

A Brief Guide to Bat Ectoparasites

David Dodds

david@plecotus.co.uk



David Dodds Ecology

www.plecotus.co.uk

0771 982 8537 01968 677868

Introduction

This guide is intended to help bat-workers to identify parasites they find on bats or in bat roosts. It includes information on how to separate members of each order and, where it is possible without the use of a compound microscope, to identify them to family, genus or species.

Whilst studying bat parasites I have often needed to refer to a 600-page Dictionary of Entomology. I have done my best to save readers of this booklet from that particular pain, by using simple terms wherever possible. I hope serious entomologists will forgive me!

Equipment

To use the guide it will be necessary to arm yourself with a x10 hand-lens as a minimum, though a x20 lens or a dissecting microscope will allow more detailed features to be recognised.

Specimens should be stored in a 70% isopropyl alcohol solution in small containers. IPA is available from pharmacies (sometimes with a little insistence), but gin or vodka, being 40% alcohol, will do at a pinch.

It is best to label containers by putting a small slip of paper inside, with the details in pencil (pencil won't run). That way labels can't get separated from specimens. Include the date, your name, an accurate location (ideally a grid reference) and as much information about the individual bat as you have (species, sex, adult or juvenile, etc). Specimens from more than one bat should never be mixed.

Specimens can be removed from bats using soft forceps. Fast-moving or "clingy" species can be made to co-operate with a dab of alcohol on a paint-brush. Ethyl acetate (nail varnish remover) is also very effective, but beware the fumes, which can make you (or the bat) dizzy if not used sparingly.

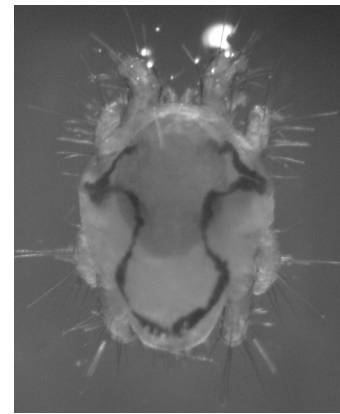
Recording Schemes

At present there are two recording schemes, which gather data on bat ectoparasites. The Flea Recording Scheme is Britain's oldest biological recording scheme and is run by Bob George, who welcomes specimens for identification. The Tick Recording Scheme is run by the Health Protection Agency. In addition, I would welcome specimens of any bat ectoparasites and will feed back as much information as possible to anyone submitting them.

The Tick Recording Scheme
Health Protection Agency
Centre for Emergency Prep. & Response
Salisbury
SP4 OJG

The Flea Recording Scheme
Mr Bob George
54 Richmond Park Avenue
Queens Park
Bournemouth
BH8 9DR

www.hpa.org.uk



Spinturnicid Mites (*Spinturnix* sp. etc.)

These are often the most obvious parasites on a bat, as they live only on the wing and tail membranes and are comparatively large, (up to 1.5mm long). Their crab-like appearance is distinctive.

They are well-adapted to life attached to a bat's wing and only leave to move to another bat. Eggs and larvae develop within the female, which gives birth to protonymphs, very similar to the adults and able to immediately survive on the bat.

Males have an obvious shield-shaped plate on the underside and a pointed abdomen, whereas females have teardrop-shaped shields and a rounded abdomen.

Id to species is primarily based on the arrangement of setae (hair-like structures), which can be often hard to see clearly without using a compound microscope.

There are six species known in the UK, and another two of uncertain status.

Spinturnix plecotinus parasitises Brown Long-eared Bats, but is uncommon.

Spinturnix myotis is more common & usually found on *Myotis* bat species.

Spinturnix acuminatus is a parasite of Noctules and occasionally Pipistrelles.

Spinturnix kolenatii has been found on Serotines in the UK.

Paperiglischrus rhinolophinus & *Eyndhovenia euryalis* have been found on Horseshoe bats.

Further Reading

Introductory

- Hutson, A.M. (1971) Ectoparasites of British Bats Mammal Review Vol 1, No. 6

Fleas

- Whitaker, A.P. (2007) Handbooks for the Identification of British Insects: Fleas Royal Entomological Society / Field Studies Council
- George, R.S. (2008) Atlas of the Fleas (Siphonaptera) of Britain and Ireland Biological Records Centre / Field Studies Council

Bat-Flies

- Hutson, A.M. (1984) Handbooks for the Identification of British Insects: Keds, Flat-flies and Bat-flies Royal Entomological Society

Bat-Bugs

- Southwood, T.R.E. & Leston, D. (1959) Land and Water Bugs of the British Isles Warne
- Usinger, R.L. (1966) Monograph of the Cimicidae Thomas Say Foundation

Mites and Ticks

- Baker, A.S. & Craven, J.C. (2003) Checklist of the Mites Associated with Bats in the British Isles Systematic and Applied Acarology.
[Download from: http://www.nhm.ac.uk/hosted_sites/acarology]
- Baker, A.S. (2006) Identifying Ticks and Mites of British Bats Bat Care News No. 41
- Hillyard, P.D. (1996) Synopses of the British Fauna: Ticks of NW Europe Field Studies Council



(Picture: Antonio Serra)

Long-legged Bat Tick (*Ixodes vespertilionis*)

This tick is closely related to *Ixodes ricinus*, the sheep tick which plagues people and pets in some areas, but it exclusively parasitises bats.

They are usually found on walls and in crevices of bat roosts in caves and are believed to feed primarily in winter. Their preferred hosts are Horseshoe bats, though they are occasionally found on Pipistrelles and Myotis species.

Blyborough Tick (*Argas vespertilionis*)

This tick occupies crevices in bat roosts. Adults are rarely found on bats as they feed quickly whilst the bat is torpid. Larval and nymph stages stay attached to the bat for up to three weeks and are often found in large numbers on sick or injured bats.

Their primary hosts are Pipistrelles. They embed their mouthparts so that the flattened body sits vertically, aligned with the fur.

Chigger Mite Larva (*Leptotrombidium sp.*)

These mites are usually seen in the ears of bats, or occasionally on faces or forearms. With legs hidden from view, they resemble tiny orange jelly-beans.

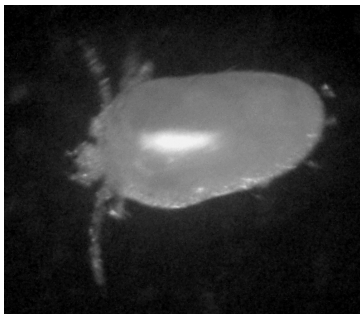
Only the larvae are parasitic. The nymphs and adults live amongst detritus within the roost, predated on smaller arthropods.

Four species have been recorded in the UK, on various bat species, but id to species level involves looking at difficult microscopic characters.

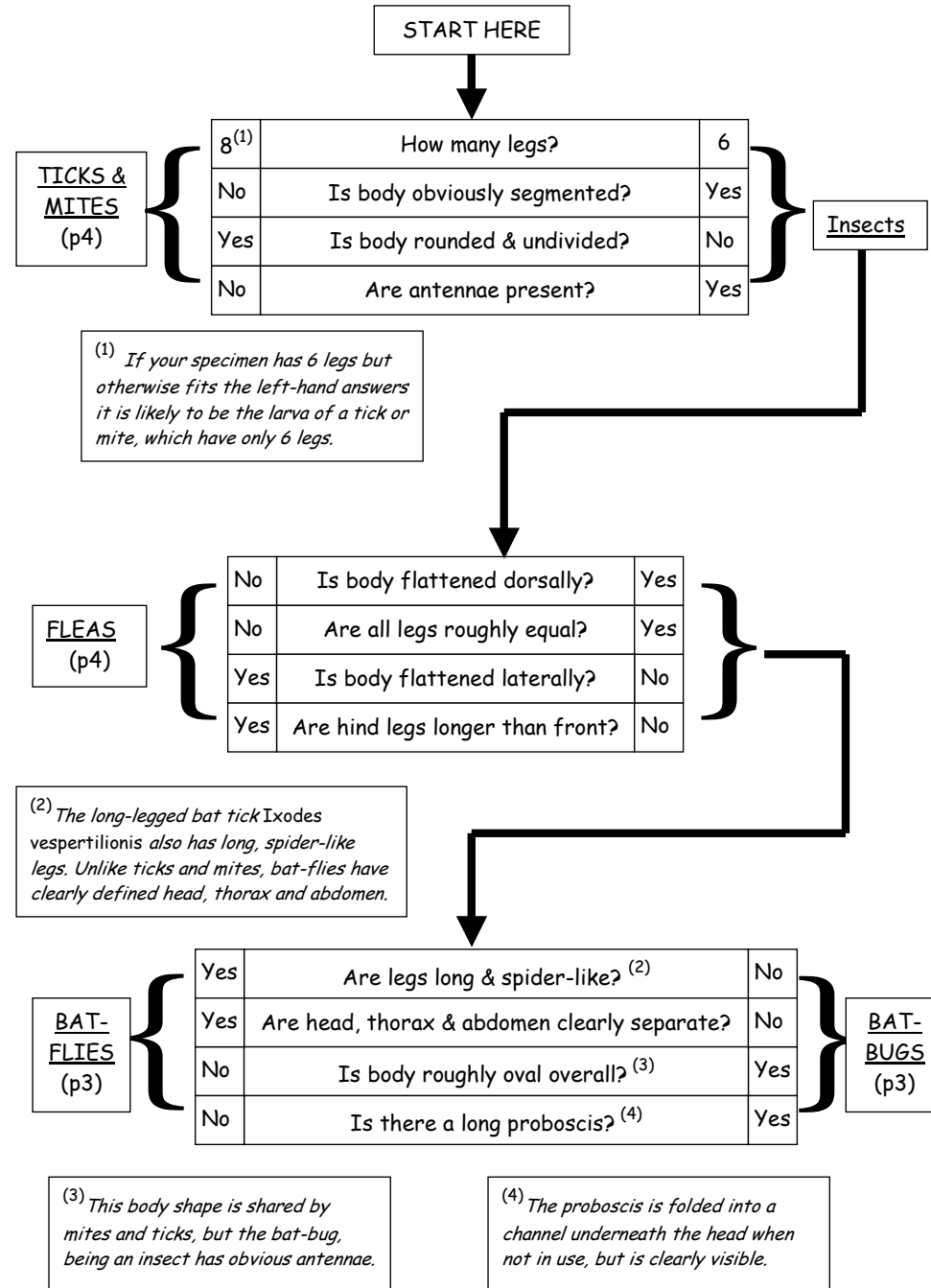
Macronyssid Mites (*Macronyssus sp.* & *Steatonyssus sp.*)

This is a group of around 15 small mites, found both on wing membranes and within the fur of most bat species. They are often visible as tiny moving specks or red "jewels" on a bat.

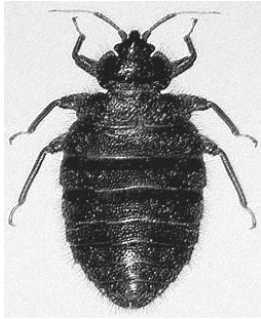
Identification to species can be difficult, even with access to a compound microscope. The status of several species is open to question and published information can be hard to access.



Key to Orders



Bat Bugs (*Cimicidae*)



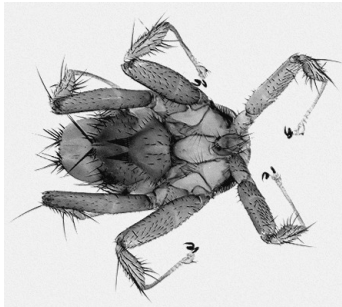
(Picture: N.T. Gallaaher)

Bat bugs belong to the order *Hemiptera*, the true bugs. These are piercing and sucking insects, most of which, for example Sheild Bugs, consume plant juices. Bat bugs and human bed bugs however, belong to the genus *Cimicidae*, which suck body fluids from their hosts.

They are temporary parasites, only found on the host whilst feeding. They are often present in roosts in large numbers, occupying cracks or crevices. Their cast skins and detritus are obvious in some roosts.

The species usually found in the UK is *Cimex pipistrelli*, though another species, *Cimex dissimilis* has been recorded. Microscopic characters are used to separate the two from each other and from *Cimex lectularius*, the human bed bug. The relative dimensions of the antenna segments are also significant. They have been recorded in roosts of Pipistrelles and Noctules.

Bat Flies (*Nycteribiidae*)



(Picture: C.W. Dick & J. Boone)

Bat flies belong to the order *Diptera*, along with such varied flies as crane flies and midges. They are distinguished from other Diptera by being wingless and are highly adapted to life as a bat parasite.

Three species have been recorded in the UK: *Nycteribia kolenatii*, usually found on Daubenton's Bats *Basilina nana*, usually found on Bechstein's Bats *Phthiridium biarticulatum*, usually found on Horseshoes.

The following key is summarised from Hutson (1984), which also contains detailed species descriptions and information on other species, which may still to be recorded in the UK.

1. - Pair of claspers ⁽¹⁾ at rear underside of abdomen, which has a rounded end (males) ...2
- Abdomen without claspers and ends in a pair of lobes (females) ...4
2. - Tibia ⁽²⁾ c. 2.5x as long as broad; claspers straight; group of 6-8 spines on rear underside of abdomen ...*Nycteribia kolenatii* ...3
- Tibia at least 3.5 times as long as broad ...3
3. - Claspers curved; group of 6-8 spines on rear underside of abdomen ...*Basilina nana*
- Claspers straight, group of c. 40 spines on rear underside of abdomen ...*Phthiridium biarticulatum*
4. - Lobes at end of abdomen about 4x as long as broad ...*Phthiridium biarticulatum* ...5
- Lobes at end of abdomen short and blunt ...5
5. - Tibia c. 2.5x as long as broad; no large plate on upper abdomen ...*Nycteribia kolenatii*
- Tibia c. 3.5x as long as broad; large plate on upper abdomen ...*Basilina nana*

⁽¹⁾ A pair of claw-like structures, visible below the rear abdomen of male specimens.

⁽²⁾ The lower of the two large leg parts, equating to the human shin.

Bat Fleas (*Ischnopsyllidae*)



Although bat fleas belong to a distinct family, they are superficially similar to the fleas which plague cats, dogs and sometimes us and are instantly recognisable as fleas. They are often seen as small oval shapes, moving rapidly through a bats fur and are difficult to capture without fast reactions.

Like all fleas, only the adults are present on the host: the egg and larval stages are found in detritus within bat roosts.

There are 8 species recorded in the UK, 2 of which are extremely rare:

Ischnopsyllus elongatus is primarily a parasite of Noctules.

Ischnopsyllus intermedius is mainly a Serotine parasite, but has been found on Noctules & Leislers's Bats.

Ischnopsyllus octactenus has Pipistrelles as it's principal host. Also found on Leisler's.

Ischnopsyllus simplex simplex has been found on Whiskered and Natterer's Bats

Ischnopsyllus hexactenus parasitises primarily Brown Long-eared Bats

Whitaker (2007) contains an excellent key to bat fleas, and includes the information on flea anatomy needed to understand it. Alternatively, send your specimen to Bob George of the Flea Recording Scheme for id (see page 2).

Ticks and Mites

