



# HEREFORDSHIRE MAMMAL GROUP

## SPRING NEWSLETTER

*(April to June 2015)*

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### Spring Events

#### April

Saturday, 11 April 2015, 10:00

**Bat and Dormouse Box Check** (two teams required)

Frith Wood, Wellington Heath  
Meet at wood entrance at SO723405  
Contact Denise Foster via HMG

Saturday, 18 April 2015, 10:00

**Bat Box Check**

Lea and Paget's Wood  
Meet in lay-by, Hawkers Lane at SO595346  
Contact Denise Foster via HMG

Sunday, 26 April 2015, 10:00

**Bat Box Check**

Old Country Wood  
Meet at Old Country House (SO726446)  
Contact David Lee via HMG

#### May

Saturday, 02 May 2015, 10:00

**Bat Box Check**

Nupend Nature Reserve  
Meet at reserve entrance at SO 580355 (room for 2 cars only so car sharing is essential)  
Contact Denise Foster via HMG

Friday 08 May 2015, 10:00

**Bat Box Checks**

Titley Pool & Brilley Green Dingle Nature Reserve – 2 teams required  
Titley Pool, meet at reserve car park – turn off Eyewood Lane at SO32237 59708 and drive to Titley Pool (long track). Brilley Green Dingle, meet at SO26861 48806 (room for 2 cars only so car sharing is essential).  
Contact Denise Foster via HMG

Saturday, 23 May 2015, 10:00

**Bat and Dormouse Box Check** (two teams required)

Frith Wood, Wellington Heath  
Meet at wood entrance at SO723405  
Contact Denise Foster via HMG

Monday, 25 May 2015, 10:00

**Bat Box Check**

Lea and Paget's Wood  
Meet in lay-by, Hawkers Lane at SO595346  
Contact Denise Foster via HMG

Saturday, 30 May 2015, 10:00

**Bat Box Checks** (2 teams required)

White Rocks and Woodside HWT Reserves, the Doward. White Rocks, meet at gate at approx. SO549157. Woodside, meet at Miner's Rest Car Park at approx. SO553158  
Contact: Denise Foster via HMG

Sunday, 31 May 2015, 10:00

**Bat Box Check**

Old Country Wood  
Meet at Old Country House (SO726446)  
Contact David Lee via HMG

## May and Early June Events

### Herefordshire Woodland Bat Project

Trapping sessions will start early May until early June. Dates for some of these events will be advertised a week in advance. If you want to be added to the distribution list for all trapping events please contact Denise Foster via HMG.

**Bats and Swifts in Churches Project** will start from May. Dates will be placed on the website a week in advance. If you are interested in attending please contact Denise Foster via HMG

## NEW MEMBERS

We would like to welcome the following new members to HMG:

Richard & Phyl King, John Paige, Lucy Fay  
Robert Hall, Karen Pugh, Elizabeth Vice,  
Mark O'Brian, Brian Wilder, Nicholas Benes,  
Katherine Bubb

## MEMBERSHIP

**Louise Scott, Membership Secretary.**

We currently have 79 paid up members in HMG and 135 followers on Facebook.

## NEWS IN BRIEF

### Swimming Mole

Here is a rare, but not a totally isolated, incident of a mole swimming. The mole was seen in the River Wye near Breinton Spring. This photo was sent to us by Nichola Geeson.



Photo: Courtesy Nichola Geeson

## Bat Box Making Day at Ast Wood

A few volunteers turned up to make some much needed bat boxes for Ast Wood. Some of the current boxes are deteriorating and are in need of replacement. Ten wooden bat boxes were made in total, which included 6 Colin Morris style boxes and 4 Kent boxes.



Photo: Mike Bailey, Dave Smith and Pierre Lefort with their efforts

Our volunteers were treated to some hot potatoes with butter and freshly made tea and coffee.



Photo: Food and drink station

## Herefordshire Biological Records Office

The Herefordshire Biological Records Office (HBRC) has now moved to their new offices in Rotherwas. An invitation to the committee was received to attend an open day in March. Two committee members represented the group. HBRC's new address is Fir Tree Lane, Rotherwas, Hereford, HR2 6LA, Tel no: 01432 261538, Email: [hbrc@herefordshire.gov.uk](mailto:hbrc@herefordshire.gov.uk)

## Weasel at Work by Dave Smith

It is not often we are lucky enough to see these small mustelids up close, but this was my best attempt at a photo using a mobile phone.

I was hedge-laying at Bodenham Lake, and was just returning to work after my morning tea break and spotted this little face peering out at me from the bottom of the hedge. We stood staring at each other for quite a while, until I walked back to my truck to get my phone.

The weasel was not worried by me walking around or opening and closing my car door. It continued to stare straight at me for several minutes, occasionally disappearing down a hole and then popping up again a few feet away while I snapped away and even managed to take a short video. The laid hedge should provide better cover for him/her and hopefully improve the habitat for the small mammal prey species.



Courtesy: Dave Smith

## MBE honour for UK Bat Worker

Jenny Clark, a UK bat carer who founded the Sussex Bat Hospital was honoured for her services to bat conservation.

Jenny has been working with injured and sick bats for 30 years. She took in her first injured bat in 1984 and was captivated by their gentleness and charm.



Photo: BBC News, 30Dec14

During peak times in the summer months, the Sussex Bat Hospital can care for up to 50 bats at a time.

## Winter Talk Review – Feral Big Cats

A total of 65 people (including 25 HMG members) attended Rick Minter's talk on Feral Big Cats in January 2015. Rick is the author of the book "Big Cats - Facing Britain's Wild Predators" and gave us a fascinating and thought provoking talk.

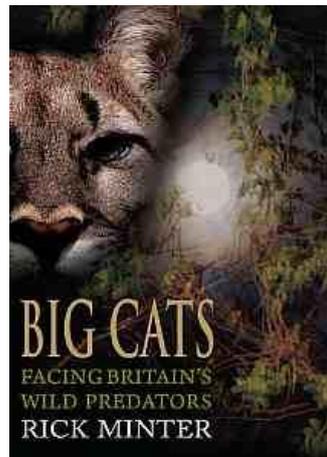


Photo: Courtesy Rick Minter

Rick described many accounts of big cat sightings, which he regularly receives from members of the public, prompting members of the audience to share their own experiences of big cat sightings in Herefordshire and other counties.

The talk covered field signs, DNA and Tooth pit analysis, and public perceptions of these iconic animals.

**So how did big cats get to be in our landscape?**  
In the 1960s and early 1970s it was fashionable

to keep big cats as pets but in 1976 legislation was introduced in the UK, the Dangerous Wild Animal Act. This act gave big cat pet owners three options. Firstly, a licence to keep the animal that cost about £1000. This included a yearly check carried out by the council to inspect the security of the compound where the animal was being kept. Secondly, there was an option to take the animal to the zoo or local wildlife park and the third option was to have the animal put to sleep.



Photo: Courtesy Rick Minter

It was this legislation that forced some big cat owners to release these animals into the wild. However, this was not the only means by which animals found their way into the British countryside. Escapes from zoos, wildlife parks and circuses were also partly responsible.

Rick has so far attended nine county rural shows two of which were quite local: Frampton County Show (Gloucestershire) and Herefordshire County Show (2014). An information tent was set up at each event in which members of the public were invited to discuss their experiences and opinions of big cats in the countryside.

There are a total of 18 reports from Herefordshire including encounters from outdoor enthusiasts such as trackers, shooters, game keepers and falconers. Game keeper sightings are linked to big cats helping themselves to pheasants, whereas falconer's sightings were directed at Big Cats being alerted to distress calls by rabbits that had been

caught by birds of prey. However, some people do not like reporting sightings for many reasons, including the fear of being ridiculed, attracting trophy hunters, betraying the animal and bringing attention to areas which could be blighted. Members of the public were asked to give their opinions of what should be done about these top predators in the countryside and most people said that they should be left alone.

In the UK, the most common sightings are Leopards, Pumas and Lynx. Most of the time these big cats go unnoticed because they lay-up or rest out of sight, maybe underground or in trees, which big cats are perfectly capable of climbing. Some of the most common places where big cats may be seen are in gullies or ditches, where they can commute unnoticed to humans but be in a good position to ambush prey. Other areas big cats frequent are under bridges, railway tunnels or high up in trees.

Black cats were the most commonly reported (70-80%), which is likely to be due to their bold colour, which is clearly visible against the local vegetation. Other large cats such as pumas are dark brown and hence better camouflaged amongst the vegetation and so are less often reported. Puma's calls have been heard on rare occasions and have been described as a "woman being strangled"! Pumas belong to the genus *Felis*, and are not capable of roaring, unlike animals of the genus *Panthera*.

When a big cat is observed it is often described as sleek, lithe, fit and having hindquarters higher than its shoulders. Determining size can always be an issue in low light or at a distance but most people estimate body length to be about a metre with a similar tail length. Big black cats have been observed stalking low, crawling inch by inch on their stomachs. However, about 20% of witnesses are alerted to the big cats when their pet dogs and horses suddenly become nervous.

Rick and his team have set up trail cameras with wide-angle lenses, which can follow targets, in areas with frequent sightings. However the low population levels of these animals means that a considerable amount of effort will be required before they are captured on camera so

observation of field signs is crucial in order to detect these animals.

Big Cats live secretive lifestyles and are resourcefully adaptable. Their territory can be as large as 50 square miles, which is a large area in which to try and capture an animal on camera or by any other tracking means. Finding scats is a difficult task and dogs are currently being trained to detect scats of big cats (as has proven successful for mustelids). Not only will this provide proof of existence of these animals but analysis of their scats will also provide information about their prey species.

In the Forest of Dean, a big cat footprint was discovered that was identified not only by its size but also by the presence of a leading big toe; unfortunately claws marks alone are not diagnostic of cat species. Other field signs to look for are fresh kills. Has the kill been plucked, and peeled? Are there bite marks on the muzzle of the dead animal? Some cats will grasp the muzzle to suffocate their prey. Neck injuries are another telltale sign as canine puncture marks may be visible at the throat of the dead animal where the cat has suffocated the prey by biting at the windpipe. However, for smaller prey, nape bites can occur. Canine teeth are about 4cm apart for an adult puma or leopard. Fur plucking is performed prior to shearing and flesh is consumed using the carnassial (cheek) teeth.

It is important to know that big cats will always shear flesh, never rip it, and the stomach and intestines are always discarded. They will take the under part at the rump end, as this gives access to the liver and heart which is surrounded by flesh. All this will be eaten exposing the ribs. A large cat is likely to drag its prey to a more secure area for consuming and sometimes they will carry it up into a tree.

Other field signs include scratch or rake marks about 5ft high on tree trunks or hair samples although these can be difficult to find since cat fur is very soft and fine. Scratch piles are formed by scent marking males and these subsequently may be overtopped by a female.

Big cats prefer deer as their main prey item but will also take other animals such as sheep. Rams are likely to be taken initially as they will be the

ones defending the flock. Any kills will be consumed lying down, so look for flattened down grass next to the dead animal and also observe whether the skin has been peeled back. There have been the odd reports of dog and pony kills/attacks where the rear end is attacked to bring the prey down.

Additional evidence is obtained from analysis of tooth-pits in prey bones, carried out by the Royal Agricultural College. The patterns of pits produced by cats and dogs are very different.



Photo: Courtesy Rick Minter

A question was raised by an HMG member about big cats being killed on the roads, since these reports never appear in the news. Some police forces are well aware of big cat sightings since they tend to be the first point of contact for a worried member of the public. In Gloucestershire, the police are quite matter of fact about big cats breeding in the county and they stated this on an ITV documentary in 2006. However, it is believed that road kills are not normally reported in order to avoid any media or public concern – the carcass is simply removed.

There is very little known about whether these animals are breeding in Britain but there has been one sighting of two cats mating. Other reports include calls of big cats mating (more commonly heard in winter), two cats being observed together, cubs and kits reported and animals observed appearing to be pregnant. However due to the isolated populations of these animals, the gene flow will be limited and inbreeding complications are likely which may be expected to limit the population. Overall, there are very low numbers of these animals in Britain and very few are breeding so this will not make a viable population.

## WINTER TALK REVIEW - Polecats



HMG's penultimate winter talk in January was once again held at The Bunch of Carrots at Hampton Bishop.

'Polecats' delivered by Johnny Birks gave us a fascinating insight to these once rare and understudied creatures. Polecats are one of the smallest of our six native mustelids, although they are considerably bigger than stoats and weasels, with an average body length of 50-59cm. Historically, all mustelids in Britain have had a bad reputation as ruthless killers, with polecats being the most hated of them all. In the 16th and 17th centuries the word "polecat" was used as an insult. They were once reasonably common in lowland rural and agricultural landscapes, where they preyed on domestic chickens and inhabited barns and outbuildings in winter months, often leaving their trademark unpleasant smell as a calling card. There was a massive decline in their population between 1800 and 1880, largely due to persecution by gamekeepers.

By 1915 it is believed that they were almost extinct in the UK reduced mainly to a small population within a 70km radius of Aberdovey in the west of Wales with a few animals in parts of Scotland and possibly the odd animal in the north and west of England. The situation for the polecat was so bad that during a study in 1990 only 3.8% of rural children could actually recognise a picture of this once common animal.

**Identification and Field Signs** - tracks and trails for polecats are not always reliable since scats and prints are very similar to those of Mink. A further complication is the presence of feral ferrets living alongside them. The ferret is a

domestic version of the polecat, which is thought to have been kept by humans for over 2000 years. Technically they are the same species which have had certain characteristics bred out to create a more docile animal with a different pelage (usually albino) however modern ferret breeders now hold a 'polecat' class at ferret shows, where animals are judged on how much they resemble a wild polecat.



Photo: Courtesy Johnny Birks

**Habitat and Diet** - In the UK, polecats inhabit woodland edge, hedgerows and other lowland rural habitats. They are nocturnal and often rest up in rabbit burrows during the day. Their main diet in the UK is rabbit (80%), but will also take other small mammals, amphibians and birds. In the winter months it is thought that their occupation of farm buildings is not due directly to colder temperatures but to an increase in rodents using these buildings, when the polecat diet changes to 65% rat. The situation is different on the continent where there are no rabbits in much of their range. In these countries they are associated with wetlands where they specialise on amphibians.

Johnny recounted a gruesome story of a pond surrounded by the corpses of many toads that had been skinned alive with their back legs eaten away. This was thought to be the work of a polecat as they have the ability to remove the poisonous skin from toads without coming into contact with the toxins.

**The Present Situation and Threats** - the situation for polecats is now much improved. The First World War kick-started their return, when persecution from gamekeepers was less of an issue. They are now spreading east across the

country at a rate of around 4km a year and are currently well established across the West Midlands.

Records of polecats are hard to come by, due to their elusive and nocturnal behaviour and nearly 80% of records are from road casualties. As well as traffic, another threat to their survival is secondary rodenticide poisoning. During the Vincent Wildlife Trust's surveys carried out in the 1990s up to 50% of animals contain varying amounts of rodenticide. However it is still unknown how many deaths can be attributed to this. The Vincent Wildlife Trust is currently in the middle of a new polecat survey, so please send in any records you have, either directly to them or forward to them to HMG so we can pass them on.

## Barn Owl Pellet Workshop Review by Viv Geen

A very enjoyable time was had by all on what was a very cold and wet January evening.



Photo: HWT provided the room and microscope for the workshop

Ten people were engrossed in the dissection of barn owl pellets brought along by Denise Foster, who gave a brief talk on the digestive track of barns owl, how the pellets are formed, and how to identify the prey items found in barn owl pellets.

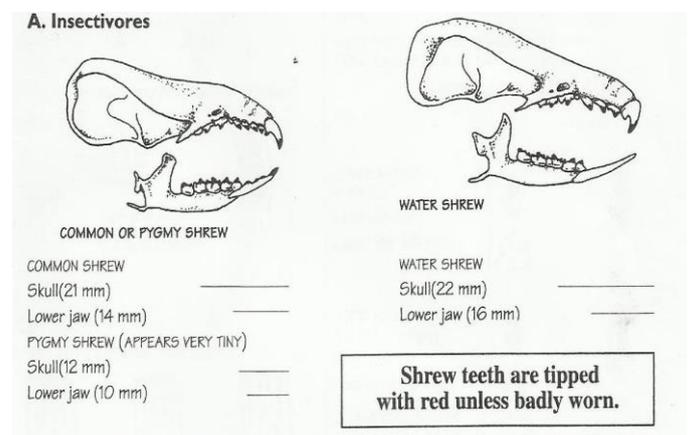
The barn owl has an alkaline stomach and so the bones and fur are kept intact, unlike the tawny owl, which has an acid stomach and digests the bones. The stomach of the barn owl is very muscular and moves the food around and filters

it to leave the bones and fur. This material is compacted into a pellet, which is then expelled via the mouth by the bird.

We all carried out dry dissection (with a little spray of water) of the barn owl pellets collected in Herefordshire and at sites in the Cotswolds. The pellets from Herefordshire mainly contained field voles and wood mice, whereas the Cotswold pellets contained other species including shrews. The small mammal species were identified from the skulls present and by looking at the upper and lower jaws, and the tooth root pattern.

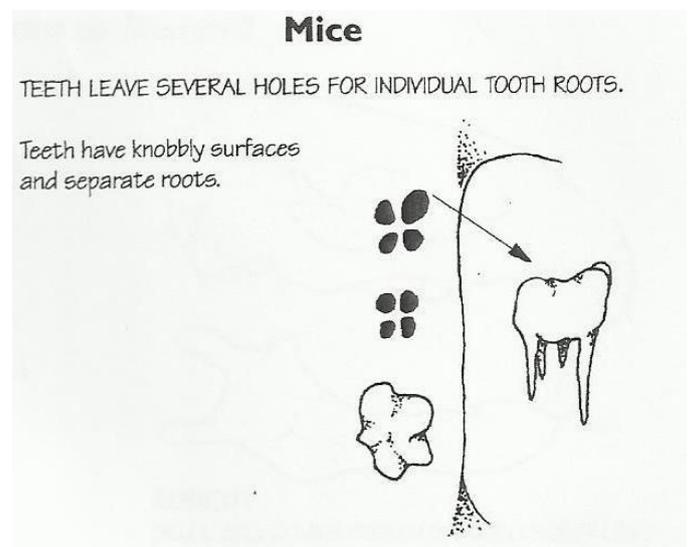
### Shrews

Common Shrew has 3 front cusps, Pygmy Shrew has 4 front cusps, and Water Shrew has one long front tooth.



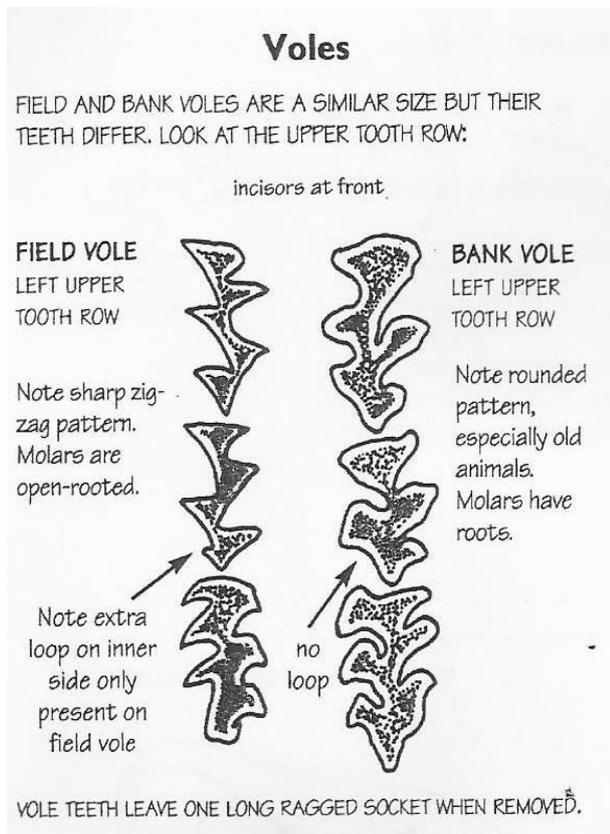
### Mice

Teeth round and knobby, with a root system. The mouse species is identified by the number of roots present.



## Field Vole and Bank Vole

The teeth are easily extracted from the jaw and are strongly grooved. Field vole teeth have grooves extending to the bottom of the tooth, whereas bank vole teeth only have grooves half way down the tooth (but beware of juveniles).



The group analyzed a total of 38 pellets with the largest pellet containing nine skulls, and the smallest containing one skull. There were mostly field voles in the pellets but we also got pygmy shrew, bank vole, and wood mouse. It is not surprising that field voles make up a large percentage of the barn owl diet as they are very slow and noisy animals (using social calls) and so are easy to catch. The common shrew is the next most abundant prey animal of the barn owl. The species of small mammal in the pellet can give useful information on the habitat used by the owl for foraging.

The entire small mammal data collected will be added to the mammal atlas for the county.

Further information on can be found in the Mammal Society publication 'Analysis of Barn Owl Pellets' by Derek Yalden.

## Bat Co-ordinator Update by Denise Foster

Considering bats are hibernating this winter there has still been plenty of work to do for the bat co-ordinator, especially concerning the two major bat projects we have ongoing.

### Woodland Bat Project:

One of the recommendations of the Woodlands Bat Project to the Forestry Commission was to provide some bat awareness training to foresters so they are aware of potential roost features in both coniferous and broadleaved trees. Another recommendation was that the Forestry Commission considers providing some bat and dormouse boxes in Frith Wood because of the importance of the site for bats and dormice.

With the help of Kate Wollen, who is part of the Forestry Commission Ecology team as well as being an active member of the mammal group, both recommendations have been achieved.

On 11<sup>th</sup> February, a working party of eleven volunteers (8 from HMG and 3 FC employees, 1 being a retired FC employee who made all the wooden boxes) turned up at Frith Wood to install 65 bat boxes and 50 dormouse boxes.



Photo: The working party at Frith Wood

We installed seven different styles of bat boxes: six styles of woodcrete Schwegler boxes and a Colin Morris Style Wooden bat box.



*Photo: Nick Underhill-Day installing a wooden Colin Morris style bat box at Frith Wood.*

We placed bat and dormouse boxes in 5 locations throughout the wood. A total of 115 boxes were installed in one day, which was a real achievement. Four of us returned to number and geo-reference the dormouse boxes on the Friday but due to the inclement weather we only managed to number and geo-reference the dormouse boxes.

In March, a Bat Awareness Training course was arranged by Kate Wollen of the Forestry Commission at Beechenhurst Lodge in the Forest of Dean. Thirty foresters from the SW of England attended this important training session which was led by Henry Andrews, author of the Bat Tree Habitat Key. Three HMG members attended this event, myself, Dave Smith and David Lee. I presented the achievements of the Woodland Bat Project so far.



*Photo: (Courtesy Henry Andrews) Barbastelle found roosting under loose bark during the Bat Awareness Training Day.*



*Photo: Pipistrelle species found in the Giants Chair during the Bat Awareness Training Day*

The afternoon was dedicated to seeking out potential roost features and we were not disappointed. Two hibernating bats were found by Henry, a barbastelle roosting behind some exfoliating bark of an oak tree and a pipistrelle bat in a fissure in the Giant's Chair. This training day was considered to be a success and was well received by the Forestry Commission, so a second training course is likely to be arranged in the Autumn. A press release to promote our collaboration with the Forestry Commission is currently being prepared.

### **Bats and Swifts in Churches Project**

Two HMG members attended a second meeting with the Diocese of Hereford in February to update the Church Buildings Officer on the status of the project. So far, the Dioceses and the PCC have given permission for us to install two Schwegler 1FS maternity bat boxes on Wellington Church and also to open up the chancel lancet window to allow bats to enter the roof void.



*Photo: Modifications to Wellington Church's chancel lancet window has now been carried out.*

These modifications took place in early March. Overall, there are a total of six new roosting opportunities for the Natterer's Bats when they return in April. HMG will continue to monitor this church during the summer.



Photo: One of two maternity bat boxes (1FS), which were installed on the church building at Wellington Church

Permission has been obtained to carry out similar modifications to Pembridge Church. However, we still waiting to hear from Pembridge Church PCC and the Pembridge Amenity Trust about the modifications as some are more complex and funding will be required to proceed.

Our last winter talk took place on 5<sup>th</sup> March at Hampton Bishop which was about on Bats and Churches where both Tim Bridges from the Diocese of Hereford and I gave presentations.

There were two parts to the talk; an update on the project so far and aims and objective for this summer. Tim then gave a presentation about the history of Herefordshire church buildings, how these buildings have changed over the centuries and how they continue to change in the modern world. Tim also covered the faculty system and explained the process of the church planning system.

A total of 38 churches were surveyed by the Herefordshire Mammal Group last year which is quite an achievement and a good start to the project. Full surveys were performed on 10 churches and dusk and dawn surveys were performed on two churches which have high numbers of Natterer's bats using the interior of the church.

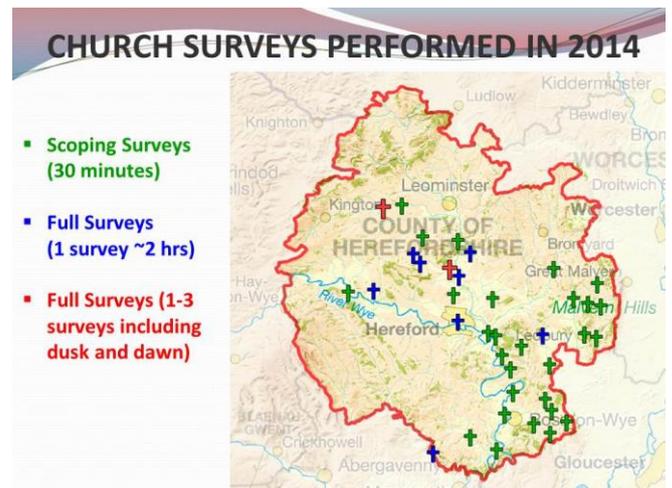


Photo: A total of 38 churches surveyed in 2014 for the Bats and Swifts in Churches project.

### BCT Ringing Conference

A few HMG members attended the BCT's Bat Ringing Conference, which took place in Birmingham in February. This was only open to people who actively ring bats in order to promote discussion about the future of ringing bats and preparation of ringing guidelines. There were three main areas of discussion which took place namely Ethics and Science, Ringing Techniques and Data Recording.

Overall, it was a very productive conference with some good discussions taking place.

### Volunteer Bat Roost Visitor Training with Shropshire Bat Group by Sophie Cowling

Four HMG trainee bat workers attended this two-day course, which was aimed at those wishing to obtain a Volunteer Bat Roost Visitor (VBRV) Licence, or those just wanting to learn more about bats.

The course covered a broad range of topics including bat identification, bat biology, threats to bats, bat habitat, architecture, survey aims and techniques. I would highly recommend it as a foundation for the practical elements of bat surveys.



Photo: Sophie Cowling

The bat identification sessions were a great way to challenge our identification skills, and see the practical issues faced when conducting roost visits. Deceased bats can provide the best information on previous roosts, and identifying those with missing heads and dried features really encouraged us to look beyond characteristic features. We also played an engaging card game, where we used scientific keys to identify bats by a limited number of features.



Photo: Sophie Cowling

The course emphasised the importance of architecture in roost visits. I was surprised at how important having the knowledge of things such as wall structure and tile type is in determining potential roost sites.

It was interesting to learn about the work conducted by neighbouring bat groups, such as Shropshire's work surveying bats underground. At the end of the course contact details were provided for VBRV trainers, it is nice to see a

number of trainers available in Shropshire. Hopefully the two bat groups will continue to work together in the future, and a big thank you to Shropshire Bat Group for inviting us attend the course, at an extremely reasonable price!



Photo: Sophie Cowling

**Editorial:** *There are presently no active licenced VBRV Trainers in Herefordshire, which we hope will change in 2015/2016. Cross border co-operation is essential for bat groups to expand their expertise for groups who lack certain skills. Anyone seriously wanting to have more involvement with bats should be encouraged to join other bat groups in order to gain wider experience.*

## Hibernation By David Lee

As winter is coming to an end, those of us who work with bats and dormice will soon be busy again as these animals arouse from hibernation. But, what exactly is hibernation?

As we all know, mammals are warm-blooded (homoiothermic), with a body temperature similar to ours – around 35-39°C. As the temperature falls, a mammal has to expend an increasing amount of energy in order to maintain its body temperature and small animals are at a particular disadvantage because of their very large surface-to-volume ratio.

Various strategies have evolved to deal with this problem including migration, communal dens or burrows and storage of food – everyone knows that squirrels bury nuts and it is common to find dormouse boxes in autumn packed to the lid with a wood mouse's winter cache of acorns.

A very effective strategy used by a small number of small animals is to give up on homeothermy and allow their body temperature to fall close to ambient temperature – into a state known as torpor. This has a double benefit. As Newton showed, the rate of loss of heat from a body is proportional to the difference in temperature between it and its surroundings, so obviously the closer an animal can get to the ambient temperature the less energy it will need to generate. In addition, another benefit kicks in as the temperature falls, since the rates of biochemical reactions slow down by a factor of between 2 and 3 for every 10°C fall in temperature. Thus if an animal can allow itself to cool down close to freezing its metabolism will slow dramatically, vastly reducing its energy needs.

### **Which animals hibernate?**

Only three groups of British mammals truly hibernate: bats, dormice and hedgehogs. Other mammals are able to use torpor but only to a limited extent. Mice (but not voles or shrews) are able to reduce their body temperature by up to about 10°C in cold conditions and if they are deprived of food, and badgers enter a state of “winter lethargy” but can only reduce their temperature by 2–3°C. Badgers save additional energy by remaining underground in social groups and on a cold winter’s day clouds of condensation can be seen around the entrance to a sett.

Bats and dormice also use shallow torpor in the summer to reduce energy consumption. Pipistrelle bats in particular have an annoying habit of going into torpor when caught in a mist net or harp trap and sometimes it can take half an hour to get them to warm up enough to fly away.

However, when hibernating, bats, dormice and hedgehogs don’t go for half measures and allow their body temperature to fall to within a degree or two of ambient temperature. Whilst in most cases body temperatures are maintained above 0°C, dormice have been known to survive body temperatures below -2°C and some bats can even survive temperatures as low as -6° without freezing.

The trigger for entering hibernation varies between species, for bats it is mainly temperature, whereas food shortage and day length are the main factors for rodents.

### **Not just deep sleep**

Without specialized adaptations extreme hypothermia would be fatal. Before entering hibernation an animal will dramatically increase its body weight, building up a store of fat to see it through the winter. As the animal cools down, its metabolic rate reduces to a percent or less of its active level and in hibernation the heart rate reduces to as few as 6 – 16 beats per minute and breathing slows down almost to a stop – indeed hedgehogs have been observed to stop breathing completely for as long as 2½ hours. Peripheral circulation is reduced and blood chemistry changes to prevent clotting at the very low flow rates. The small amount of energy required to keep the body ticking over is produced from the animal’s store of white fat by a process known as gluconeogenesis, whence it is broken down by the liver to produce glucose.

An American little brown bat hibernating at 2°C uses just 4mg of fat per day from a total of about 2.5g (assuming it was well-fed when it entered hibernation). In theory this would provide enough energy to keep it going in continuous hibernation.



Photo: Hibernating Lesser Horseshoe bats in a local railway tunnel

Despite appearing dead to the world a hibernating animal remains in control and aware of its surroundings and will arouse if disturbed or if the temperature falls dangerously low.

## Arousal

At the extreme low temperatures of hibernation muscles cannot function, so a hibernating animal is unable to warm itself up by shivering.

Instead it has a store of special brown fat – appropriately known as BAT (brown adipose tissue). This is located on its back, between its shoulder blades. BAT is rich in mitochondria and, unlike normal white fat, metabolizes directly to produce heat, acting like a starter motor to warm up the body until the muscles can take over by shivering.

Arousal is a very expensive process – typically a single arousal can burn off enough fat to keep a bat going for 65 days in hibernation. It is surprising, therefore, that hibernating animals do not remain in torpor for the entire winter but arouse periodically, every few days or weeks, depending on the species.

Dormice and hedgehogs normally remain in their nests during these arousals, but if the weather is mild bats may emerge and forage for insects and males may even mate with still-hibernating females.

The reason for these periodic arousals is still not understood, but in light of the high cost in terms of energy they must have an important purpose.

There have been various suggestions, including monitoring of environmental conditions, excretion of waste products, depletion of essential nutrients, retention of memory and even sleep deprivation. A recent plausible suggestion, based on studies of ground squirrels, is for the stimulation of immune responses, which would be seriously suppressed at low temperatures. However, as yet, no one really knows the answer.

Whilst our other hibernators arouse frequently, the introduced edible dormouse is a true hibernator. Known in German as the “Seven Sleeper”, it typically remains out cold for at least 7 months, from October to May. However it is greatly dependent on beechnuts, and in a poor mast year may hardly emerge at all. It has even been reported to return to dormancy after only two weeks of activity in a non-breeding year.

## Where do they hibernate?

Hazel dormice build small, tight nests buried under leaf litter, which are rarely seen.



Photo: Hazel dormouse in summer torpor

Hedgehogs nest under fallen logs, brambles or piles of brushwood or else down rabbit holes or under sheds. It is important to take care when lighting bonfires since, if they are built too long in advance, hedgehogs may see them as ideal hibernation sites and they may be roasted to death!

Most bats are difficult to find in hibernation. Whilst horseshoe bats hang freely in caves and tunnels and are easy to see, all our other species – the vesper bats – crawl into crevices and can disappear deep into rubble in the floors of caves or cracks in trees. They can also turn up in crevices in window frames. Typically, several hundred lesser horseshoes can be counted during a hibernation survey in a mine but no more than two or three vesper bats will be seen. However, if a bat detector is left recording in the mine it is likely to record just as many vespers as horseshoes!

Whilst the majority of bats hibernate fairly close to their summer quarters, there are some long distance travellers. From European ringing studies noctules and Leisler’s bats have been found to migrate up to 1500km from NE Europe to hibernation sites to the SW. The champion European migratory has to be Nathusius’ pipistrelle which has been found to travel more than 1900km – an almost incredible distance for an animal that weighs less than a pound coin!

# TRINIBATS AND THE VAMPIRES – THE TRINIDAD BAT EXPEDITION

By Denise Foster

Trinidad is the southernmost Caribbean island and lies just seven miles off the coast of Venezuela. Due to its close proximity to the mainland its fauna and flora are typically South American and it has a rich biodiversity of species including approximately 68 species of bats.

The 68 species represent 9 families, which include the insectivores, a group of bats we are familiar with in Britain. Other groups include pollinators, fruit eating bats, fishing bats, carnivorous bats, nectar feeders and the sanguivores; the vampires will be discussed later in the article. Venezuela, which lies south and west of Trinidad has over 100 species of bat recorded, but in Tobago, the island just north of Trinidad there are only 19 species recorded, so Trinidad is a particularly special Caribbean island for bats.



Figure: Map showing the location of Trinidad in relation to South America and the Caribbean.

The Trinidad Bat Project (Trinibats) was launched in 2011 and it is a collaboration between native Trinidadian and naturalist Geoffrey Gomes, UK bat worker Daniel Hargreaves, together with Luke Rostant, a senior lecturer at the University of West Indies.

I have been lucky enough to be included on the Trinibats Expedition team since 2012 and this year was my fourth trip. Each year around 12 UK bat workers go to Trinidad to contribute to this very important project. The involvement of international bat workers sends a very important message to the government as well as local

people, particularly the fact that people from overseas are happy to pay a lot of money in order to come to Trinidad and contribute to the conservation of the island's bats. Whilst there has been previous scientific work carried out on the bats of Trinidad, much of this data has either been lost or it went home with the researchers and remains unrecorded on the island.



Photo: Courtesy Luke Rostant teaching school children about the importance of bats.

The two main objectives of the project are to educate local people about bats and change their perceptions of these animals, and to influence government legislation since currently all species of bats are classed as "vermin". Under the Conservation and Wildlife Act of 1958, an owner, occupier or their agent is permitted to hunt and destroy, without licence, any animal on the list of vermin. The first "animal" on that list is "Bats", which means that all bat species are classed as one animal. This is incomprehensible to us in Britain because all our 18 native species of bats have the highest protection. Bats were undoubtedly added to the list because of the problems with rabies and conflict with local fruit farmers who considered bats to be a pest. The link between bats and human rabies was established in 1931 and between 1925 and 1937 there had been 73 confirmed human cases of rabies in Trinidad together with a heavy loss of livestock. Since that epidemic there has not been a single human case of rabies in over 70 years and over the period 1971-2010, only one bat out of a total of 3868 bats tested in Trinidad was found to be infected with rabies.

Each of the nine families of bats in Trinidad has a very important role to play in the biodiversity of the island, even the vampires. However, some

local people object to them for many reasons such as competition for fruit, occupation of dwelling houses and the many problems that come with livestock and disease. At the very least the government needs to recognise that a large number of bats are extremely important for pollination and seed dispersal and have no reason to be included on a government "Vermin" list.



Photo: Courtesy of National Carnival Commission via Trinibats Facebook Page. Most people associate bats with Halloween, but in Trinidad they are associated with Carnival time.

The present status is that the Trinibats consortium has sent a package of documents to the Trinidadian Government in support of the removal of all bat species from the vermin list. Whilst it is believed that this may be achievable it is likely that a compromise will have to be reached leaving vampire bats alone on the list of vermin. Education of local people about the importance of bats is very important because attitudes towards them will not instantly change. Geoffrey Gomes has been making this a priority and is currently writing a book about the Bats of Trinidad, which will be a good educational reference for local people and visitors alike. This book will be available to purchase this year.

Personally, there are two main reasons for working on an important project such as Trinibats. Firstly, the huge benefit of finding out about new bat species overseas, learning new skills, understanding the different cultures and attitudes towards bats, and also working with other bat workers which has helped me become a much more confident bat worker. Secondly, it is a nice feeling to be part of an international team that has the potential to create great

change to help conserve these iconic but vulnerable animals.

An introduction to all the bats of Trinidad would indeed turn this article into a textbook because of the large number of species. However, I would like to cover the infamous vampire bats, a group of bats that international bat workers find interesting and exciting – an opinion unfortunately not shared by many local people. Certainly on all the trips from 2012 to 2015, the common vampire was the bat that most UK bat workers wanted to see!

Vampire bats got their name from human myths about vampires. Vampires are believed to be people who return from the dead to feed on the blood of the living. Consequently, when blood-feeding bats were discovered by European explorers, they were given the name vampires. These blood-feeding bats were already known to people of South and Central America well before their discovery by Europeans. Bram Stoker was intrigued by bats that fed on blood and included them in his book *Dracula*, before which there was no connection between bats and vampires in popular mythology.

### **Vampire Bats**

There are two species of vampire bats that have been confirmed to exist in Trinidad: the common vampire (*Desmodus rotundus*) and the much rarer white-winged vampire bat (*Diaemus youngi*). A third species, the hairy-legged vampire bat (*Diphylla ecaudata*), is present in South America but there are only unconfirmed records from Trinidad.

All three species feed on blood and are all part of the large *Phyllostomidae* family: the new world leaf-nosed bats. Vampire bats are fully adapted to drink blood and they are not dentally equipped to chew food of any kind, nor do they drink water. Whatever water they require is obtained from the blood they drink. Unlike other predators, the prey of the vampire bat will usually survive the encounter.

They all have large eyes and a flattened nose-leaf. They are medium sized bats weighing approximately 30-35g and roost mainly in caves and hollow trees. They are highly specialised animals with amazing features: they locate their

prey using sight and smell before landing and crawling on the ground or along a branch towards their prey. They are highly agile and use their long thumbs and muscular hind legs to run and jump.

All vampire bats have heat receptors in their nose, which are maintained about 7°C cooler than their body temperature. These sensors are used to locate a blood vessel. They then use their razor-sharp front teeth to make a small incision. The bat's saliva contains a powerful anticoagulant and anaesthetic that allows the blood to run freely without disturbing the animal. The bat then laps up the blood with its tongue. To meet their energy needs, the vampire bats need to drink two-thirds of their body weight each night, which is about 15-20 grams of blood, most of which is non-nutritious plasma. Their bodies have adapted to lighten that load, and their stomach lining rapidly absorbs much of the blood's water content and sends it to the kidneys so it can be excreted. The bats can process their meal very quickly and start urinating just a few minutes into the feeding. If they couldn't do this they would be too heavy to take off from the ground.

However, vampire bats recently have made a positive contribution to society because their powerful glycoprotein anti-coagulant has been developed as an anti-clotting agent, appropriately called Draculin! This drug is now used as a treatment for strokes, because of its ability to break up blood clots.

In Trinidad, vampire bat numbers are controlled by the Ministry of Agriculture's Anti Rabies Team due to the perceived risk transmission of rabies to domestic animals. The increase in the number of cattle together with a decline of natural prey species, due to hunting and the loss of habitat, has resulted in the common vampire bat feeding almost exclusively on livestock.

During the 2013 Trinibats trip, we were joined by the "Rabies Team". It was clearly evident during this trip that some team members clearly lacked proper knowledge of their target species and consistently misidentified harmless fruit bats as vampires.

### **Common Vampire (*Desmodus rotundus*)**

The common vampire bat is a medium sized bat with a forearm length between 53 and 64 mm and has a "U" shaped tail membrane. Its thumbs are very long, with three well-developed pads on underside, near the base, which enables it to run along the ground.



Photo: Common vampire (*Desmodus rotundus*)

One of the things I personally found fascinating about both the common and the white-winged vampire bat was how they showed such curiosity for their subjects. Whilst being handled, they would slowly turn their head and study each individual in the group as if it were weighing up its next meal, which I have never observed with any other species. Whilst Daniel Hargreaves was talking to the group, the bat would focus intently on him as if he was listening to every word – such incredible behaviour!



Photo: Courtesy of Daniel Hargreaves. The saddest donkey in the world – It is not only people that would like to see the end to vampires they can be detrimental to livestock as well

However, it is all well and good for us, as foreign visitors, to swoon over such an animal, but if you live locally and your livestock and pets are

visited by these creatures then they do tell another story. The common vampire will feed from cattle, pigs, goats, donkeys, and deer. However, it is when they feed from domestic animals that conflict occurs.

Common vampire bats roost in caves but have been found in other buildings in Trinidad. If they fail to find food on a regular basis they will deteriorate very rapidly. After 2-3 nights without feeding, they are close to starvation. However within their social groups, bats that have fed during the night will regurgitate blood for those who did not manage to find food, and this behaviour will be reciprocated on other nights. However, there may be some individuals who take advantage of this generosity, but will soon be ousted from social group if the favour is not reciprocated. The common vampire bat feeds solely on the ground, and it has evolved to be as nimble on the ground as it is in flight. While most other bats are awkward crawlers, the common vampire can move with a quick run-like gait or hop along the ground, supporting its weight on its hind legs and using its wings and elongated thumbs to steer and push off of the ground. This comes in handy for chasing after prey on the move and for jumping out of the way to avoid being trampled.

### **White-winged Vampire Bat (*Diaemus youngi*)**

The white-winged vampire bat feeds mainly on birds, especially chickens. They get their name from the trailing white-edge to their wing membrane. Their thumbs have two pads on the underside at the base. The forearm is smaller than the common vampire and measures 48-54 mm. They have no tail membrane and they have very powerful legs and are generally more muscular than the common vampire. They are also considered to be much more relaxed and gentle than their cousins.

White-winged vampires have a few tricks for feeding on domestic chickens, without startling the birds. Sometimes, they will approach a hen and mimic a chick by nuzzling up to her brood patch. Brood patches are featherless areas that are densely packed with blood vessels and are used to transfer heat to eggs or chicks during nesting. These blood vessels make an easy target for the white-winged vampire bat, and if the hen

thinks it's her chick cuddling up to her, she'll sit on the bat giving it easy access to drink her blood. On other occasions, the bat will climb up onto the hen's back, mimicking the touch and movement of a mounting rooster, sending the hen into a crouching position, which is typical before mating. The bat can then crawl gently up the hen's neck and the hen will stay in that position until the bat hops off. However, unlike common vampires, they do not run and jump, they land and crawl along or underneath the bird's perch. Again if one of the bats in their social group has not fed during the night then reciprocal feeding will usually take place.



Photo: Courtesy Daniel Hargreaves, White Winged Vampire Bat (*Diaemus youngi*)

Trinibats expeditions from 2011 to 2015 have recorded a total of 56 species of bat. However, other organised field trips have confirmed another 2 species so a total of 58 so far.

Trinibats 2015 encountered both species of vampire bats both roosting and in the mist net.

It would be unfitting for me not to mention the highlight of this year's Trinibats Expedition and finding the largest bat in the new world - the False Vampire Bat (*Vampyrum spectrum*).

### **False Vampire Bat (*Vampyrum spectrum*)**

This is the largest bat in the new world with a wingspan of almost 1 metre. It is classed as "Near threatened" on the ICUN list of threatened species.

During a field trip to a local forest, we caught a female False Vampire bat in the mist nets which we were able to radio-tag and subsequently track it back to its roost. This was a very exciting moment for Trinibats as this bat is very rare and

localised. This very large carnivorous bat (feeding on small mammals and birds) weighed 165g. The roost, in a tree hollow, was filmed by Daniel Hargreaves during the week and footage showed 6 bats inside, a male, two females and 3 juveniles. This roost will continue to be monitored by Luke Rostant over the next month or two.

We were able to observe food items being brought back to the roost by the male for the female and the juveniles. A False Vampire roost normally consists of a breeding pair and two or three of their non-breeding offspring. One adult, usually the female, always stays in the nest with the young. Both parents bring food back to the roost, presumably to share with their young or other roost members.



Photo: The female False Vampire Bat caught in a mist net.

**Editorial: It is very important for the Trinibats team to ensure that the location of the roost is kept secret due to the current classification of bats as “vermin” under the Conservation and Wildlife Act of 1958.**

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### FACEBOOK

HMG also has an active Facebook page where we post all our events past and present. [www.facebook.com/groups/222077991279736/](http://www.facebook.com/groups/222077991279736/)

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