BaTML Factsheet:
An introduction to the analysis of bat droppings

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Dated: 1st June 2005

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Why look at bat droppings?

The analysis of bat droppings does not sound like a particularly appealing prospect however it can reveal a lot about the diet of a colony and/or an individual bat. Because different bat species feed upon different 'menus' of insects we can also use the undigested bits of insects left in the droppings to identify the potential species of bat that the droppings belong to.

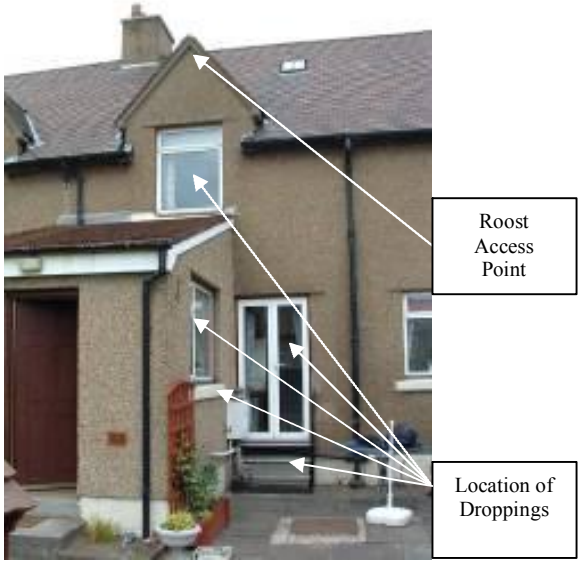
Analysing droppings is non-intrusive and does not normally require a licence (unless entering a bat roost to collect them). It can be used to narrow down the likely identity of a bat species even when you cannot see the bats involved. This can be useful for many purposes, including; habitat conservation, mitigation, monitoring surveys or just to increase your knowledge of bats and their diet. Unfortunately analysing bat droppings is time consuming and requires lots of practice. It can however be extremely interesting and a worthwhile area of study.

Where would I find droppings?

Generally speaking the best places to find droppings are in the vicinity of a roost. For example if a bat is roosting in a building, it is very often evident as a roost due to the presence of droppings against windows/stonework directly under the roost access point and on the ground below. Figure 1 shows examples of where droppings were found outside a bat roost in central Scotland. Quite often when searching for roosts, bat workers look down (as opposed to up) for signs of bat presence through the location of their droppings rather than looking for the bats themselves, which often would be hidden from view.

If you are a licensed bat worker and have gained access to a roost, droppings will be concentrated under the main roosting areas within the structure. However for some species, especially those that like open loft spaces (i.e. Brown long-eared) you will quite often find droppings scattered underneath the length of the floor beneath the ridge beam within an attic. These droppings have been excreted there as the bats fly within the loft along the area offering the most space for flight.

Figure 1: Location of droppings found outside a roost



What do they look like?

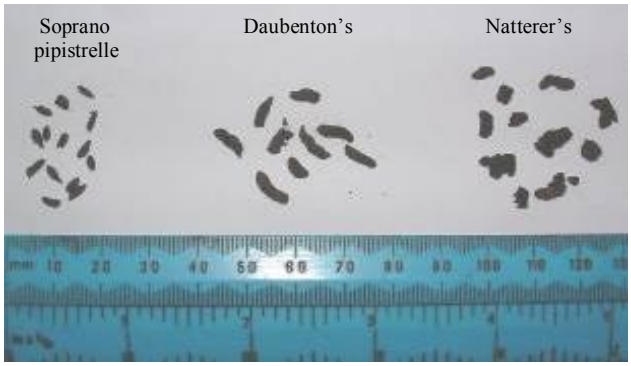
The identification of droppings in itself (without further analysis) is not an exact science as potentially within each bat species there could be a range of sizes, texture and colour depending on:
(a) what the bats have been feeding upon
(b) where the droppings were found
(c) how old the droppings are

Older droppings tend to look greyish if present in dry air circumstances. In addition to this older droppings will break down into smaller pieces over time depending on the conditions where they accumulate. Figure 2 shows examples of droppings from three species of bat.

It is a good idea to build up your own reference collection of droppings from known sites to assist you with narrowing down the options when you come across an unknown sample. Fresh droppings collected from dry areas tend to provide the best examples for reference purposes. At first these droppings may look like mice droppings, however

mice droppings tend to be slimy when fresh or very hard when old. Bat droppings, on the other hand, reduce to powder when rubbed between your fingers as they are almost entirely composed of the undigested fragments of insect prey. In addition to this the location of the droppings can very often eliminate the likelihood of them coming from mice (i.e. on a window pane).

Figure 2: Examples of bat droppings



What equipment do I need?

You do not need any special equipment to collect droppings, just a small airtight container to store them in and tweezers to allow you to gather them from the site. 35mm film containers are ideal for storage and it is good practice to always label your specimens noting the location, date collected, name of collector and species involved (if known).

To start analysing the droppings you will need a stereomicroscope with a magnification of between x10 and x25 as well as a good top light source. You will also need some tools to help you to tease the dropping apart. The essential items are a pair of fine entomological forceps, Petri dishes, microscope slides and a pair of fine (0.1mm) headless entomological pins, each held in a pin holder.

Before you can start to identify the remains in the dropping you will need a basic knowledge of the insects that you may find. We would recommend the following three books:

- Field Guide to the Insects of Britain and Northern Europe. M Chinery. ISBN 0002199181 Harper Collins, 1993.
- Field Guide to the Spiders of Britain and Northern Europe. M J Roberts. ISBN 0002199815. Harper Collins, 1995.
- The Identification of Arthropod Fragments in Bat Droppings. C Sheil, C McAney, C Sullivan & J Fairley. ISBN 0906282330. The Mammal Society, 1997.

It is also advisable that you build a reference collection of whole insects for you to compare against the items you may find. This can be done over a period of time as you encounter different habitats in different seasons. To do this, you will need a hand net to catch the insects, some small tubes, storage containers and alcohol (70%) to preserve your specimens in. Again, remember to properly label your reference collection.

How do I analyse a dropping?

Choose a dropping at random from the batch and place in a small Petri dish. Add some glycerine and then tease the pellet apart using very fine needles. The small fragments of insect remains are then removed from the glycerine and placed on a microscope slide. Use your stereomicroscope to begin to identify and record the insect families to which the fragments belong. This process can be time consuming and to begin with it takes a fair amount of effort to make the necessary connections. However with patience and some guidance you can quickly begin to categorise your findings and thereafter develop your results more meaningfully. On average a fairly experienced person will often take up to an hour for each dropping.

Once finished, the slides can then be sealed with a special mounting fluid that hardens to permanently preserve the remains. Always ensure your retained slides are properly labelled with the details relating to the sample in question.

Bibliography

In addition to the previously mentioned books, the following publications contain useful information:

Bats. P Richardson. ISBN 0905483413. Whittet Books, 1994.

The diets of British bats (Chiroptera). N Vaughan. Mammal Review, 1997. Vol 27, No2, 77-94.

Which Bat Is It? R E Stebbings. ISBN 0906282195. The Mammal Society, 1993.

Acknowledgements

We would like to acknowledge and thank Sue Swift for the advice and training she has provided us with regarding the analysis of bat droppings.