses, are unproven or untested, yet are sometimes proposed, and licensed. Some cases highlight that development cycles can extend over long periods. Where one field has been developed, focus for future urban expansion falls on the next, and so on. The cumulative net impact of loss of green spaces, field by field, is completely unknown. We do not know what the long-term impacts on populations will be. They may take years or decades to become apparent. Some larger, multi-phase planning applications consented eight years ago are still under construction, or houses are not yet sold or occupied. It still remains to be seen whether the mitigation measures for these will prove to be successful or not.

In the meantime, where NE licences have been issued, follow-up monitoring of mitigation measures is a standard requirement, so that information should be forthcoming. I would like to see a detailed systematic review of planning case histories carried out, as has been done for other EPS. Lack of information about the effectiveness, or otherwise, of mitigation measures, and assessment of how these are being implemented, or not, seem to me to be weak links in the chain. Planning developments may, or may not, be a serious threat to dormouse populations, locally or nationally, but these impacts need to be properly understood if dormouse populations are to be properly protected.

JUNCTION BOX RESCUE



Alan Loweth

Alan Loweth, a volunteer with Folly Wildlife Rescue in Kent, reported an unusual call out. BT engineers had opened the front panel of a junction box, and a nest of torpid dormice almost fell to the ground. Luckily the engineer caught the animals and a local woman assisted by calling the rescue centre. Alan was able to return the nest of juveniles to a nearby woodland.

NEW STYLE DORMOUSE BOXES

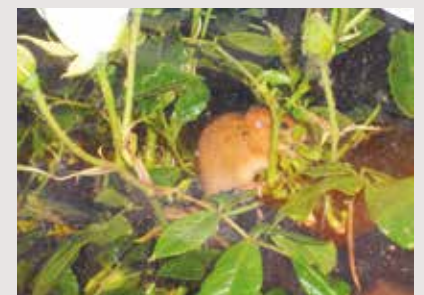


Henry Stanier

Henry Stanier at the Bedfordshire, Cambridgeshire and Northamptonshire Wildlife Trust has developed a new nest box design that excludes birds whilst still attracting dormice. For more information and to download the design plans please visit their website. www.wildlifebcn.org/dormouse.

DORMICE EATING APHIDS

Angela Blaen sent us a great photo of a dormice eating aphids from her roses.



The curse of the visor spiders

They may be small but they elicit a large reaction - especially when you find these spiders hidden behind your sun visor - as Alison Looser and Simone Bullion report.

Last December, after collecting in the first batch of nest tubes in Suffolk, we were surprised to discover this large spider lurking behind the sun visor of the car! A few days later another one appeared in the same location. Several spiders have now been found behind the visors of three different cars, all after having transported dormouse nest tubes. Visors are now checked carefully before travelling to avoid any unexpected surprises!

Upon closer inspection it has been identified as the walnut orb-weaver spider, *Nuctenea umbratica*. This spider likes living in crevices, particularly under peeling bark. It is morphologically adapted to this way of life as it can pull all its legs in and flatten itself. Dormouse nest tubes and car sun

visors appear to provide an acceptable substitute if no bark is present.



Alison Looser

Finding a natural dormouse nest on the Isle of Wight

After years of searching, we finally found a natural dormouse nest at our nature reserve Briddlesford Woods, this October. It was in an area of dense coppice regrowth, almost sitting on a thick bramble stem. Please send in any photos you have of natural nests that you have found.



Nicola At-Fuaji

Where do dormice hibernate?

John Prince - a member of the Common Dormouse Captive Breeder's Group - wonders why we don't know more about how and where dormice spend the winter months.

The last couple of winters have been extremely wet – potentially very bad news for dormice. Whilst working in our wood, Little Linford, we were often ankle deep in mud and water. Twice this year we found a badger sett that had been flooded. It was difficult to see where dormice could hibernate without being under water. Had they moved to drier parts of the wood?

In the past I have dismantled log piles that could have provided protection for dormice over-wintering on the ground, but no nests were found. I have also spent hours on my knees searching through hazel stools, mossy banks and any area that looked suitable for winter nests. I've looked in the base of pollarded trees, such as ash and field maple, the piles of brash on the side of rides, but have found nothing. Perhaps the dormice are hibernating in the dead hedges around the coppice coupes but unfortunately these are too hard to search.

So does it matter? Well I think it does. First of all we would better understand their requirements during this crucial time, and we would have a better idea of how many animals survive hibernation. Also if we knew where they hibernated we could avoid destroying suitable winter habitat. We don't know what damage we are doing at present.

This is one aspect of dormouse ecology we need to study further in the wild. In captivity they build a tightly woven nest under the leaf litter. But this is because they have no other choice – since we haven't found these nests in the wild, we don't know where they hibernate in similar situations or if they go elsewhere.

Studies have shown that edible dormice hibernation in groups under ground. Do hazel dormice do the same? It's time we carried out a thorough study on how this species spends the winter and where it goes. If there's a potential study I

would like to offer Little Linford wood as a study site to help answer some of these questions.



Keith Allen