

A Photographic Field Guide to the Bats of the West Indian Island of Dominica

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Dominica 2007

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ABSTRACT

No current field guide incorporates photographs and descriptions of all of the species of bats known to occur on the island of Dominica. The guide presented here is based on bats captured using mist nets and insect nets at various locations on the Archbold Tropical Research and Education Center and the Morne Trois Pitons National Park in Dominica. The field guide provides several pictures that show important identifying features of the five bat species that were captured.

INTRODUCTION

There are 12 species of bats found on Dominica. These are as follows: *Pteronotus davyi*, *Noctilio leporinus*, *Brachyphylla cavernarum*, *Monophyllus plethodon*, *Artibeus jamaicensis*, *Ardops nichollsi*, *Sturnira lilium*, *Natalus stramineus*, *Eptesicus fuscus*, *Myotis dominicensis*, *Tadarida brasiliensis*, and *Molossus molossus* (Genoways et al. 2001). Several field guides have been created for Antillean bats, but there is not a field guide with photographs specifically for the bats of Dominica. Gannon et al. (2005) provided an illustrated field guide entitled *Bats of Puerto Rico*, and it provided illustrations and descriptions of *N. leporinus*, *A. jamaicensis*, *B. cavernarum*, *E. fuscus*, *T. brasiliensis*, and *M. molossus*. However, there were not many photographs of the bats and the field guide was only concerned with Puerto Rico. Baker et al. (1984) provided an identification key with photographs of *N. leporinus*, *B. cavernarum*, *A. jamaicensis*, *A. nichollsi*, *S. lilium*, *M. dominicensis*, *T. brasiliensis*, and *M. molossus* in their publication *Occasional Papers: Field Guide to Antillean Bats*, but again, the focus of the publication was not on Dominica specifically. Genoways et al. (2001) did provide information about the bats of Dominica in their publication on the bats of Dominica, but they did not

include any pictures of the bats. There have been many individual and group projects about bats by the students participating in the Dominica Study Abroad course offered at Texas A&M University, but none of the projects attempted to make a photograph field guide of the bats of Dominica. Therefore, I wanted to create a field guide with detailed photographs of the bats of Dominica that can easily be used by anybody with an interest in bats.

METHODS

The bats were captured using mist nets and insect nets at varying locations on Dominica between May 25 – June 8, 2007. The bats were captured on May 25 and 30 at Checkhall River on the Archbold Tropical Research and Education Center (ATREC) by stretching a mist net over the river using two bamboo poles. They were captured on May 28 and June 4 at the Stream House at ATREC by using an insect net. Bats were captured on June 3 at Stinking Hole in the Morne Trois Pitons National Park by using a mist net held by students. A mist net was erected on June 4 and June 8 adjacent to the entrance gate to ATREC in front of a man-made cichlid pond. Finally, a net was set up on June 6 and June 8 at the ATREC porch.

The Checkhall River capture site is at a narrow and shallow portion of the river with one large fig tree nearby, several smaller trees, monocots, and large boulders on either side of the river. The Stream House is a small house just slightly downhill from the main ATREC facility and it has a corrugated metal roof that makes an ideal habitat for *M. molossus*. Stinking Hole is an old cave that is volcanic in origin with a vertical shaft and is located in the rainforest near Middleham Falls of Morne Trois Pitons National Park. The cichlid pond is located between the gate and lab of the main ATREC

facility and there is no vegetation around the pond except for that growing on the wall of the pond. The ATREC porch is devoid of water and vegetation, but bats can be observed flying past and feeding on the insects attracted to the porch lights.

Bats were extracted from the nets as soon as they were discovered in order to minimize stress to the animal. If a bat was too entangled in the net to be extracted by hand, the mist net was cut around the bat until it was free. All photographs were taken at the capture site in order to reduce the handling time of the bat and to release the bat in the place where it was captured. If a photograph was needed of an extracted bat but there were more bats in the net, the bat was gently placed in a sock or a reptile bag until the other bats were extracted from the net. All pictures were taken using a Canon PowerShot S3IS digital camera. Picture cropping and shading adjustments were made using Adobe Photoshop CS2 software.

RESULTS

I was only able to capture and photograph specimens of *A. jamaicensis*, *B. cavernarum*, *M. molossus*, *M. plethodon*, and *T. brasiliensis*. Below are the descriptions of the bats as well as figures illustrating those descriptions.

Artibeus jamaicensis- Jamaican fruit bat (Figures 1-4)

The Jamaican fruit bat is a large fruit eating bat with a wingspan of 40-45 cm (Fig. 1). The wings are broad and short (low aspect ratio) (Fig. 1) (Gannon et al. 2005). It has white eye-stripes above and below the eyes, but depending on the region, the stripes are distinct, faded, or non-existent (Pedersen 2005). This species has a very well developed nose-leaf on its snout (Figs. 2, 3) (Gannon et al. 2005). The Jamaican fruit bat

has a narrow uropatagium (or tail membrane) that stretches between the inner surfaces of its back legs (Pedersen 2005). The uropatagium is “U” shaped and the tail is not visible externally (Figs. 1, 4). The wing membranes and uropatagium are thick, tough, and black (Figs.1, 4).

Artibeus jamaicensis may be confused for *S. liliium* or *A. nichollsi* due to the fact that the three species are fairly large leaf-nosed bats. However, compared with *S. liliium*, *A. jamaicensis* has a noticeable uropatagium (Fig. 4) and *S. liliium* has very hairy legs. When one compares *A. jamaicensis* and *A. nichollsi*, one of the main differences is that the uropatagium on *A. nichollsi* is very furry (Pedersen 2005) as opposed to the naked uropatagium of *A. jamaicensis* (Fig. 4).



Figure 1. A picture of *A. jamaicensis* showing the general size of the bat and the bat’s overall appearance.



Figure 2. A close up photograph of *A. jamaicensis* showing the detail of the bat's face and nose-leaf (arrow).



Figure 3. A close up photograph of *A. jamaicensis* showing the detail of the bat's face as viewed from the side as well as the details of the bat's ear.



Figure 4. A close up photograph of *A. jamaicensis* showing the detail of the bat's "U" shaped uropatagium and lack of a noticeable tail.

Brachyphylla cavernarum- Lesser Antillean fruit bat (Figures 5-8)

The Lesser Antillean fruit bat is large with a wingspan of around 45 cm. The wings are broad (Fig. 5) (Pedersen 2005). It has a short snout with a small nose-leaf (Figs. 6, 7). The nose is small, circular, and pig-like in appearance (Fig. 6) (Pedersen 2005). It has relatively small eyes for a leaf-nosed bat (Figs. 6, 7) (Pedersen 2005). The tail is only a few millimeters long and completely enclosed in the uropatagium (Fig. 5, 8). The uropatagium is similar to that of the Jamaican Fruit Bat's (Fig. 4) (Gannon et al. 2005).

Brachyphylla cavernarum is fairly easy to identify relative to the other leaf-nosed bats (*A. jamaicensis*, *A. nichollsi*, *M. plethodon*, and *S. liliium*) on Dominica. While *B. cavernarum* does have a very reduced uropatagium (Fig. 8) like the other leaf-nosed bats, it is the only leaf-nosed bat on the island with such a reduced nose-leaf (Figs. 6, 7).



Figure 5. A picture of *B. cavernarum* showing the bat's overall size as compared to the hands of an adult man.



Figure 6. A close up photograph of *B. cavernarum* showing the details of the bat's face and nose-leaf.



Figure 7. A close up photograph of *B. cavernarum* showing the detail of the bat's face as viewed from the side as well as the details of the bat's ear. This picture also shows the thumb (arrow) of one of the bat's wings behind the nose. This is not to be confused with its nose leaf.



Figure 8. A close up photograph of *B. cavernarum* showing the detail of the bat's "U" shaped uropatagium and lack of a noticeable tail.

Molossus molossus- velvety free-tailed bat (Figures 9-12)

The velvety free-tailed bat is moderately small with a wingspan of just under 30 cm. It has long, thin pointed wings (high aspect ratio) (Fig. 9) (Pedersen 2005). It has round ears that join on the forehead, making it appear to have a bonnet (Figs. 10, 11). The bat has a smooth upper lip (Fig. 11) (Pedersen 2005). The antitragus (located in the ear) is well developed and looks nearly circular (Fig. 11). It has a short, blunt snout and somewhat tubular nostrils (Gannon et al. 2005) (Fig. 11). The tail extends about half its length beyond the uroptagium (Fig. 12) (Pedersen 2005).

Molossus molossus can be easily distinguished from all of the other bats except for *T. brasiliensis* because its tail extends well past the uroptagium (e.g. more so than *M. plethodon*) (Fig 12). *Molossus molossus* can still be easily distinguished from *T. brasiliensis* because it has smooth upper lips (Figs 10, 11) as opposed to the deeply ridged upper lips of *T. brasiliensis* (Figs. 18, 19).



Figure 9. A close up picture of *M. molossus* showing the bat's overall appearance.



Figure 10. A close up photograph of *M. molossus* showing the detail of the bat's face and body.



Figure 11. A close up photograph of *M. molossus* showing the detail of the bat's face as viewed from the side as well as the details of the bat's ear.



Figure 12. A close up photograph of *M. molossus* showing the detail of the bat's uropatagium and the extension of the tail (arrow) beyond the membrane.

Monophyllus plethodon- long-tongued bat (Figures 13-16)

The long-tongued bat has a wingspan of around 30cm (Fig. 13) (Pedersen 2005). The long-tongued bat is a small bat with a small, heart-shaped nose-leaf (Fig. 14). It has a long snout (Fig. 15) and a tongue that is equipped with small bristles which help it collect nectar from the corolla of the flowers it feeds from (Pedersen 2005). Its short, stump-like tail extends beyond its narrow uropatagium (Figs. 14, 16) (Pedersen 2005).

Monophyllus plethodon can be easily distinguished from the other species of leaf-nosed bats (*A. jamaicensis*, *A. nichollsi*, *B. cavernarum*, and *S. lilium*) because of its small size, its long snout (Fig. 15), and the fact that its short tail extends beyond its uropatagium (Figs. 14, 16).



Figure 13. A photograph of *M. plethodon* showing the overall appearance and size of the bat.



Figure 14. A photograph showing the detail of *M. plethodon* as viewed from the front as well as the overall appearance of the bat.



Figure 15. A close up photograph of *M. plethodon* showing the details of the face as viewed from the side.



Figure 16. A close up photograph of *M. plethodon* showing the detail of the bat's uropatagium and its tail.

Tadarida brasiliensis- Brazilian free-tailed bat (Figures 17-20)

Brazilian free-tailed bats have long wings with tapered tips (Pedersen 2005) (Fig. 17). The proximal edge of the wings is broad (Gannon et al. 2005). It has large ears that make it look like it is wearing a hat (Figs. 18, 19) (Pedersen 2005). The bat has deep vertical ridges along its upper lips (Figs. 18, 19) (Pedersen 2005). The antitragus of the Brazilian Free-tailed Bat is half-moon shaped (Figs. 18, 19) (Gannon et al. 2005). Its mouse-like tail extends past the uropatagium at around half of its length (Fig. 20) (Pedersen 2005).

Tadarida brasiliensis can be easily distinguished from all of the other bats except for *M. molossus* because its tail extends well beyond the uropatagium (e.g. more so than *M. plethodon*) (Fig 20). *Tadarida brasiliensis* can still be easily distinguished from *M. molossus* because it has deeply ridged upper lips (Figs. 18, 19) as opposed to the smooth upper lips of *M. molossus* (Figs. 10, 11).



Figure 17. A picture of *T. brasiliensis* showing the overall appearance and size of the bat.



Figure 18. A close up photograph of *T. brasiliensis* showing the detail of the bat's face (including the ridges on the upper lip) and ear.



Figure 19. A close up picture of *T. brasiliensis* showing the detail of the bat's face and body as viewed from the side.



Figure 20. A close up photograph of *T. brasiliensis* showing the detail of the bat's uropatagium and tail.

DISCUSSION

Five species of bats were collected over a three week period. Bats were caught each night that netting was attempted except for the nights that mist nets were set up on the porch and one of the nights that a net was set up in front of the cichlid pond. I was unable to capture bats on the ATREC porch possibly because the porch lights were illuminating the mist net. Bats could be seen flying by occasionally, but they were able to detect the net and avoid it.

I was satisfied with the pictures of *A. jamaicensis*, *M. molossus*, and *T. brasiliensis* because I either had enough moonlight or access to electric lights, allowing me to get enough detail in my photographs. However, the photographs of *B. cavernarum* and *M. plethodon* were not as defined and sharp because of the pitch black of the rainforest at night and the fact that I only had one night to photograph the bats at Stinking Hole. As far as the final picture quality goes, I only learned how to use Photoshop

software after I arrived to Dominica, therefore the colors and clarity of the pictures were not at the level I had wanted. However, I feel that the pictures still illustrate the characteristics of the sizes, facial features, and uropatagia of the bats.

Due to the limited time I had to work on this project, I was unable to photograph all of the bats. However, I have included short descriptions of the other species as well as references to pictures of the bats:

The tree bat (*Ardops nichollsi*) has a spike-like nose-leaf as well as a spot of white fur on each of its shoulders (Pedersen 2005). It can be distinguished from the other leaf-nosed bats of Dominica (*A. jamaicensis*, *B. cavernarum*, *M. plethodon*, and *S. lilium*) due to the presence of the white shoulder spots and because it has a furry uropatagium.

(Pedersen 2005). Pictures of this bat can be found at

<http://biomicro.sdstate.edu/pederses/guideanic.html> .

The big brown bat (*Eptesicus fuscus*) does not have a nose-leaf and is a medium sized bat. It has short ears with a blunt tragus. Its tail is long and enclosed in its uropatagium (Spurgeon 1997). It can be distinguished from the free-tailed bats (e.g. *M. molossus* and *T. brasiliensis*) because its tail doesn't extend beyond its uropatagium. Pictures of the bat can be found at

<http://museum.utep.edu/chih/theland/animals/mammals/eptesicusfuscus.htm> .

Adequate descriptions could not be found for the Dominican myotis (*Myotis dominicensis*).

However, the reader is referred to *Field Guide to Antillean Bats* (Baker et al. 1984) for an

identification key and a picture of this bat. The funnel-eared bat (*Natalus stramineus*) is an incredibly small bat that has a flight pattern that looks similar to that of a large moth

(Pedersen 2005). This bat can be distinguished from the other bats of Dominica by its small size and large, pointy, funnel-shaped ears. Pictures of the bat can be found at:

<http://biomicro.sdstate.edu/pederses/guidenstr.html> . The bulldog bat (*Noctilio leporinus*) is a large bat with long, pointy ears. It has extremely long feet and a face that somewhat resembles a bulldog's (Pedersen 2005). These characteristics easily distinguish this bat from any other bat found on Dominica. Pictures of the bat can be found at:

<http://biomicro.sdstate.edu/pederses/guidenlep.html> . Davy's naked-backed bat (*Pteronotus davyi*) is easily distinguishable from all of the other Dominican bats because its wing membranes meet above its back, giving it the impression that its back is naked. Pictures of this bat can be found at:

<http://piclib.nhm.ac.uk/piclib/www/image.php?search=naked&getprev=65581> . The little yellow-shouldered bat (*Sturnira lilium*) is a small leaf-nosed bat with yellow fur on the shoulders. Its tail is completely absent and the highly reduced uropatagium is fringed with long hairs (Myers 1999). The little yellow-shouldered bat is distinguished from *A. nichollsi*, the only other leaf-nosed bat on Dominica with a furry uropatagium, due to the fact that *S. lilium* lacks white shoulder spots. Pictures of the bat can be found at:

http://bio-ditr1.sunsite.ualberta.ca/detail/?P_MNO=2118 .

ACKNOWLEDGEMENTS

Special thanks are given to Kristen Alexander, Angie Peredo, Jessica Leigh Moore, and Dr. Robert Wharton for their help setting up the nets, extracting bats, and holding them still for the pictures. I would also like to thank Stephen Ross, Kyle Wallace, Jarrod Comte, Morgan Kohut, Patricia Mullins, and Lauren Ward for helping set up the nets and recording data. I would like to thank Dr. James Woolley for providing useful tips in Photoshop, because I doubt I'd have figured it out on my own. Finally,

extra thanks are due to Dr. Robert Wharton for being a good sport about being bitten multiple times while I was trying to adjust my camera settings.

WORKS CITED

- BAKER, R.J., J. A. GROEN, AND R.D. OWEN. 30 November 1984. *Occasional Papers: Field Key to Antillean Bats*". The Museum Texas Tech University. Lubbock, TX. Number 94.
- GANNON, M.R., A. KURTA, A. RODRÍGUEZ-PURÁN, AND M.R. WILLIG. 2005. *Bats of Puerto Rico*. Texas Tech University Press. Lubbock, TX.
- GENOWAYS, H.H., R. M. TIMM, R.J. BAKER, C.J. PHILLIPS, AND D.A. SCHLITTER. 7 February 2001. *Bats of the West Indian Island of Dominica: Natural History, Areography, and Trophic Structure*. Museum of Texas Tech University. Lubbock, TX. Number 4.
- MYERS, P. 1999. "Sturnira lilium". *Animal Diversity Web*.
http://animaldiversity.ummz.umich.edu/site/accounts/information/Sturnira_lilium.html. Accessed 10 June 2007.
- PEDERSEN, S. *Bathead*. "Short Guide to the Bats of the Northern Lesser Antilles".
<http://biomicro.sdstate.edu/pederses/guide.html>. Accessed 22 March 2005.
- Pteronotus davyi fulvus*. Natural History Museum.
<http://piclib.nhm.ac.uk/piclib/www/image.php?search=naked&getprev=65581>.
Accessed 10 June 2007.
- SPURGEON, T. October 1997. *Big Brown Bat*.
<http://museum.utep.edu/chih/theland/animals/mammals/eptesicusfuscus.htm> .
Updated 14 May 2006. Accessed 10 June 2007.

VONHOF, M. 19 March 2001. *Little Yellow-shouldered Fruit Bat* (Sturnira Lilium)

Feeding on Fig. http://bio-ditrl.sunsite.ualberta.ca/detail/?P_MNO=2118.

Updated 25 September 2001. Accessed 10 June 2007.