Roosting Site Preferences of *Artibeus jamaicensis, Natalus stramineus, Monophyllus plethodon, Molossus molossus,* and *Tadarida brasiliensis* in Dominica

Nicole Wade and Chris Bradshaw
Dominica 2000

Abstract: Roosting sites for several bat species present in Dominica were studied over a three-week period. Humidity, temperature, crack size (the cracks in which the bats actually hung in the roosting sites), head-body length, and internal dimensions of the roosts were collected. A correlation with head-body length and crack size was found. Bats of a similar size were found to inhabit similar dimensioned cracks. Bats were also found to inhabit roosts where the internal temperature was lower and the internal relative humidity was higher than the external. Roosts were also found in typical locations, as earlier described in previous literature, with some exceptions (*Natalus*, *Molossus*, and *Monophyllus*).

Introduction: This experiment was conducted over a three-week period in Dominica, an island in the lower Antilles. Dominica is home to several species of bats; the species studied in this report include *Artibeus jamaicensis, Natalus stramineus, Monophyllus plethodon, Molossus molossus,* and *Tadarida brasiliensis*. Relationships were looked for in roosting preferences based on size of bat versus size of roost, humidity, and/or temperature. *Tadarida* and *Molossus* tend to roost in buildings; *Artibeus* and *Natalus* are typically found in sea caves and trees; and *Monophyllus* are typically found in trees (Evans and James, 1997).

Materials:

- 15 meter measuring tape
- Sling Psychrometer
- Electronic Temperature probe
- Aluminum telescoping rods
- Bug Net (hand held)
- 12 inch ruler
- Duct tape

Methods: Data were collected as follows:

Using previous knowledge from past research groups and Dr. Lacher we identified roosting sites. The roosting sites were then measured with the measuring tape to get rough dimensions. Using the aluminum rods, duct tape, and the

ruler a device was fashioned to measure the cracks in which the bats actually hung in the roosting sites, "crack size." At this time the relative humidity and temperatures were taken as well. Another group also measured average bat size and these data were used for comparisons. On another visit to the Tou Santi site Dr. Lacher netted 16 bats with a bug net. The bats were netted for identification purposes only. These data were then reviewed and relationships analyzed.

Results:

Site 1 - Cabrits: *Tadarida* roost

Average Temperature inside: 28.5°C
Average Temperature outside: 29.9°C
Average Humidity inside: 81.5%
Average Humidity outside: 72%
Length of Building: 7.02 m
Width of Building: 4.06 m
Height of Building: 2.9 m
Average Crack size: 21.6 cm x 2.4 cm
Head-Body Length: 5.59 cm
Approximate number in colony: 50-100

Site 2 - Cabrits: *Artibeus* roost

Average Temperature inside: 27.0° C
Average Temperature outside: 29.9°C
Average Humidity inside: 75%
Average Humidity outside: 72%
Length of Building: 6.55 m
Width of Building: 4.10 m
Height of Building: 3.2 m
Hole in ceiling size: 12.5 cm x 15 cm x 45 cm
Average Head-body size: 9.8 cm
Approximate number in colony: 1-5

Site 3 - Streamhouse: *Molossus* roost

Average Temperature inside: 28.3°C
Average Temperature outside: 27.7°C
Average Humidity inside: 67%
Average Humidity outside: 68%
Length of Building: 2.5 m
Width of Building: 1.5 m
Height of Building: 2.31 m
Roof wavelength x amplitude: 8 cm x 2.4 cm
Average Head-body size: 5.74 cm
Approximate number in colony: 2-7

Site 4 - Tou Santi: *Natalus* and *Monophyllus* roost
Approximate Temperature inside: 30.0C -35.0C
Average Temperature outside: 23.6C
Approximate Humidity inside: 100%
Average Humidity outside: ---
Length of Opening: 8.0 m
Width of Opening: 5.4 m
Depth of Opening at ledge: 9.5 m
Actual Depth: unknown
Average Head-body size: ---
Approximate number in colony: 10,000

Discussion: The data indicate that the bats all tend to favor roosting sites with a lower internal temperature than external temperature. This is likely due to the shading effect of the roosting sites. Bats are not normally found in bright sunny areas and tend to inhabit darker shelters. The lack of sunlight is a factor in the lower roosting site temperatures. Crack size on the *Molossus* and the *Tadarida* had the same approximate width, these bats have similar body sizes (5.74 and 5.59 respectively). The larger *Artibeus* (head-body size of 9.8 cm) had larger cracks that it roosted in (12.5 cm x 15 cm x 45 cm). The bats roosted in cracks that provided them the most shelter possible, had as many sides covered as possible, and more surface area to cling to. It is a logical assumption that a larger bat would need a larger crack to roost in, and this is supported by the similarity in crack width in the *Molossus* and *Tadarida* colonies. The match in average size of the cracks coupled with the relative similarity in head-body size taken together support the notion that crack size is determined by body size. We also found a higher internal relative humidity in all but one of the roosts where data were collected. An exception to this was the *Molossus* roost, but that roost is a short term nursing colony and not a permanent roost. This could explain the anomaly. A possible reason for the elevated internal relative humidity is the moisture that comes from the exhalation of the bats and the fact that the spaces are enclosed thereby making moisture evaporation difficult. *Molossus* were found in a building with a corrugated roof, above the upper story, Southeast shower in the stream house at the Springfield Station, as indicated in Evans and James (1997). The *Tadarida* were also found in the expected roost environment, abandoned buildings, at Fort Shirley. *Artibeus* were not found in sea caves as is normally expected. *Artibeus* were

found in a large hole, 12.5 cm x 15 cm x 45 cm, at Fort Shirley, which is by the sea. The *Natalus* were found in a large roost in a cavern, more specifically a "lava tube", not in a sea cave. It is not know why the *Natalus* are in the large cavern instead of a sea cave, possibly because of the large food supply in the area (insects). The *Monophyllus* were found in the same large cavern as the *Natalus*, not in trees like expected. The *Monophyllus* are also probably located in the cavern for the same reason as the *Natalus*, food (nectar).

Possible errors occurred in the research when we took measurements; this could be corrected by being more diligent in making sure the measuring is accurate and using a ladder to measure high surfaces instead of an expandable measuring lift. Another cause for error might occur when the temperature and relative humidity readings were taken at different times of the day at different locations. This could be corrected easily by making sure that readings are taken at the same times of day. Errors may also occur because some of the roosts contained small colonies. The individuals in these small roosts may not be typical of larger populations found elsewhere. These errors would be corrected by sampling at sites where the colony sizes are larger. Possible uses for this research are to focus on one species and their specific roosting behavior, possibly by exploring the roosts at Massacre (by the Soca Rum factory) and Canefield (by the filling station). There is also research that could be done to determine when the bats roost in certain areas, such as the *Molossus* roost, possibly incorporating banding of the bats to better track their movements. In conclusion, the bats seemed to prefer a more humid and cooler environment to roost in. We believe that this results from the fact that all of the roosts were dark shelters and had respirating creatures in them. Site preference was typical as indicated in previous studies. This research can easily be the platform for more in depth study as indicated previously.

Works Cited:

Evans, P.G.H. and A. James. 1997. Dominica Nature Island Wildlife Checklists. Roseau: Ministry of Tourism. Vol. 2, pp. 44-47.