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Plecotus / Natagora
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Vespertilio vzw
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Identification of bats in hibernation

October 2019

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Cover photo: Ruddy Cors (*Myotis emarginatus*)
English translation: David Galens – Vespertilio vzw – May 2020 – www.vespertilio.be.
A special thanks to John Haddow, Stuart Newson and Nils Bouillard for their linguistic input.

It is the goal for this guide to evolve. If you have any comments about the proposed identification characteristics or know of other (reliable) methods, feel free to share those with us at plecotus@natagora.be. This guide is constantly updated following comments and suggestions. You can always download the latest version via www.chauves-souris.be: under "Publications" - "Documents à télécharger" or www.vespertilio.be. This is the May 2020 version.

Any translation, adaptation to a different geographic region, use or reproduction in the context of studies on bats is strongly encouraged. Do not hesitate to contact us regarding the source files (plecotus@natagora.be).

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Présente dans tout l'espace Wallonie-Bruxelles, Natagora possède de nombreuses réserves naturelles, réparties sur 4 800 hectares. Le grand objectif de l'association est d'enrayer la dégradation de la biodiversité et de contribuer au rétablissement d'un meilleur équilibre entre activités humaines et protection de l'environnement.

Natagora is present throughout the Wallonia and Brussels and has numerous nature reserves spread over 4 800 hectares. The main objective of the association is to stop the decline of biodiversity and to help restore a better balance between people and nature.

Introduction

We can all agree that the identification of bats in hibernation is not always a smooth process. It's often a matter of figuring out which bat species that piece of ear or muzzle in that deep crack belongs to. Or whose blurry silhouette is covered in condensation drops, hanging 5m above ground... And all this, under challenging circumstances as we want to keep our presence in the hibernaculum as short as possible to avoid excessive disturbance, which is a stress factor that should not be underestimated. Even when a bat is visible up close and one can see the whole animal, the identification features to identify the species with high certainty are not always obvious!
The purpose of this document is to summarise all identification features to identify bats that can be observed in hibernation in Belgium. It is not intended for use outside the hibernation period or other geographical regions. Certain species that have never been recorded in Belgium in the winter are therefore not included in this document (this is the case for the *Nyctalus* species, as well as *Eptesicus nilssoni* and *Vespertilio murinus*).
It is also important to mention that the criteria used here are not "absolute". There are indeed exceptions as well as identification features seemingly obvious in high quality photographs but in reality may be far less obvious. It is advisable to never rely on a single characteristic. A good identification is generally based on a number of different characteristics and a critical approach. If you are not sure (because the bat is in a difficult place or too far away, not all features are visible, or simply because of a lack of experience), you should only note what you are sure of. A << Myotis sp. >>, or even << Chiroptera sp. >> is better than an incorrect identification.

Data reporting

It is important to report observations trough your local/national data portal.

Limiting disturbance

Hibernation is a critical period. In order to limit the disturbance of bats there are some to guidelines to follow while surveying bats in hibernaculum:

- do not touch hibernating bats under any circumstance
- limit the lighting to a minimum and adjust the light intensity with respect to the distance to the individuals
- limit taking photos as much as possible (photos with flash in particular)
- limit noise as much as possible (whisper, pass only once, ...)
- to stay as short as possible in the vicinity of bats and in the hibernation roost in general
- do not exhale under or in the direction of bats that are nearby
- limit the number of counters depending on the area of the hibernation roost

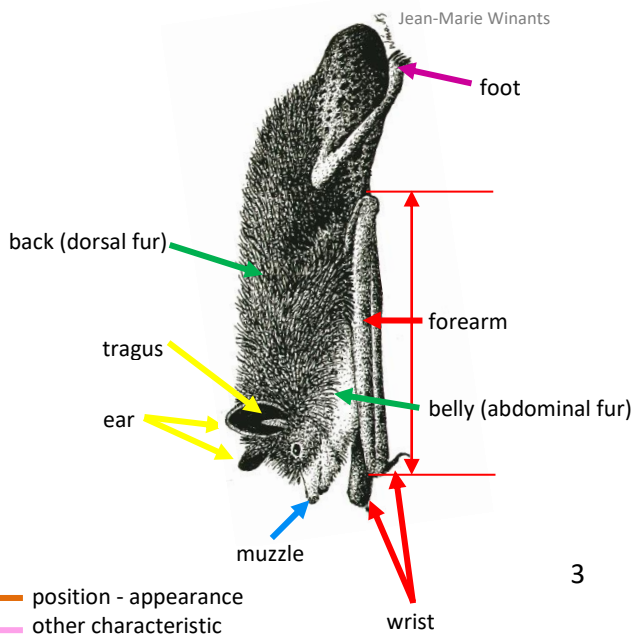
NB: Those guidelines are applicable to Belgium only. In the UK, a number of the actions listed above are subject to strict licensing.

Morphology, criteria and colour code

The diagram below shows the various body parts of a bat that are used to identify hibernating bats.

The colours of the arrows are consistent throughout this guide. This means that specific identification features can easily be found.

Every species sheet includes important information, at the bottom of the page: body length (top of the skull to the base of the tail), the type of hibernacula used and the preffered roosting locations and temperatures.



Rhinolophus hipposideros

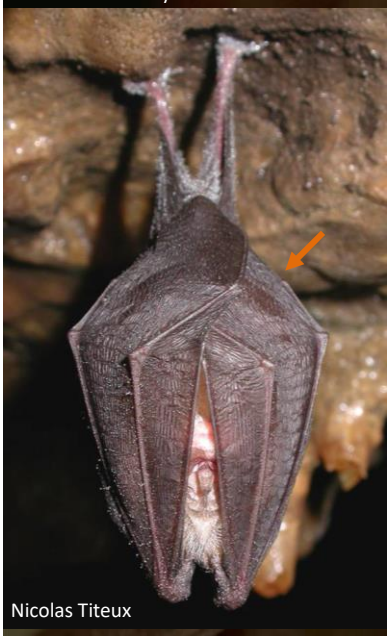
Lesser horseshoe bat - **Rh**


Jean-Louis Gathoye

The **main distinguising feature** for the two **horseshoe bat species** is the **difference in size**.
The Lesser horseshoe bat is really small: its body is **no larger** than a **thumb** or **a match box**.

Rhinolophids always **hang freely** and are **wrapped** in their **wing membrane** (contrary to other species).

Horseshoe bats are extremely sensitive to disturbance: always use caution!


Nicolas Titeux

Posture - appearance

mostly (as good as) **completely enveloped in its wings** – the body is mostly invisible;
(as opposed to *R. ferrumequinum* where the wrap-around is looser)

Nose

a. comparatively, the **lancet** (upper part of the nose leaf) looks **larger** than *R. ferrumequinum*;
b. **distinctive muzzle**: a membrane with skin folds, one of which is in the shape of a **horseshoe**.

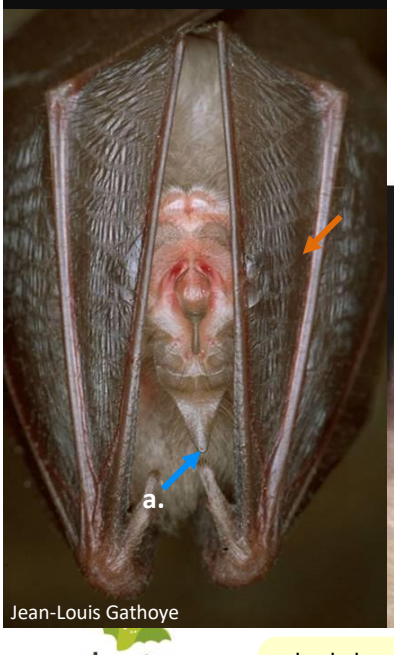
Fur (rarely visible during hibernation)

grey-brown back, (light)**grey belly**, **low contrast** with the back.

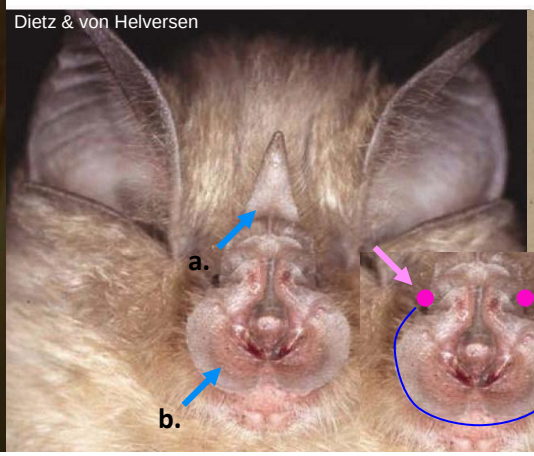
Other characteristics

the eyes are **closer to each other than** in *R. ferrumequinum*.

!!! Be careful not to confuse !!!
Sometimes, *Plecotus spp.* and even *Myotis spp.* tend to envelop themselves in their wing membrane



Jean-Louis Gathoye



Dietz & von Helversen

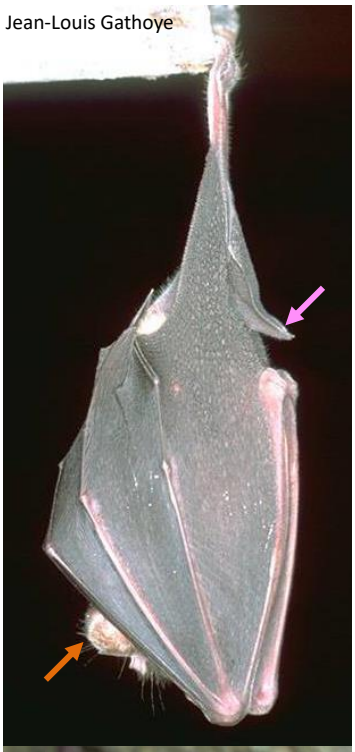

Jean-Louis Gathoye

- body length: 37-45 mm, small

- hibernaculum: underground sites
- position in hibernaculum: hanging freely
- temperature: heat-loving - 7 to 11°C

Rhinolophus ferrumequinum

Greater horseshoe bat - **Rf**


Jean-Louis Gathoye

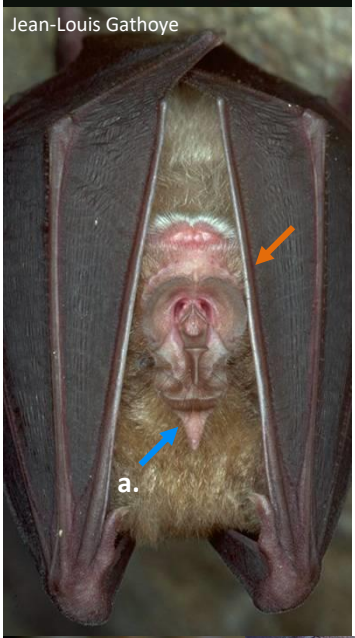
The **main distinguising feature** for the two **horseshoe bat species** is the **difference in size**.
The Greater horseshoe is about the **size of a pear**.

Rhinolophids always **hang freely** and are **wrapped** in their **wing membrane** (something other species very rarely do).

Horseshoe bats are extremely sensitive to disturbance: always use caution!

Posture - appearance

not completely enveloped in its wings – the muzzle stays visible;
the wrap-around is 'looser' than *R. hipposideros*



Jean-Louis Gathoye

Nose

a. the **lancet** (upper part of the nose leaf) looks **proportionally much smaller** than *R. hipposideros*;
b. **distinctive muzzle**: a membrane with skin folds, one of which is in the shape of a **horseshoe**.

Ears

the ears of both horseshoe bat species are pointed and the extremities are bent outwards. There is **no tragus**.

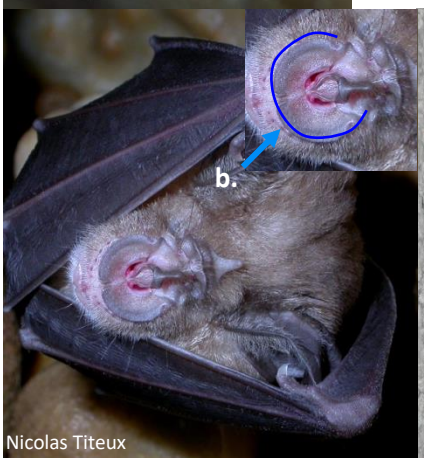
Fur

reddish dorsal fur, **dirty white abdominal fur**, **low contrast** with the back. (limited visibility during hibernation).

Other characteristics

the tail is folded along the back, a unique characteristic of horseshoes.

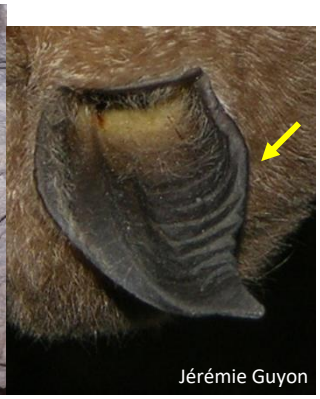
!!! Be careful not to confuse !!!
Sometimes, *Plecotus spp.* and even *Myotis spp.* tend to envelop themselves in their wing membrane



Nicolas Titeux


Serge Motquin


Bernard Urbain


Jérémie Guyon

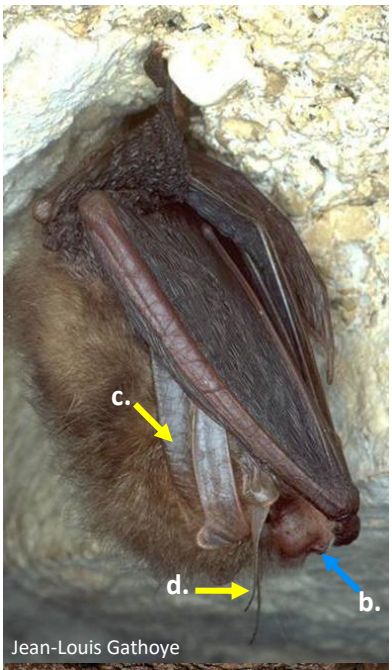
- body length: 57-71 mm, big

- hibernaculum: underground sites
- position in hibernaculum: hanging freely
- temperature: heat-loving - 7 to 11°C

plecotus
natagora

Plecotus auritus

Brown long-eared bat - **Pa**



The distinction between both long-eared bats in hibernation is not always possible. When in doubt the taxon Plecotus spec (PaA) is used.

Posture - appearance

stubby and oval shaped body.

Nose

- **a.** **characteristic muzzle**: light coloured (from pink to light brown) with bloated look and and protrusions like two potatoes next to each other;
- **b.** blunt and rounded, the appearance of a «European truck».

Ears

- **c.** **folded** back **under the wings** during hibernation (a rare exeption is possible);
- **d.** **only the tragi protrude** (and may look like pointed ears!);
- **e.** long and pointed tragus with an even end, same colour as the ear, often completely pink.

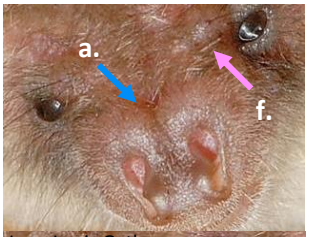
Fur

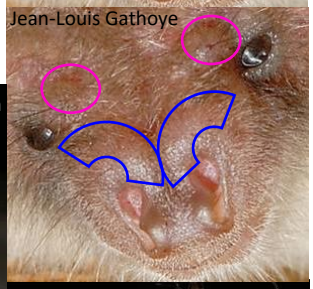
reddish brown dorsal fur with long and loose hair.

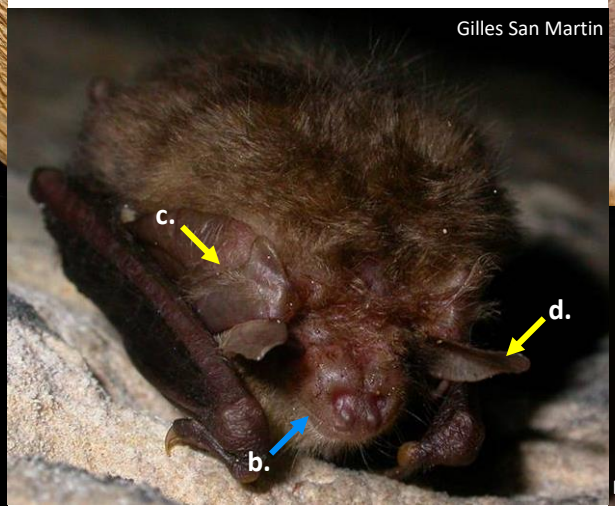
Other chracteristics

- **f.** presence of **two** clear, **thick 'warts'** with a diameter equal to that of the eye;
- **g.** **very long hair** on the toes.

P. austriacus in contrast, has short hair



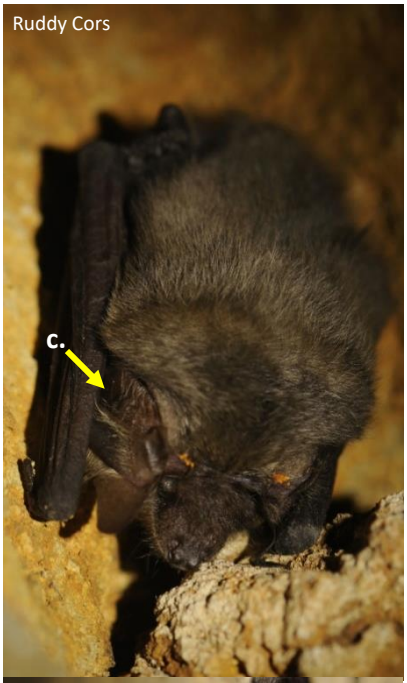


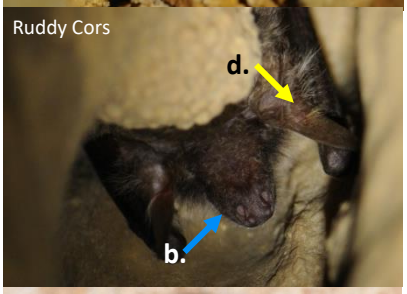


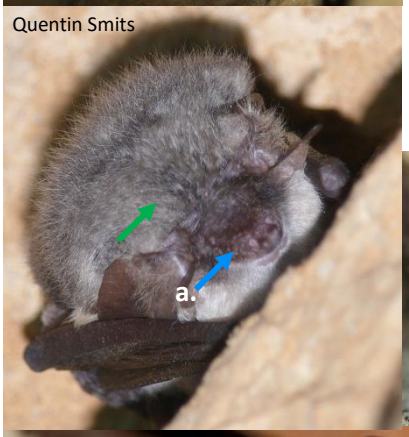
- body length: 41-58 mm, medium-sized
- hibernaculum: buildings, underground sites, trees
- position in hibernaculum: hanging on the wall or ceiling, often crawled away in a gap at the entrance
- temperature: tolerates low t° but also stays in warmer places

Plecotus austriacus

Grey long-eared bat - **PA**







The distinction between both long-eared bats in hibernation is not always possible. When in doubt the taxon Plecotus spec (PaA) is used.

Posture - appearance

stubby and oval shaped body.
(like *P. auritus*)

Nose

a. **distinctive** muzzle: **dark**, **less pronounced protrusions** than *P. auritus*;
b. elongated, looks like a dog's snout or an «American truck»

Ears

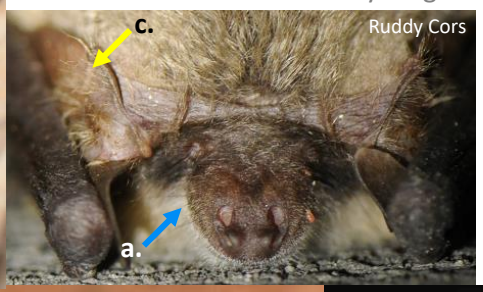
f. **folded** back **under the wings** during hibernation (a rare exeption is possible);
g. **only the tragi protrude** (and may look like pointed ears!);
h. long and pointed tragus with an even end, same colour as as the ear, often completely pink.

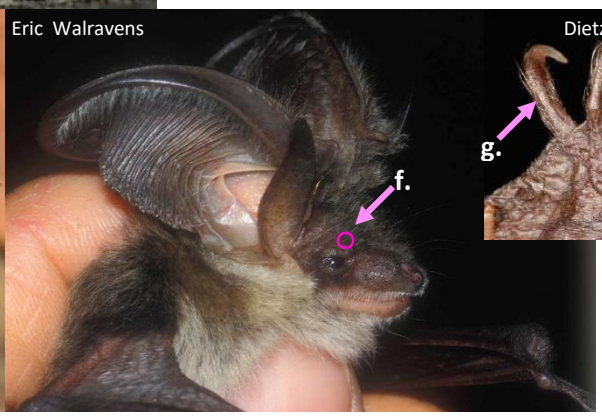
Fur

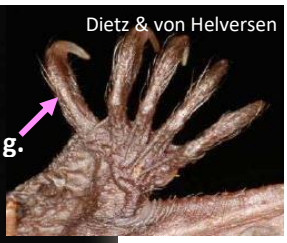
long and loose dorsal fur, leaning towards grey.

Other characteristics

f. presence of two **small** and less pronounced **'warts'** with a diameter smaller than that of the eye;
g. **short hair** on the toes.
very long with *P. auritus*





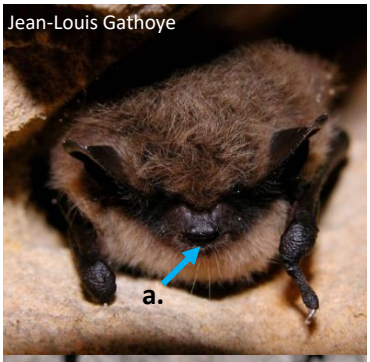


- length (head + torso): 41-58 mm, average
- rarity: rare
- hibernaculum: buildings, underground sites, trees
- position in hibernaculum: hanging on the wall or ceiling, often crawled away in a gap at the entrance
- temperature: tolerates low t° but also stays in warmer places

plecotus
natagora

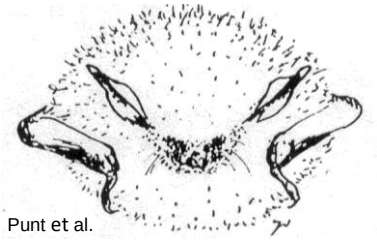
Myotis mystacinus / brandtii / alcathoe

Whiskered bat / Brandt's bat / Alcathoe bat - **Mmba**



The distinction between these three species is very difficult in hibernation, is usually recorded as Mystacinus spec (Mmb) and is further referred to in this manual as Mystacinus sl.

It is one of the smallest species that is observed in hibernation but also the most common.



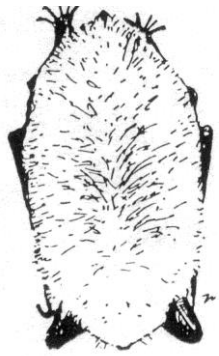
Forearm

forearm and wrist are usually **much thinner and smaller** than *M. daubentonii*.

Nose

a. in front view the black mask or **black V** is very characteristic;
!!! Careful, not always obvious !!!

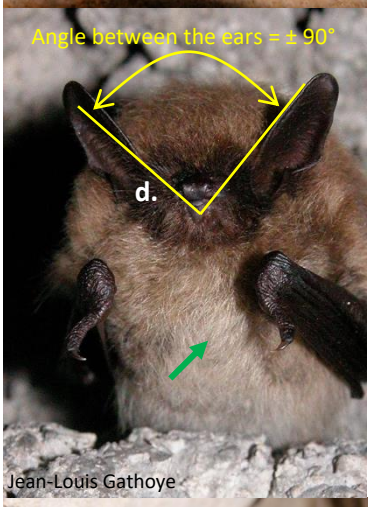
b. **small snout**, slightly protruding and dark (dark pink to black). Older animals often have a paler muzzle.



Ears

c. the **tragus** is **pointed**, long and slender and the **notch** is quite **flat**;
useful features for the distinction from *M. daubentonii*

d. **angle** between the ears = **± 90°**.



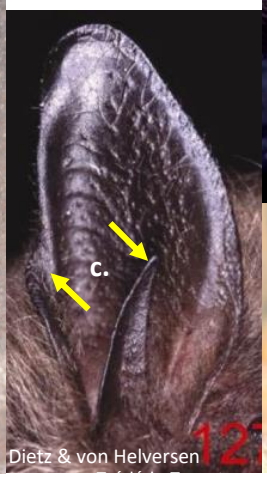
Fur

abdominal fur is **lighter** than the back, rather **beige** (not white).
Less «clean» than the other *Myotis* spp.

Other characteristics

e. in hibernation, the colour of the skin (ears, muzzle, wings) contrasts strongly with both back and abdominal fur, which gives a **tricolour** look;
as opposed to *M. daubentonii* which is 'bicolour'

f. unlike *M. daubentonii*, the **feet are small** (less than half the tibia), **with no long hairs** on the toes.
Uropatagium attached to the toe.

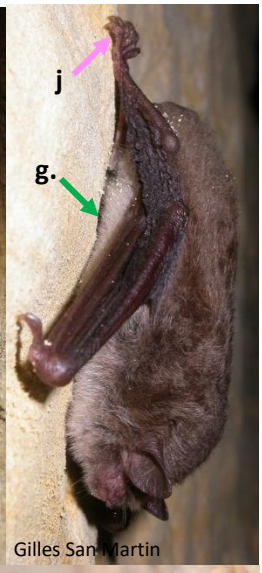


- body length: 35-51 mm, small
- hibernaculum: underground sites, buildings
- position in hibernaculum: often hangs on the wall, but also in cracks or, occasionally, hanging freely
- temperature: often in the colder zones (5°C and less)

Myotis daubentonii

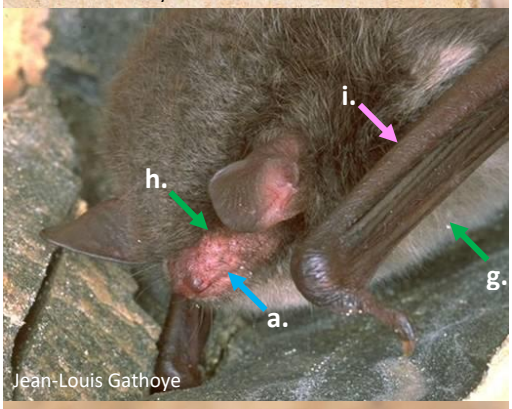
Daubenton's bat - **Md**

Ruddy Cors

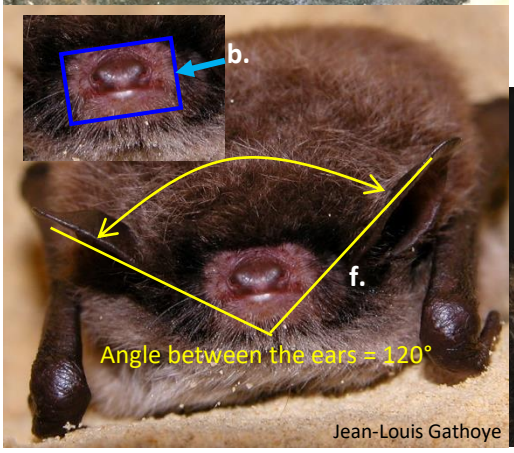


Gilles San Martin


Jean-Louis Gathoye



Jean-Louis Gathoye



Jean-Louis Gathoye

Forearm

forearms and **wrists** are **thicker** and **more robust** than in *M. mystacinus s.l.*

Nose

a. **pink snout**; much lighter than in *M. mystacinus s.l.*

b. on the more lightly coloured individuals, a well defined **pink rectangle** can be seen;

!!! Beware, this is not always clear, especially with juveniles that have a more greyish to dark snout !!!

c. much **shorter** and **stubbier** than *M. nattereri.*

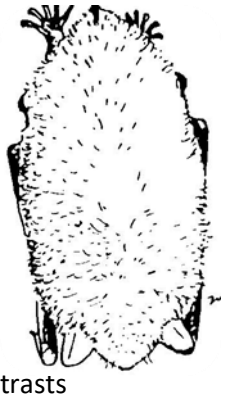

Punt et al.

Ears

d. **small** and not prominent, viewed dorsally: do not extend beyond the muzzle when folded forward;

e. **tragus** is rather **short** and **rounded**;
good characteristics for distinction with *M. mystacinus sl.*

f. **angle** between the ears = **± 120°**.



Fur

g. **pale abdominal fur**, rather **greyish** (not white);

h. area between the ear and muzzle is relatively hairless.

Other characteristics

i. in hibernation, the colour of the skin (ears, wings) contrasts only slightly with the brown-grey back, which provides a '**bicoloured'** appearance;
in contrast to the 'tricoloured' *M. mystacinus sl.*

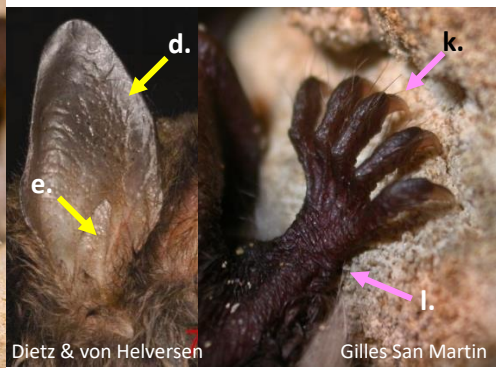
j. the **feet** are **typically large**, an excellent characteristic for distinguishing *Myotis mystacinus s.l.*;
!!! M. dasycneme also has big feet !!!

k. **large hairs** on the **toes**;

l. anchor of uropatagium at the ankle.
instead of at the toe like *M. mystacinus sl.*

PARENTAL ADVISORY EXPLICIT CONTENT

Along with *M. nattereri,* the only species likely to in its hibernaculum in the winter.



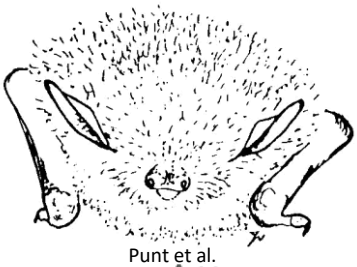
Dietz & von Helversen
Gilles San Martin

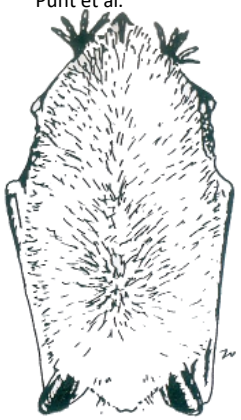

Luc Malchair

- body length: 40-60 mm, small/average
- hibernaculum: underground sites, crevices in bridges
- postition in hibernaculum: mostly hanging freely on the wall but also in in cracks, or more rarely, hanging free
- temperature: variable

Myotis dasycneme

Pond bat - **MD**


Punt et al.



Posture - appearance

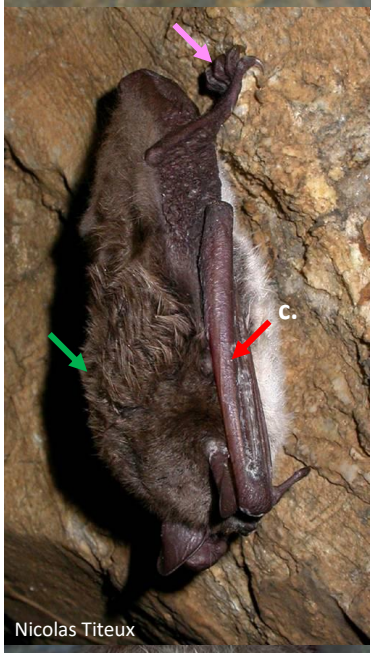
a. generally an **elongated and rectangular shape**;
b. *M. dasycneme* **ressembles *M. daubentonii***, but is **much larger**.

Forearm

c. **thick, robust and reddish brown**;
d. the elbows are often far away from the body.

Nose

the **snout** consists of **2** separate **lobes** and therefore gives the impression of 2 adjacent lumps.



Ears

e. relatively **small** and only project beyond the snout in top view;
f. **short** and **rounded tragus**.

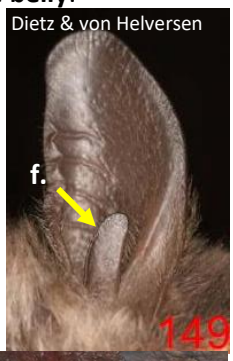
Fur

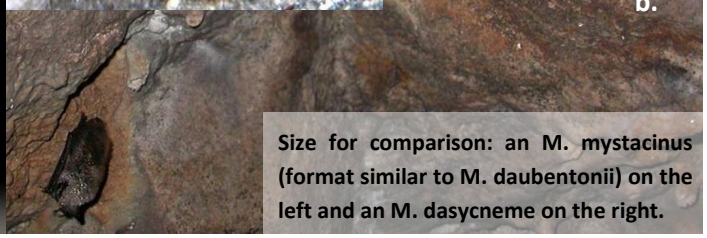
cocoa-coloured dorsal fur that **contrasts** strongly with the **white belly**.

Other characteristics

big feet are a distinctive feature: this allows them to grab insects on the water surface (trawling).

!!! *M. daubentonii* also has big feet !!!



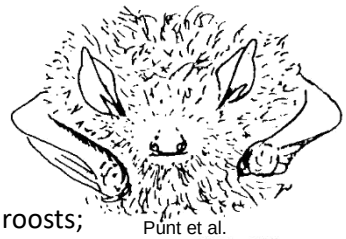


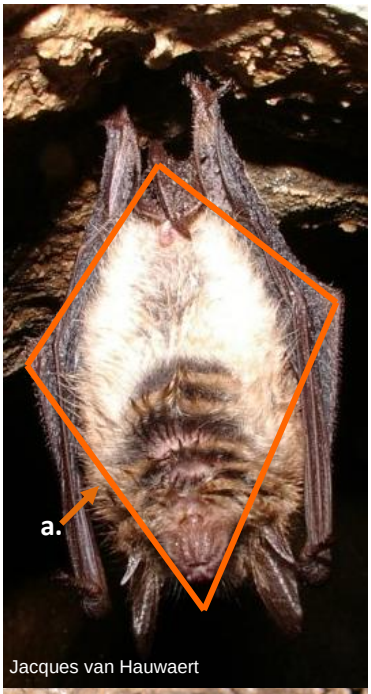
Size for comparison: an M. mystacinus (format similar to M. daubentonii) on the left and an M. dasycneme on the right.

- body length: 57-68 mm, big
- hibernaculum: underground sites, buildings
- position in hibernaculum: hanging freely, but also in cracks and holes
- temperature: variable

Myotis emarginatus

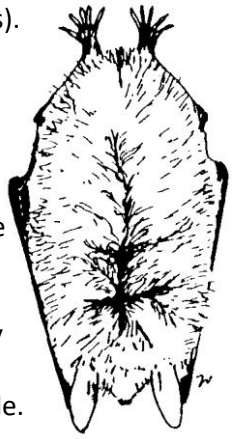
Geoffroy's bat - **ME**





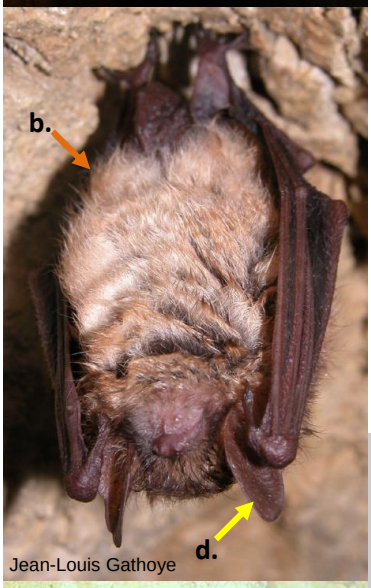
Posture - appearance

- **a.** **diamond shaped body** (the elbows are far apart), from the front, the wrists often cover the ears;
- **b.** most often hanging **freely** in the warmer zones of winter roosts;
- **c.** often form dense clusters (from two to several dozens of individuals).



Ears

- **d.** relatively **long**, **fine** and **pointed**, **aligned with the body** towards the ground;
- **e.** the «notch» in the ear is in fact an earlobe that also occurs in most other myotis species. With *M. emarginatus* however, it is noticeably higher, and if visible, a good ID feature;
- **f.** from the front the **ears** are more or less **parallel**, or at a limited angle.

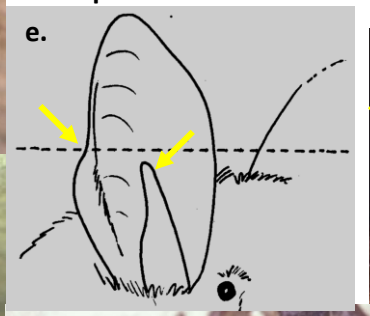


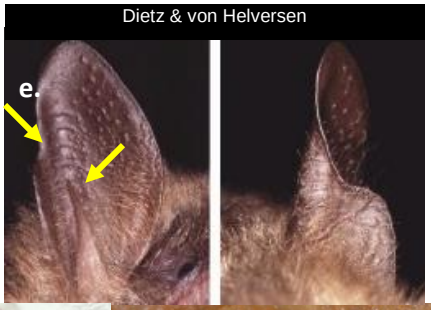
Fur

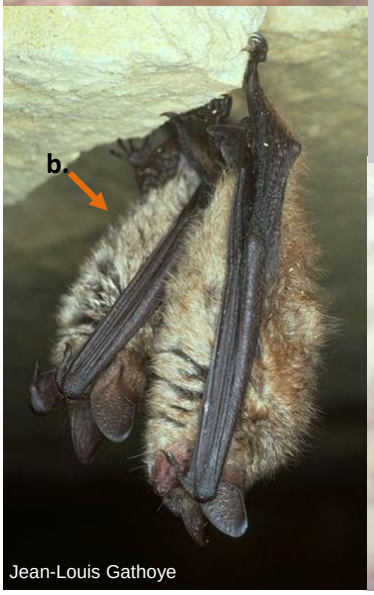
- **g.** **woolly** and **thick**. In individuals that have been hibernating for a while, the fur shows a characteristic «striped» appearance, like a **wet dog**;
- **h.** the **back** has a characteristic **reddish colour** and the abdominal fur, lightly contrasting with the back, has an equally characteristic light brown to beige colour;
- **i.** **5%** of the individuals **are melanistic** (fur and skin are uniformely dark).

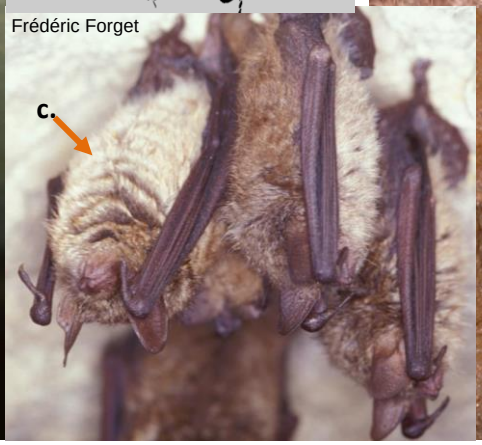
!!! not to be mistaken with other dark species such as Barbastelle !!!

The tragus does not extend past the notch







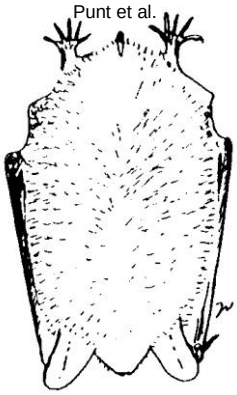


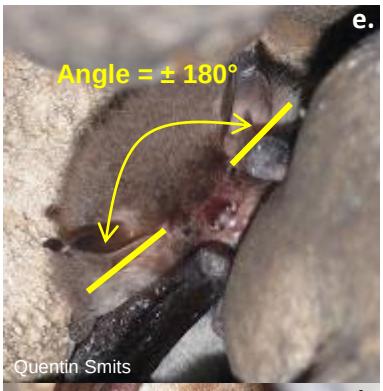
- body length: 41-53 mm, medium-sized
- hibernacula: underground sites
- position in hibernaculum: often free hanging, also often forms clusters
- temperature: reasonably heat-loving - up to 9°C

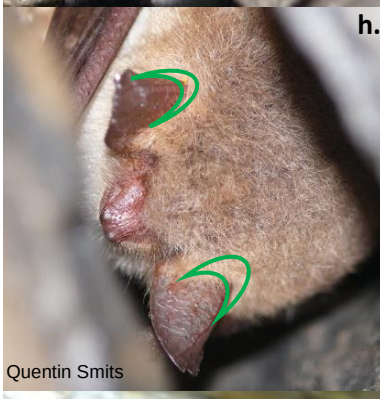
Myotis nattereri

Natterer's bat - **Mn**

Punt et al.







Posture - appearance

a. **chubby**, **oval-shaped** body;

b. *M. nattereri* often crawls deeply in cracks or cavities, or hangs with the belly against the wall.

Nose

pink snout, like *M. daubentonii*, but much finer and more elongated.

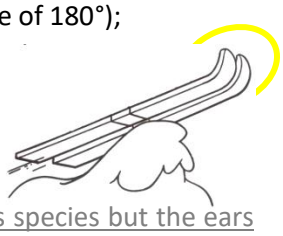
Ears

c. **rather long** (shorter than *M. bechsteinii*), unfolded, they would protrude beyond the snout
(unlike *M. daubentonii* and *M. mystacinus/brandtii),*
light in colour, **leathery** and **translucent** (veins are visible!);

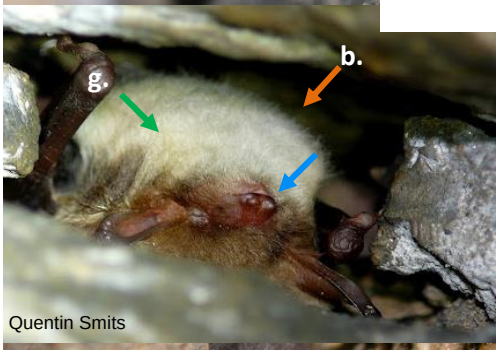
d. very long and fine tragus, extending beyond the half of the ear;
good feature for distinction with *M. bechsteinii* that has a shorter tragus

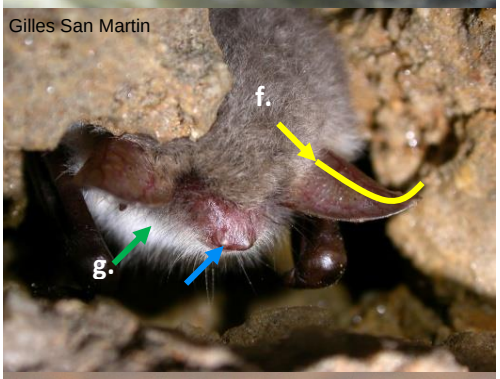
e. from the front, the ears appear to be aligned on a plane (angle of 180°);

f. **curl upwards** like the tips of a ski, with a rounded end.



NB. This feature can sometimes be found in other Myotis species but the ears do not have the same colour, angle, texture, shape, etc.



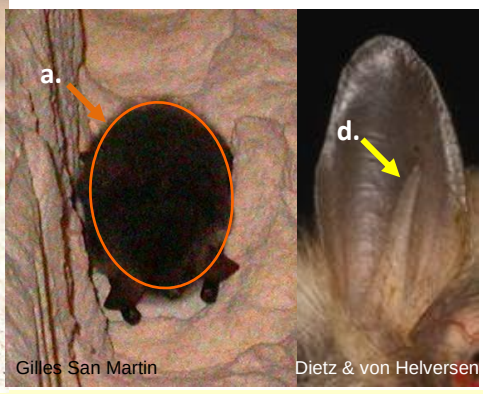


Fur

g. **pure white belly**, spotless (it's the « cleanest» *Myotis*), contrasting strongly with the **grey brown back**;

h. **light cream 'crescent moons'** clearly visible **behind** the **ears**.

Even from a distance and/or under poor conditions, the long and raised ears, accentuated by lighter hair, are good ID features. They appear to cover the wrists.



PARENTAL ADVISORY EXPLICIT CONTENT

Along with *M. daubentonii* they are the only species likely to mate during the winter.

- body length: 41-55 mm, medium-sized
- hibernaculum: underground sites
- position in hibernaculum: usually deep in cracks, sometimes hanging against the wall
- temperature: variable, often tolerates very cold conditions

plecotus natagora

Myotis bechsteinii

Bechstein's bat - **MB**

Jean-Louis Gathoye

Posture - appearance

this species generally hibernates very deeply in cracks and other crevices, making them less frequently observed.

Nose

pink, little hairy muzzle, similar to *M. myotis*.

Ear

a. distinctive: very **long** and **wide**, **U-shaped**, they protrude well beyond the muzzle and measure approximatly **1/3 of the body length**;

b. unlike *Plecotus* the ears are **not connected** to the base and are **never folded** behind the wings;

c. tragus smaller than half the earcup.

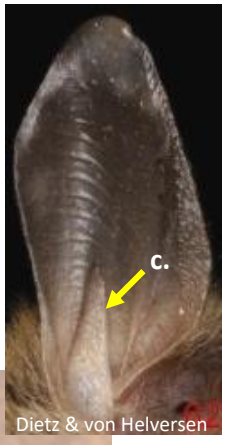
Good characteristic for distinction with *M. nattereri* (longer tragus)

Fur

the long **white-pale grey abdominal fur** contrasts well with the back; These long hairs sometimes stick together to form parallel stripes which makes the dark grey base of the fur visible.

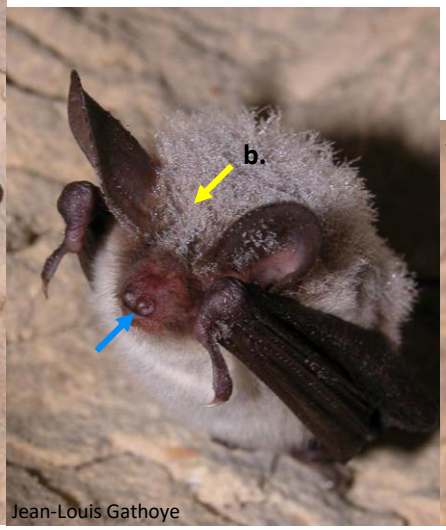
!!! not to be mistaken with *M. emarginatus* !!!

Jean-Louis Gathoye

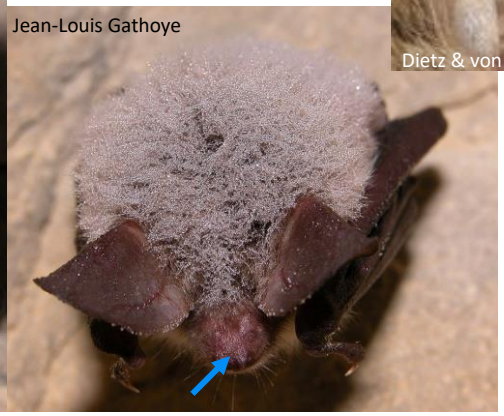


Dietz & von Helversen


Jean-Louis Gathoye



Jean-Louis Gathoye

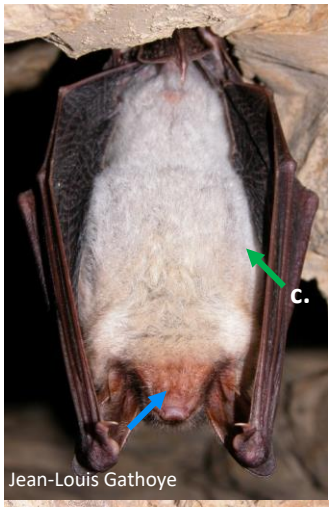

Jean-Louis Gathoye

- body length: 45-55 mm, medium-sized
- hibernaculum: trees, underground sites and buildings
- position in hibernaculum: is rarely found in winter habitats because it's often hidden in very deep cracks but also sometimes hanging freely against the wall
- temperature: variable

plecotus natagora

Myotis myotis

Greater Mouse-eared bat - **MM**

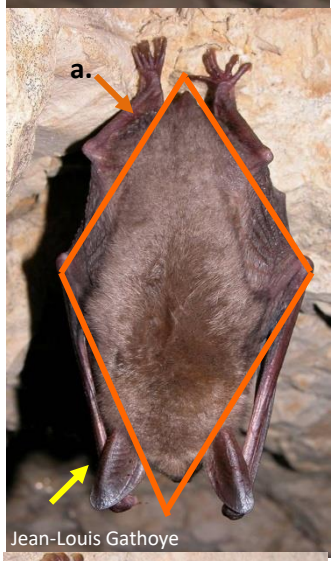


Jean-Louis Gathoye

Posture - appearance

a. the body generally gives a **bony** impression reminiscent of a **'sack of potatoes'** (due to the numerous bumps) and is rather **diamond-shaped**;

b. generally **free hanging**, often as high as the ceiling will but sometimes just hanging on the walls.



Jean-Louis Gathoye

Nose

protruding, relatively hairless **snout** (German shepherd-like).

Ears

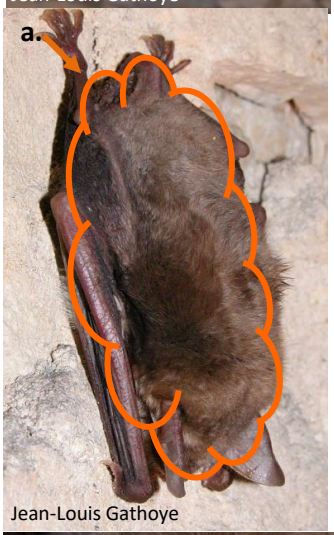
large, **shiny**, come beyond the snout but are only 1/4 to 1/5 of the bodylength.

Unlike *M. bechsteinii* that has seemingly larger ears. The ears of both species have the same length but *M. myotis* is much larger than *M. bechsteinii, making the ears of the latter appear relatively larger.*

Fur

c. very **white belly fur** contrasting strongly with the back;

d. **typical implantation** of the hair at the level of the forehead (reminiscent of incipient forehead baldness).



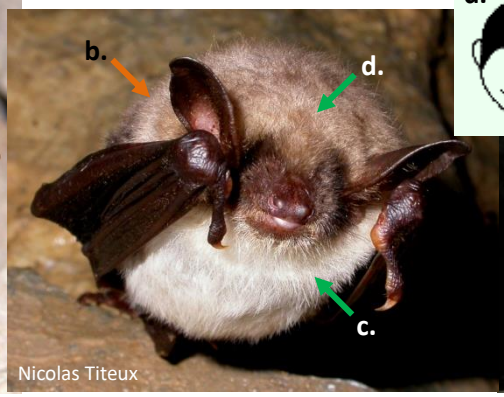
Jean-Louis Gathoye

Other characteristics

the «Goliath» among our bats: the very large size is an important feature.


Dietz & von Helversen


Jean-Louis Gathoye



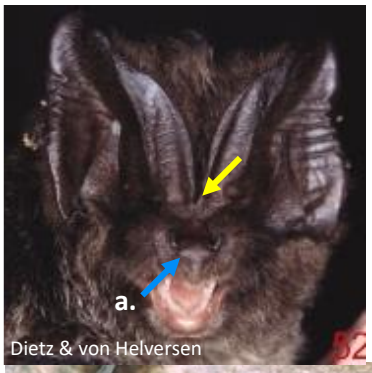
Nicolas Titeux


Thierry Petit

- body length: 67-80 mm, very big
- hibernaculum: underground sites
- position in hibernaculum: often free hanging, sometimes hanging on the wall
- temperature: heat-loving

Barbastella barbastellus

Barbastelle bat - **Bb**



Dietz & von Helversen

Posture - appearance

this species often looks for winter roosts reminiscent of the loose bark it uses in the summer: **cracks**, **loose rocks**, **hanging cloths** or **panels** along **walls**. Often free hanging, with the belly against the wall or forming dense clusters.


Jean-Louis Gathoye

Nose

a. **black** and very characteristic **face**;

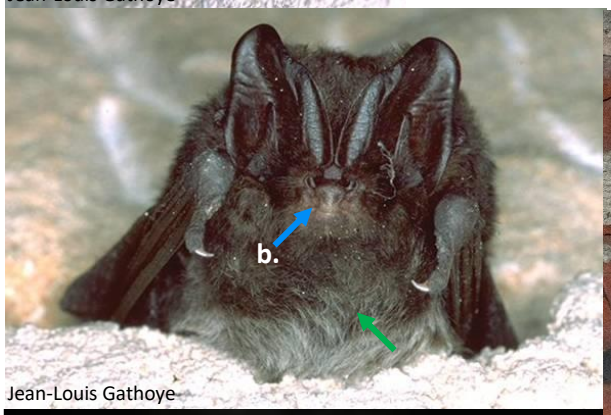
b. **flattened snout (‘pug’)**, nostrils are pointed upwards.

Ears

black, **wide** and **triangular**, touch each other at the base.

Fur

silky (‘like the fur of a mole’), **coal black dorsal fur**, often with greyish hairtips and **dark grey abdominal fur**.



Jean-Louis Gathoye


Jonathan Demaret


Ruddy Cors


Luc Malchair


Dietz & von Helversen

- body length: 45-58 mm, average
- hibernaculum: mainly trees, rarely underground sites
- location in hibernaculum: often hanging on walls or tucked inside cracks
- temperature: prefers low temperature (near entrances, ventilated areas)

Pipistrellus sp.

Pipistrelle - 3 species - **(Pp, Pn, PP)**


Quentin Smits

Posture - appearance

Pipistrelles are **rarely** found in **underground sites**. If so they are located in **cracks**, very often in **tight clusters**. Hibernation often seems to be shallower, the animals responding quickly to light.

Ears

small, **black** and often **rounded**, with a **round** and quite **short tragus**.

unlike *M. mystacinus*

Fur

generally **dark**, with **little contrast** between **abdominal** and **dorsal fur**.

Common and Soprano pipistrelles have a very characteristic red-brown (gingery-brown) fur; the Nathusius's pipstrelle has a browner fur.


Quentin Smits

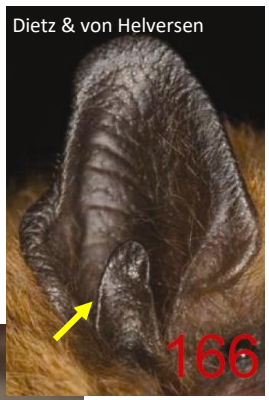
Other characteristics

very dark skin (wings, ears, muzzle, …), the pipistrelle's black mask is reminscent of *Myotis mystacinus s.l.* . Also the low contrast between abdominal and dorsal fur, the triangular shape of ears and rounded tragus are useful identification features.

Pipistrelles are very small: barely larger than a match box.


Cyril Schönbächler


M. Daniel




Tony Rock

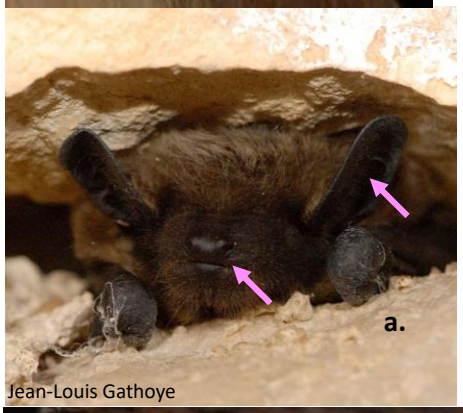

Gilles San Martin

- body length: 32-55 mm, small
- hibernaculum: mainly buildings, rarely in underground sites
- location in hibernaculum: very often in groups in narrow and deep cracks near the entrance
- temperature: tolerates low temperatures - often in very dry conditions

Eptesicus serotinus

Serotine bat - **Es**

Vincent Cohez



Jean-Louis Gathoye

Posture - appearance

in winter, serotines are rarely found in underground sites. They are often concealed in crevices in poorly insulated and ventilated areas.

Forearm

forearms and **wrists** are **very large** and **dark**, often **greyish** as if covered in **dust**.

Nose

rather **elongated** and **protruding snout**, similar to a fox snout. The «thick nose» is a striking feature.

Ears

wide and **rounded**, very **dark**, with a **wide**, **short** and **round tragus**.

Fur

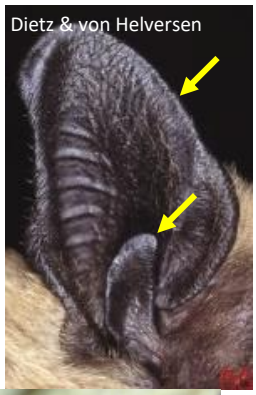
completely **dark coloured**: **brown dorsal fur**, slightly lighter **belly** with a **brown/creamy touch**, slightly contrasting with the back, more pronounced than in pipistrelles.

Other characteristics

a. completely **dark skin**, the **face** is very **dark** (and provides a typical 'black mask');

b. **large size**, making them easy to distinguish from pipistrelles.


Vincent Cohez


Dietz & von Helversen


Jean-François Julien


Vincent Cohez


Quentin Smits

- body length: 62-80mm (big !)
- occurence: common
- hibernaculum: mainly buildings, rarely in in underground sites
- location in hibernaculum: in deep cracks or crevasses near the entrances
- temperature: tolerates very low temperatures

plecotus natagora